forgings such as gear elements, cultivators' tooth, flanges, and cam shafts, and hand tools including spanners and drivers.

Most joint ventures own both die forging and free forging equipment.

(2) Current state of development and major issues

In general, forging industry emerged later than other metalworking subsectors. Indonesia is no exception as the industry lags behind other subsectors in terms of the number of establishments and production capacity. Many companies in operation are recent startups. There are many foreign companies planning to invest in the country expecting a rapid growth in the near future.

The foundry industry mostly uses steel materials imported from Japan and Australia, and some locally produced materials. Steel materials for dies are all imported from Japan.

3.3.5.4 Die-making subsector

(1) Industry size and structure

There is no company specializing in die making. Most shops are operated as part of joint ventures specializing in foundry, metal press or forging operation. In addition, medium-sized enterprises produce small dies together with other products.

(2) Current state of development and major issues

Large foundries mostly manufacture their moulds by themselves. Small foundries also make their own moulds, but simply using samples furnished by customers.

Castings for dies are made by large foundries, and processed by press shops. Stamping dies are also made by large press shops which are capable of making dies of fairly large size. Those requiring a high level of precision or of complex shapes are imported from parent companies in Japan and elsewhere.

Forging dies are manufactured by die shops of forging manufacturers.

At present, most die shops are operated as captives of metalworking companies. The specialized die manufacturers is expected to emerge in the future as demand grows.

3.3.6 Ceramic building materials subsector

3.3.6.1 Industry size and structure

Ceramic building materials covered by the present study are floor/wall tiles and roof tiles (collectively referred to as "ceramic tiles").

Ceramic tile demand consists of 62% from housing, 18% office buildings, and 12%

hotels and apartments. Ceramic tile consumption grew at a rate of 61.1% annually between 1988 and 1992, far exceeding 10% for the construction industry during the same period. This is a result of increased use of ceramic tiles for houses as standards of living rise. However, consumption per capita is far below that in neighboring countries including Thailand and Malaysia, but major growth is expected in the future.

Domestic production and consumption of ceramic tiles were balanced in 1993, until supply became tight after that. Even if new or added capacities (as of December 1994) are constructed immediately, supply capacity will not meet forecasted demand in 1995.

The wall/floor tile industry is more or less capital-intensive in nature, and is dominated by large enterprises. Of total annual production capacity of 150 million square meters, 40 leading companies account for 97%. Cement tiles and terrazzo tiles are competing with ceramic tiles in the market with the former being sold at lower prices. Since they build up dirt with a long period of use, ceramic tiles are increasing by used but priced at 3 to 5 times higher. As a result, many of small, family-operated cement tile factories have gone out of business, as ceramic tile factories having modern equipment are entering the market.

Roof tiles are classified into the double-baked glazed type and single baked unglazed type. The glazed type is used for high-grade housing and partly exported. Most houses use the unglazed type. Competing products are the metal type roof tiles and colored cement roof tiles. The former is losing market share due to poor durability. The latter is widely accepted by consumers because of high-grade appearance not to mention its low price. The demand grows as it is used for RS houses built by the public housing corporation. However, it has been found to cause leak during heavy rain, thus anticipating a slow down in demand in the future. While the unglazed type continues to be dominating in the market for some time, it is reasonable to expect that demand shift to the glazed type will occur with the rise in household income.

Production of glazed tiles is done by large companies using automated lines imported from Japan. The unglazed type is manufactured by companies of varying size using the conventional shuttle furnace.

There are 11 sanitary ware makers and all but one are classified as large enterprises. Two have equity partnership or technical cooperation with foreign companies. The rest of companies mostly use technologies introduced from Japanese or Italian companies. Foreign-affiliated companies export 30% – 50% of their products.

Bricks are made by small-and-medium-sized enterprises as well as micro enterprises operating throughout the country.

3.3.6.2 Current state of development and major issues

Principal materials for ceramic products are available in many countries. The Indonesian industry's major strength lies in its large domestic market, and low energy cost that account for major portions (30% of total).

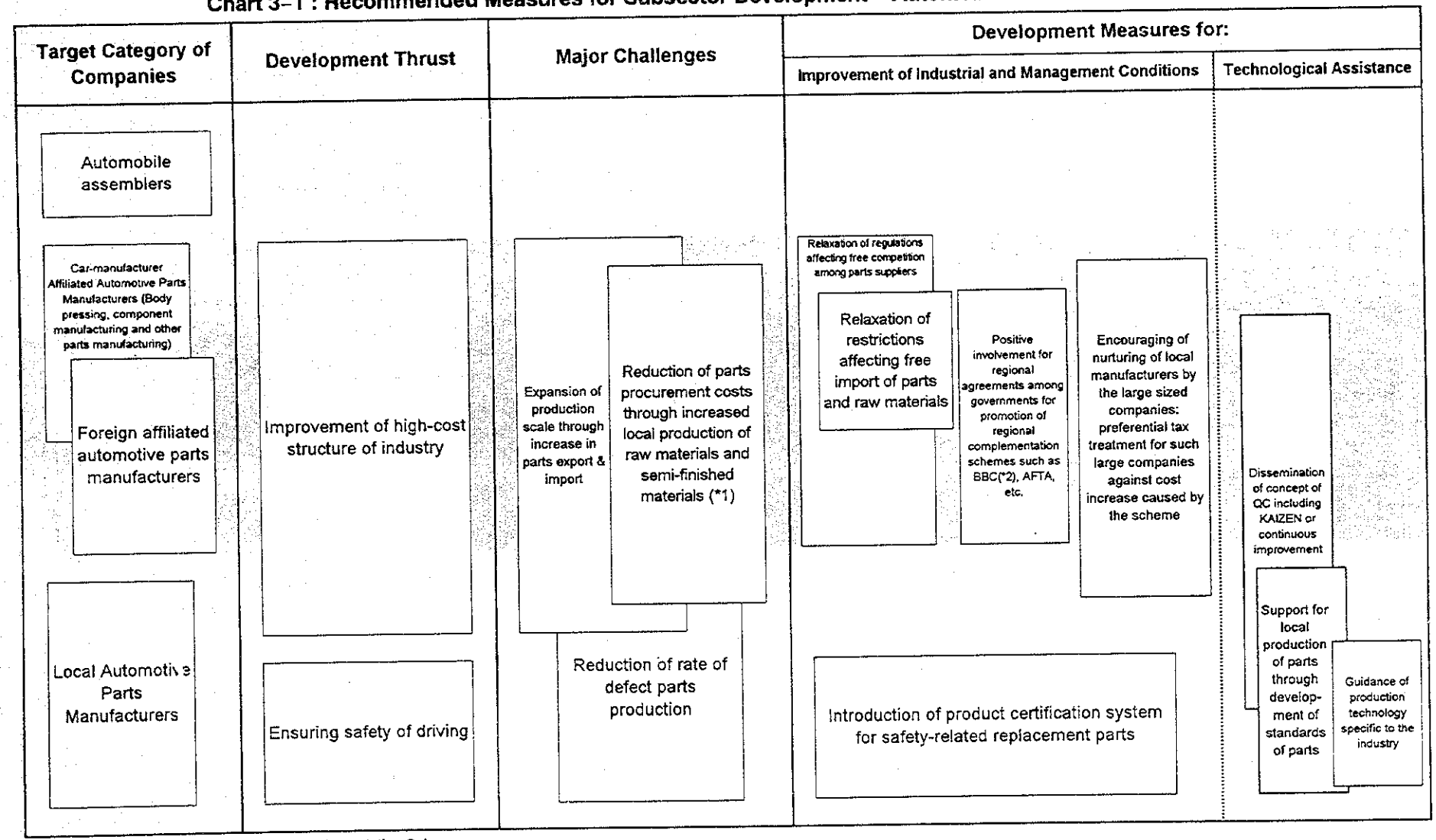
The ceramic construction material industry in Indonesia has been less exposed to problems related to price competitiveness, technology and quality, as they mainly serve the domestic market with the domestic demand continuously outgrowing supply capacity.

At the same time, there is a significant gap between 1) wall/floor tiles and glazed roof tiles produced by large manufacturers using automated lines, and 2) unglazed roof tiles and bricks produced by small enterprises using traditional production techniques. The former originates from foreign technology that has been transferred in the form of equipment purchase which is accompanied by technical assistance from foreign companies during the startup stage. Products are partly exported, however, export efforts have been hindered by supply shortage in the domestic market that have prompted manufacturers to shift supply to the more profitable domestic market. On the other hand, the latter is based on traditional local technology and is labor-intensive by nature. Thus, it offers some advantages for Indonesia where low-cost labor is available in abundance. The products are not suitable for long distance transportation because of heavy weight in relation to its low price, and because their manufacturers tend to be located near the market. Thus, they are not likely to compete with imported products of similar type. On the other hand, the rise in household income causes ceramic tile demand to shift upward i.e, to high-grade products. The unglazed roof tile industry will also deteriorate in the long run. If this occurs, small enterprises will simply have to go out of business, as large companies diversify their product line to high-grade products.

The development of Sanitary ware industry may be characterized as similar to glazed roof tiles, except for the fact that they are already exporting, mainly through foreign-affiliated companies.

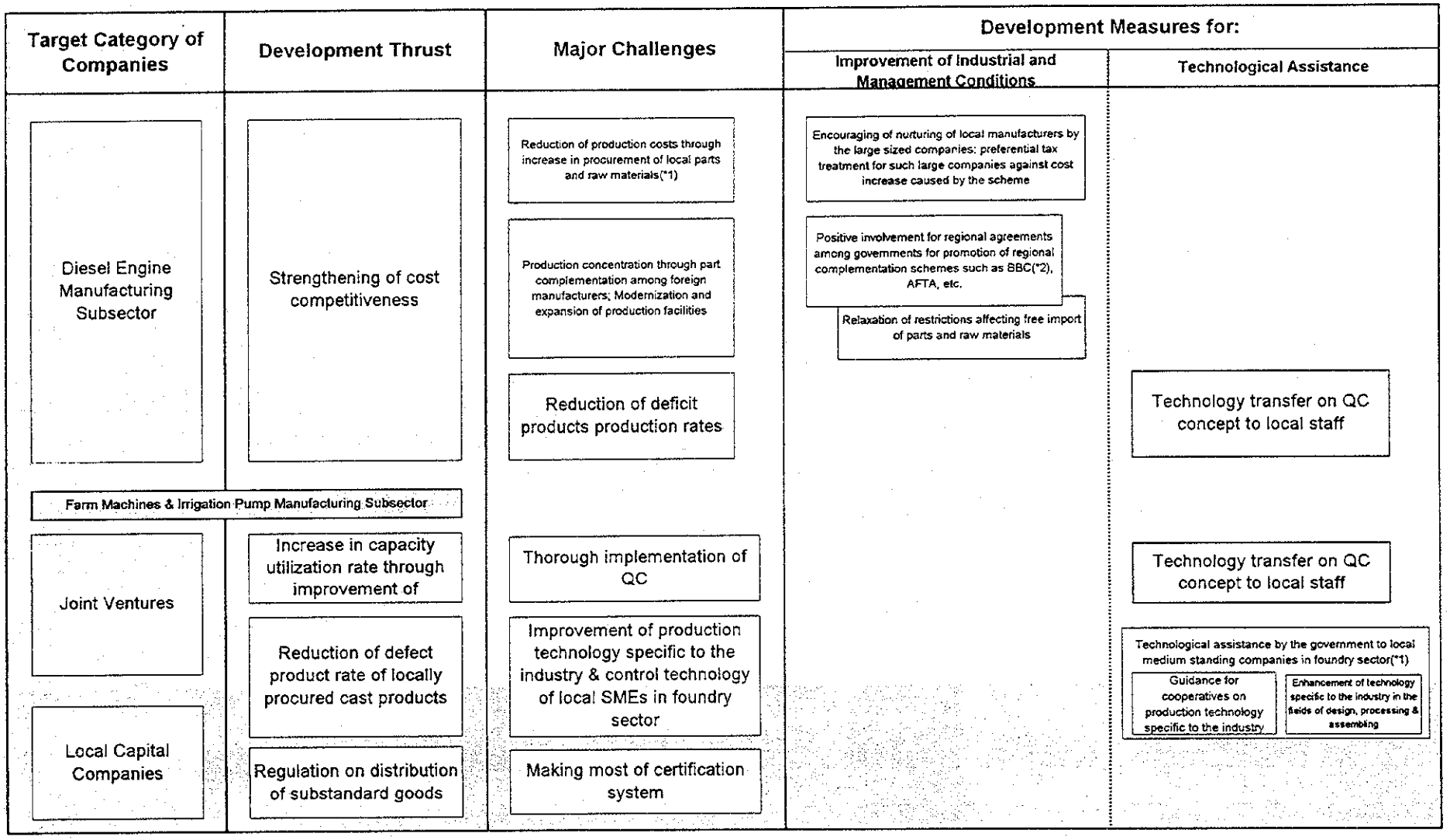
There is the lack of awareness in the industry of major challenges needed in 1) cost competitiveness, and 2) quality improvement. To meet these challenges, two factors are important: 1) quality stabilization for raw materials, and 2) reduction of percentage of defects and cost reduction resulting from through strict quality control.

Chart 3-1 : Recommended Measures for Subsector Development – Automobile & Automotive Parts –



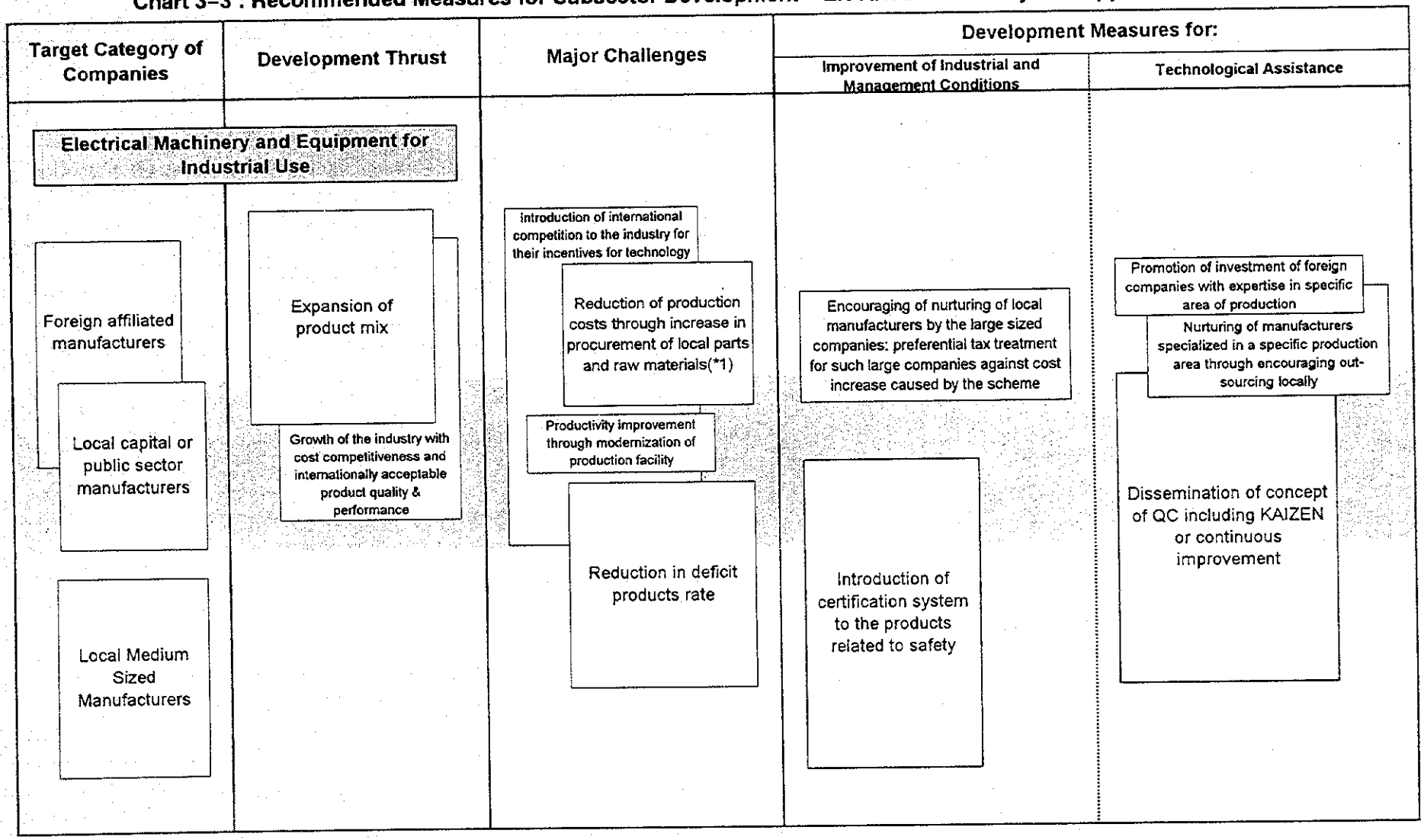
(*1) See Chart 5; (*2) Brand to Brand Complementation Scheme

Chart 3-2 : Recommended Measures for Subsector Development – Agricultural Machinery –



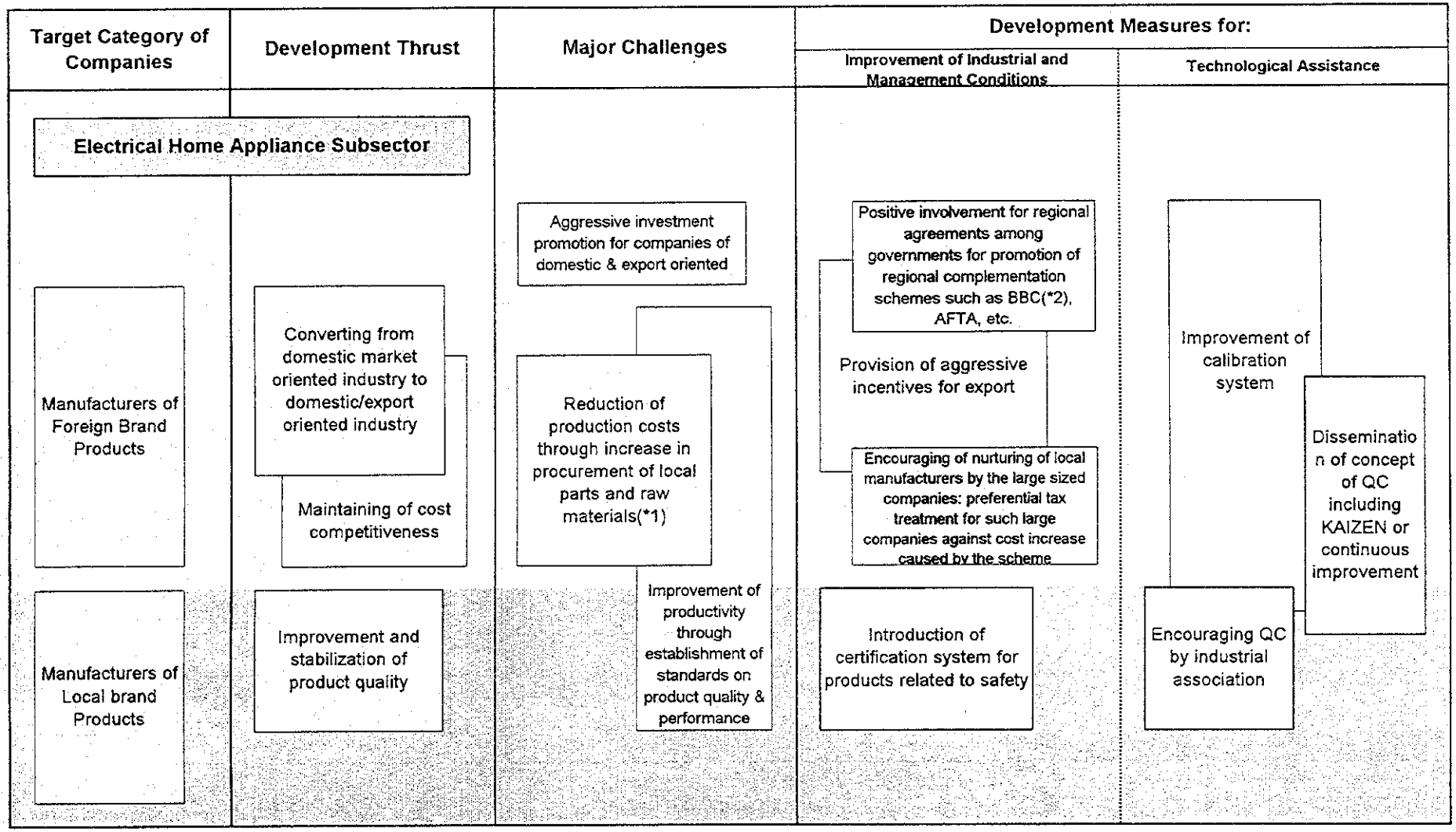
(*1) See Chart 5

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



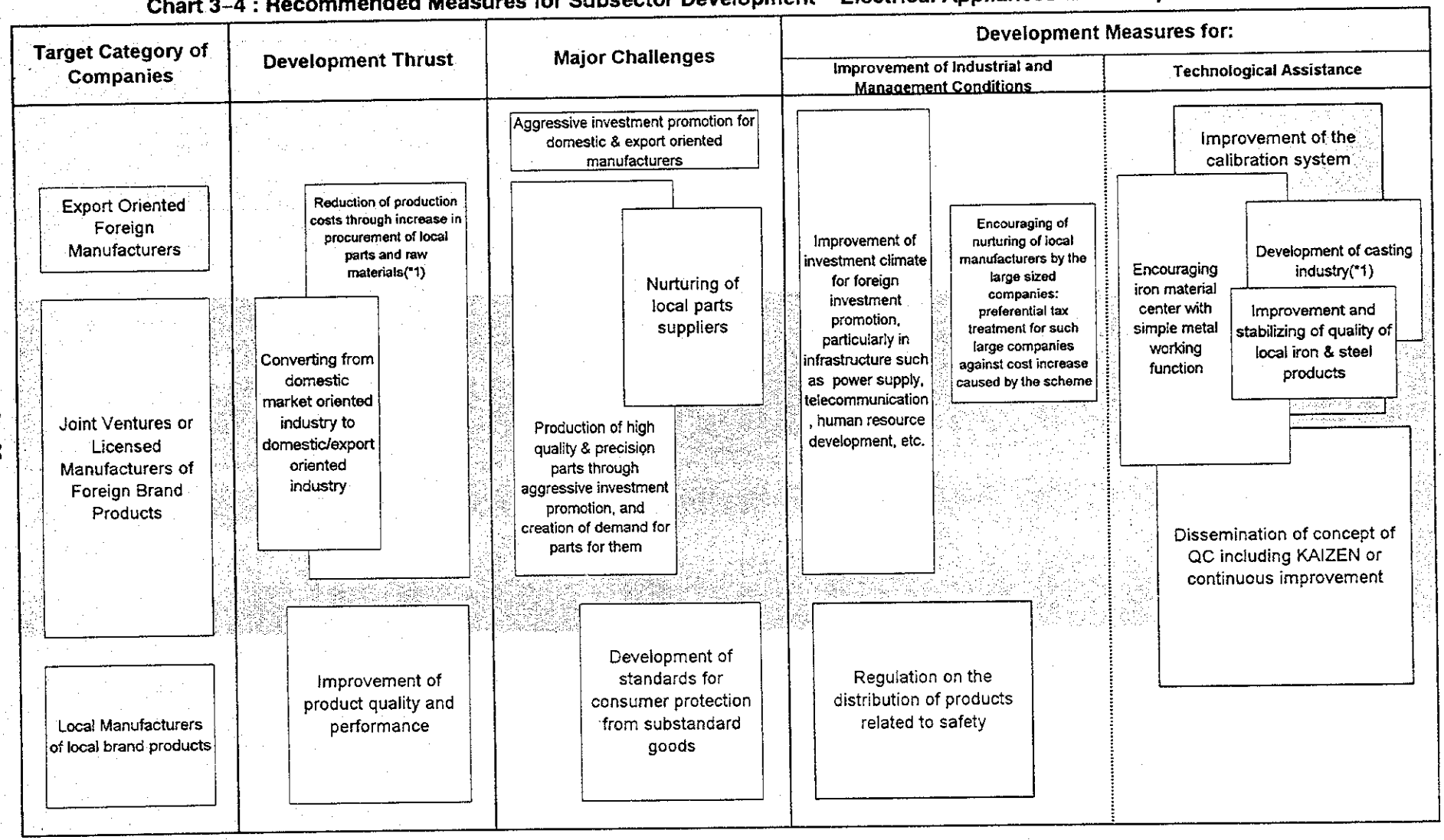
(*1) See Chart 5 (*2) Brand to Brand Complementation Scheme

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



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

Chart 3-4 : Recommended Measures for Subsector Development – Electrical Appliances and Components –



(*1) See Chart 5

Chart 3–5 : Recommended Measures for Subsector Development – Metalworking –

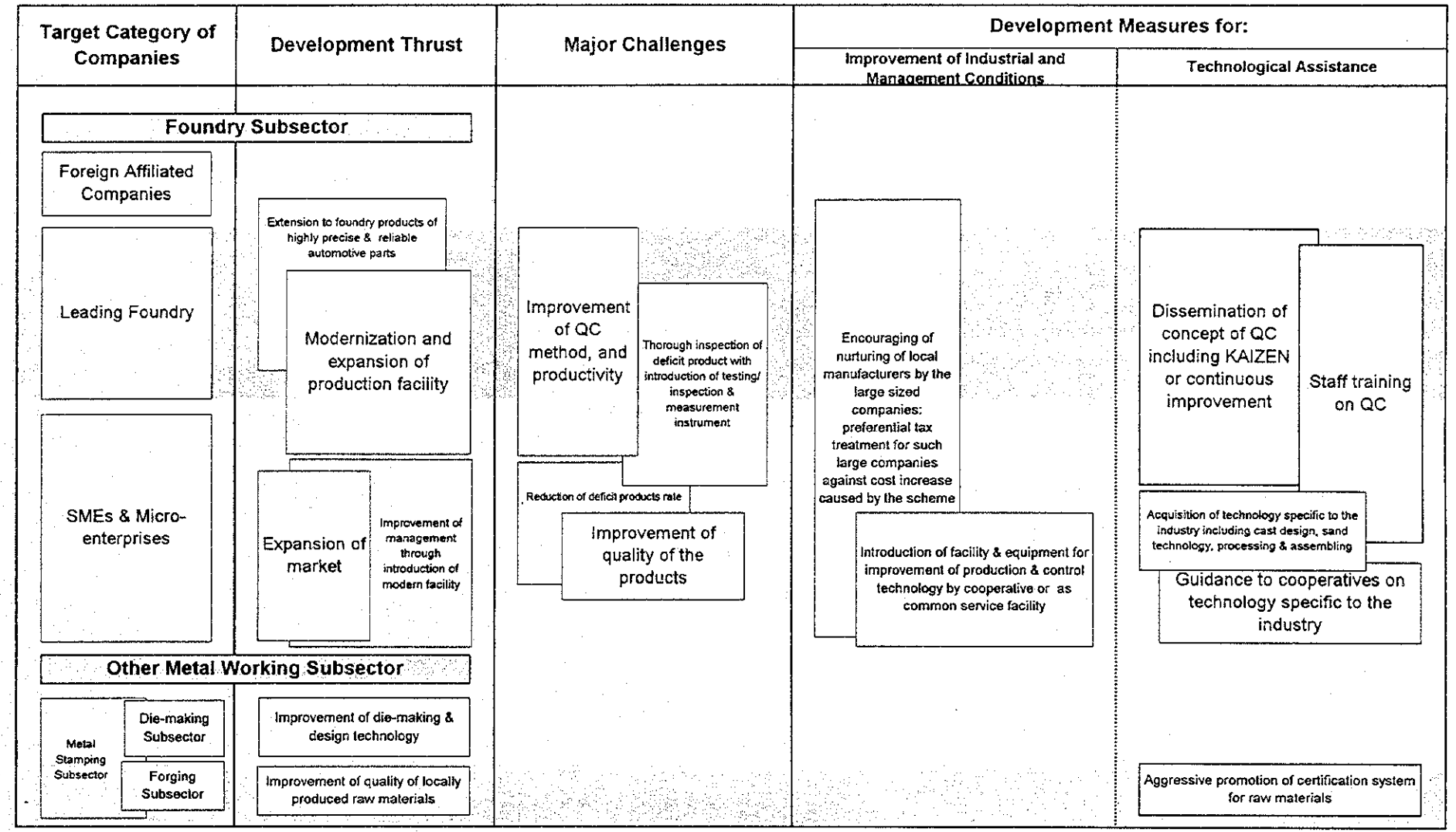
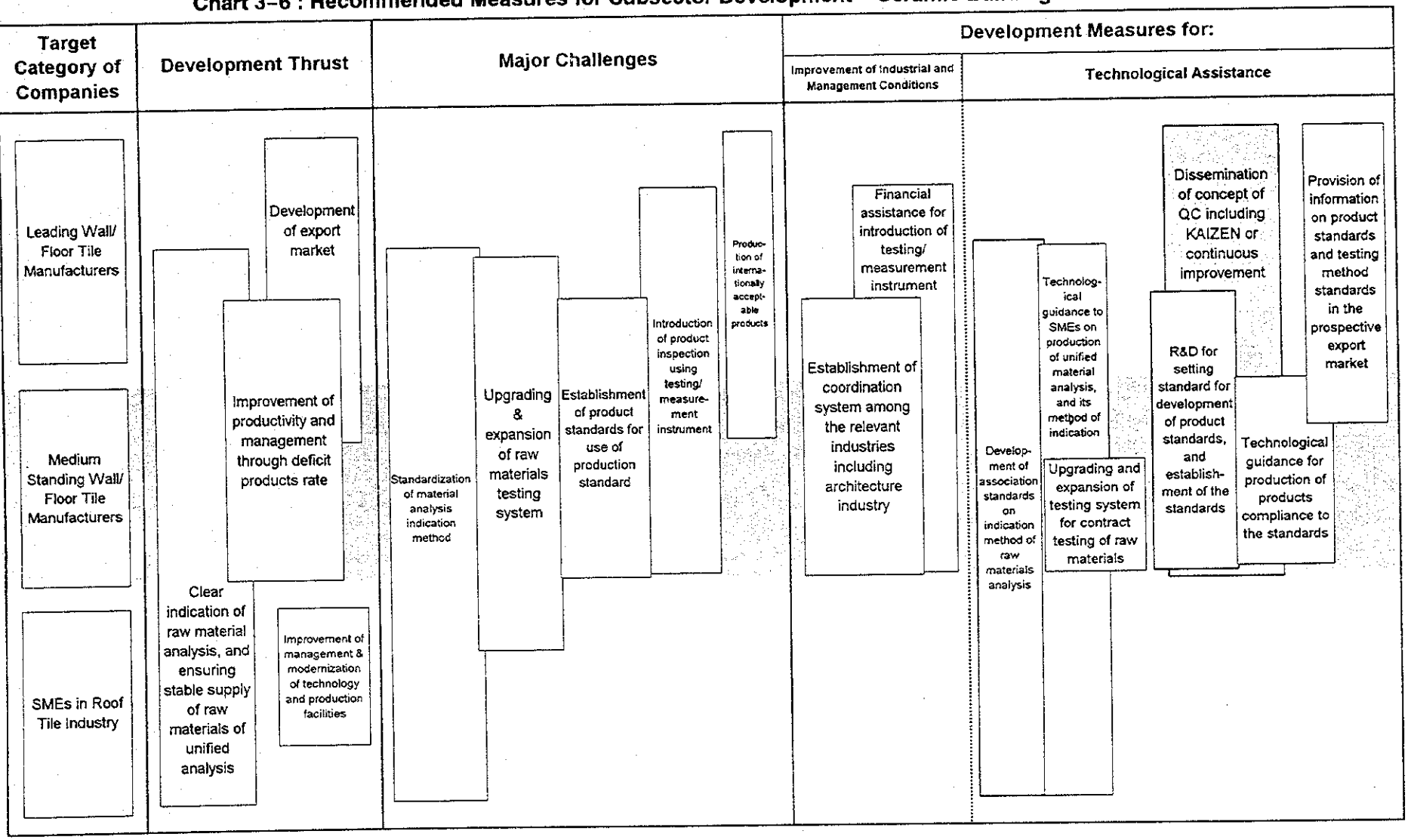


Chart 3-6 : Recommended Measures for Subsector Development – Ceramic Building Materials –



4 Industrial Standardization, Certification, and Accreditation Project

4.1 Project Outline

4.1.1 Historical background of the present system

National standardization activity in Indonesia was initiated in 1928 by Indonesia Standardization Foundation (Yayesan Dana Narmalisasi Indonesia: YDNI). After the country's independence in 1960, various institutions (related ministries and agencies in effect) have been separately leading standardization activities, without national policy or coordination function. As a result, diverse standards were developed and operated, and the move failed to serve the best interest for society and the government.

Subsequently, the government and the industries began to recognize the need for unified national standards. In 1984, an organization to coordinate standardization activities at a national level, DSN (Dewan Standardisasi Nasional; Standardization Council of Indonesia) was established by Presidential Decree No.20. In fact, DSN was mandated by Article 19 of the Act Related to the Industry of 1984 "Undang–Undang Republik Indonesia" No.5, which states that "the government establishes standards for substances and industrial products for the purpose of assuring product quality and achieving its application to production activity."

After the establishment, DSN has been working to launch 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 to the preparation status of 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.

The project outline described in 4.1 describes the system, scheme, organization and processes contemplated under SNN, followed by their actual application in 4.2.

4.1.2 Basic policy for future formulation

The government's basic policy for industrial formulation is described in REPELITA VI (See Chapter 3). REPELITA VI sets forth the premise that strong technical capabilities and a reliable economic system form the foundation of the power and modernized industry and points out that the lack of technological facilities and qualified expertise constitutes an obstacle to the achievement of the goal. To overcome the weakness, the strengthening of industrial ability is set forth as one of important industrial formulation policies, and "standardization, certification, and accreditation" is identified as one of five industrial technology improvement programs.

1) Standards are applied in an integrated manner through cooperative ventures between the business community, research institutions, universities and government
2) Applicable standards are evaluated and revised to meet current needs
3) Create a network of certification of tested product qualities
4) The functions of the accrediting institutions are enhanced; increased private sector participation in enhancing the capabilities of experts and technicians as well as the hardware used by quality testing centers
5) Secure international recognition of domestic testing centers
6) Convince the business community of the need to adopt and apply ISO-9000; including training for ISO-9000 quality assessors to enable them to obtain international accreditation

The related ministries are responsible for reducing their own policy into practice based on REPELITA and are making preparation in accordance with basic laws and regulations, particularly Cabinet Order No.15/1991 on Indonesian national standards, and Presidential Decree No.12/1991 concerning the establishment, application, and supervision of Indonesian national standards.

4.1.3 Project structure and implementation body

4.1.3.1 Project structure

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

Among them, important systems, 1), 2) and 6) are described below. 5) will be discussed later.

(1) Standards establishment system

The system to establish SNI consists of the following elements:

1) Structure of the standards establishment organization and work flow

Each technical institution on standards establishment establishes a technical committee organized in accordance with Cabinet Order No.15/1991. The detailed work flow of the technical committee will be presented in the guideline for standards establishment.

2) SNI establishment procedures

a) Preliminary proposal

A preliminary proposal for a standard is prepared by the technical committee or an individual or an organization who needs the standard and is submitted to an organization responsible for establishing the standard.

b) Draft proposal

Once the preliminary proposal is approved, the technical committee may establish a sub-technical committee or a working group that actually develops a draft proposal. The formulation of the draft proposal requires data from international standards, foreign standards, research institutes, and industries. The draft proposal is prepared in accordance with the provisions of the SNI preparation guideline. Note that standards referred or incorporated into the draft proposal must be specified in SNI.

c) Preliminary review of the draft proposal

The technical committee of the technical institution on standards establishment may make the draft proposal available to related organizations that do not have representatives on the technical committee for suggestion and input, before referring it to the pre-consensus conference or the national consensus conference.

d) Final proposal

The final proposal that incorporates, as required, suggestion and input by the secretariat of the technical committee is then referred to the pre-consensus conference or the national consensus conference. Under the national consensus among related

parities in accordance with the provisions of Cabinet Order No.15/1991, the final proposal becomes draft SNI.

c) Approval of SNI

The draft SNI submitted by the technical institution responsible for the establishment of the standard is reviewed by DSN's Executive Council and is approved by DSN as a new SNI.

3) Basic principles in the SNI establishment process

Basic principles in the SNI establishment process are as follows:

a) As a more realistic approach, SNI may adopt the whole or part of international or foreign standards if considered appropriate.

b) To make best efforts to harmonize SNI with regional or international standards.

c) To learn from experience in countries that have similar socioeconomic conditions and/or formulation conditions.

4) Standard formulation program

Principally, technical institutions that formulate the standard must propose standards formulation program to DSN. In order to get enough time for DSN to make evaluation and research, the technical institutions that formulated the standard are expected able to make the standard formulation program in the beginning of every new year. However, technical institution that formulated the standard could propose additional standard formulation program any time according to the needs.

In the standards formulation program, it is necessary to explain, regarding the identification of standards, planning to be composed.

5) Reviewing of SNI

SNI will be reviewed within five years after the establishment or as required.

6) Duties of DSN secretariat

a) Preparation of a list of existing national standards, and a list of standards subject to certification

b) Preparation of a list of duplicated themes for standardization

c) Preparation of a guideline for removal of duplicate standards

d) Preparation of draft regulations for SNI approval

e) Publication of a SNI approval list by DSN

7) Duties of DSN–Committee B and DSN–Committee F (DSN's support units)

a) DSN–Committee B is responsible for all the standards other than safety.

b) DSN–Committee F is responsible for safety standards.

8) PH–DSN's working rules

PH–DSN performs its work in accordance with the following rules:

a) To obtain consensus on the draft SNI.

b) To obtain approval of the competent minister.

c) The draft SNI will not be revised in the near future.

d) The draft SNI is documented and is signed by the person in charge.

e) To solve the issue of duplication between draft standards.

f) To comply with SNI–approved work flow chart.

g) To comply with the SNI preparation guideline.

h) To follow the general guideline for safety.

(2) Standard implementation system

Standard Implementation System of SNN is Described as follow:

1) Implementation criteria of standards

a) Administrative criteria of standards application

Organization units for handling of standardization consist of government organization, profession , producers and consumers. Some examples:

Government structural

Organizational unit here is a unit charged with the task of handling standardization activities in the organization concerned with structural such as PUSTAN/MOI, Directorate of Standardization and Quality Control at the Ministry of Trade, Products Quality Testing Center at the Ministry of Trade, or non–structural authority such as Agricultural Standardization Commission at the Ministry of Agriculture.

Profession

– Association of Indonesian Engineers.

Producers

– Business Associations.

Consumers

– Foundation of Consumers Institute.

b) Technical standard for application of standards

Application standards

SNI is implemented under SSN.

Testing facilities

1. A testing facility accredited by KAN;
2. A sampling organization located in a local area;
3. Equipment used for testing;
4. Trained testing personnel; and
5. A testing location equipped with a control system.

2) Application of standards

Application of standards should follow the DSN guideline for SNI application.

Upon application of SNI, the following certificates and documents are issued:

1. An accreditation of an execution organization in standardization activity issued by KAN;
2. A certificate issued to a quality control system certification body;
3. A SNI mark certificate issued by a product/service certification body;
4. A certificate issued by a technical professional certification body;
5. A test report issued by an accredited testing laboratory;
6. A certificate of technical test result on the operating system of a product complying with standards, issued by a technical inspection organization; and
7. A calibration certificate

3) Standards application process

a) SNI becomes effective through the following process:

1. Notice of SNI approval from DSN;
2. Notice of decision from the head of a technical institution on standards establishment; and
3. Notice of decision on penalty imposed on violator issued by the head of the technical institution.

b) Activity report

Each KAIT prepares and maintains reports on testing, verification and certification activities and their results and submits them to DSN via KAN. DSN evaluates these reports and provide input or recommendation as required.

4) Record system for application and supervision of standards

Application of standards is continuously managed for each relevant element of application activity. Management record is associated according to the status of

accreditation, certification, testing, evaluation, and sampling by following the relevant DSN guidelines.

5) Accreditation system for application of standards

The work flow of accreditation for application of standards is shown in Chart 4-2.

a) Accreditation organization

An accreditation organization is formed for standards application activity. Accreditation is carried out by KAN, which is established by DSN, under support of its technical institution, KAIT.

KAN main task

KAN has the following main tasks:

- to carry out coordination, synchronization, to guide and to supervise cooperation among the technical institutions regarding accreditation and certification activities,
- to submit recommendations and considerations to DSN concerning national policy in the field of accreditation and certification.

PH-KAN(KAN's executive council)

The daily activities of KAN shall be carried out by PH-KAN.

KAIT

KAIT is a committee formed by a technical institution to carry out the task of sectoral technical activities for the committee relating to the scope/field of duty and function of a technical institution. Organizationally KAIT is part or KAN.

b) Assessor team

Assessor team is a team charged by KAIT with the task of, on behalf of KAN, to carry out part or all of the function related to the evaluation of an institute in the activity of standardization.

Assessor criteria

The criteria which an assessor has to meet are:

1. the assessor should have education and technical capability in the field in which he is needed for the duration of the evaluation period.
2. the assessor should fulfill requirements as set down in the Guidelines given by DSN.
3. the assessor should process a combination of the necessary qualification and experience to enable him to function effectively as a member of the assessor team.

Lead assessor

Lead assessor is the official given authority to coordinate and personally lead the

assessment of an institute in connection with standardization.

c) Test laboratory

A testing laboratory is a laboratory that has been properly accredited by KAN on behalf of DSN upon the recommendation of KAIT in line with the DSN Guidelines No.01-1991, 02-1991 and 03-1991.

Testing laboratory types

1. Permanent laboratory

A permanent laboratory shall be a testing laboratory established on permanent site basis for a period more than three years. A permanent laboratory shall perform both permanent and field tests.

2. Non permanent laboratory

A non permanent laboratory shall be a laboratory having no permanent basis but it could perform laboratory testing, measurement, calibration, characteristic description or products. In general, a non permanent laboratory performs the following laboratory functions:

- a field laboratory,
- a mobile laboratory,
- a portable equipment.

3. Field laboratories

A field laboratory shall be a non permanent testing center where the tests shall be carried out by the staff of testing organization outside the permanent laboratory.

Duties of the accredited testing laboratory

1. Standard testing laboratory shall function to monitor and improve the capacity and workmanship of all laboratories under the network by performing repeat tests, inter laboratory tests, parallel tests, and shall be responsible for the calibration work of individual laboratory members of the network.
2. Standard testing laboratory shall function to develop testing methods, to standardize chemicals and to evaluate testing standards.

d) Personnel certification body

Personnel certification body is a body accredited by KAN on behalf of DSN upon the recommendation of KAIT to carry out the activity of personnel certification. This body issues certificates on the capability of a person who has undergone training

in skills of assessor, analyst and welder. The criteria of a body for personnel certification and rules governing the system of personnel certification is set down in the DSN Guidelines.

e) Quality system certification body

Quality system certification body is a body accredited by KAN on behalf of DSN upon the recommendation of KAIT to carry out quality system certification. This body issues quality system certificates to a company fulfilling the requirements of SNI series 9000. The criteria of a body for quality system certification and rules for the system of quality system certification are set down in DSN Guidelines.

f) Product/service certification body

Product/service certification body is a body which is accredited by KAN on behalf of DSN upon the recommendation of KAIT to carry out the certification of product/service. This body issues product/service certificate which states that company/producer has obtained the right to the mark on its product/service. The company/producer concerned is required that the goods/service it produces has met all SNI requirements. The criteria of a body for product/service certification and rules for a system of product/service certification is set down in the DSN Guidelines.

g) Technical inspection body

Technical inspection body is a body which is accredited by KAN on behalf of DSN upon the recommendation of KAIT to carry out technical inspections. This body issues technical inspection certificates stating that working system of a product fulfills the set of requirements. The criteria of a body for technical inspection and rules relating to a certification system of technical inspection is set down in the DSN Guidelines.

The body should report issuing certificates activities to KAIT, then submit it to KAN.

h) Technical committee

Technical committee formed by KAIT shall function to study any

evaluation reports submitted by any assessing teams and shall suggest the KAIT to or not to accredit any certification bodies, testing laboratories, or technical inspecting bodies being under assessment.

i) Marking

Marking shall be a process of putting an SNI certificate or mark on any products/services signifying that the marked products/services have met certain technical standards or specifications.

Types of marks

Any product/service may have any of the following two marks:

1. A safety mark shall be a special message on the safety use of a product/service, made in a combination of colors and shapes which may include graphic symbols or proper words.
2. A SNI mark shall be a certificate mark on any product, signifying that the products bearing the SNI mark have met SNI requirements.

Mark symbols

A SNI mark shall be made in a symbol to be drawn as provided under Presidential Decree No.12. A safety mark shall be made in a symbol drawing as DSN shall approve.

Mark symbol management

The management of mark symbols shall be KAIT representing KAN.

Symbol marking rights

The product/service certification body shall provide any industries with rights to put proper mark symbols on any product/service meeting certain standard requirements.

Certified industries and manufacturers

Any industry and manufacturer to be certified or provided with SNI marking rights shall meet the following criteria:

1. shall be an Indonesian national legal entity,
2. shall operate own production equipment and controlled facilities of good quality under a quality assurance program,
3. shall keep product/service samples to be marked with proper quality standard symbols,
4. shall separate the quality control unit from production units,
5. shall own proper number of quality control personnel,
6. shall enter into a quality control agreement,
7. shall not produce any product/service under the standard,
8. shall be subject to proper supervision, inspection and evaluation.

Marked products

Products subject to marking shall meet the following criteria:

1. being always with products of same production system and continuous production method,
2. product quality shall meet certain standards,
3. warrant product quality.

Marking methods

Marking shall be limited to products meeting certain standard requirements. Any marks on products meeting certain standard requirements shall also describe the standard adopted by the producer of the products.

6) Testing laboratories national network

To implement the national standard, any technical institution shall need a number of proper and qualified testing laboratories. DSN had developed a series of national network of testing laboratories to facilitate the realization of quality assurance.

Any testing laboratory shall follow the testing procedures in an accurate and proper manner so as to make the issued certificates acceptable, legal and reliable. Therefore, any testing laboratory which issue quality certificates shall be subject to a total capacity test, including the technical and honesty aspects of the personnel carrying out the quality assessment work in testing laboratories, referred to in DSN Guide line No.01–1991 "General requirements for capability of calibration laboratories and testing laboratories". Any testing laboratories having met the criteria shall be accredited for a formal recognition of the capability of the testing laboratories to perform special tests. For the purpose of accrediting testing laboratories, there shall be a laboratory accrediting system of rules, procedures and management referred to in under DSN Guidelines No.02–1991 "Testing laboratory accreditation system – Accreditation board conditions" and 03–1991 "Testing laboratory accreditation system – Implementation instructions".

a) National testing laboratory network's elements

Membership

1. All standard testing laboratories under the technical institutions shall be members of the testing laboratories national network.
2. Members of the testing laboratories under a technical institution shall be the government and private testing laboratories already accredited by the KAIT representing DSN referred to in DSN Guidelines 01, 02 and 03.

Management of testing laboratory accreditation

Management of the accreditation of any testing laboratories under any technical institution shall be KAIT represented by any standard testing laboratories. Administrative criteria of the management shall also meet the following criteria:

1. authorized to apply government decisions,
2. having an organizational structure, a set of job descriptions, work procedures and programs related to laboratory accreditation,

3. having facilities and qualified personnel for developing and performing laboratory accrediting program activities in a continuous manner, referred to in accrediting criteria and procedures,
4. having both technical experience and professional expertise in accrediting work,
5. be honest and neutral,
6. having executory rules and procedures of laboratory and testing accrediting and certification systems referred to in DSN Guideline,
7. keeping confidential any certification activities and supervisions,
8. having criteria on quality testing, inspection and control systems and manuals,
9. periodically publish lists of quality controlled products/service,
10. periodically publish and distribute the descriptions of laboratory accreditation, certification and marking systems,
11. preparing and keeping well periodic and updated records,
12. having own assessing team and/or technical committee to evaluating testing laboratory network member candidates.

Technical criteria of any testing laboratory shall be as the following:

1. having own laboratory and qualified staff to enforce the existing rules,
2. having own criteria and systems of a testing laboratory,
3. having own criteria on testing laboratory accuracy assessment,
4. having own criteria and proficiency test(round robin and parallel tests)
5. having own criteria on legal testing procedures,
6. having own criteria on penalty enforcement,
7. having own calibrating system and could do it well and continuously,
8. having own well managed technical administration,
9. adopting a certain quality control system,
10. having own assessing staff to evaluate any testing laboratory member candidates.

b) Accrediting procedures

The accrediting procedures shall be applied through a number of stages referred to DSN Guideline No.03. Chart 4-3 shows a flow of the accrediting procedures.

1. Initial stage
2. Assessing stage
3. The stage of complete assessing process study by KAIT
4. Accreditation award by KAN

c) Operational guidelines

This description shall cover all requirements, including soft and hardware, management and the organization of a testing laboratory, and the description may be used as a guideline by any testing laboratory for testing any products.

Testing laboratory soft and hardware requirements

Any laboratory instruments and any laboratory work environment shall meet DSN Guideline NO.01 requirements.

Laboratory instrument requirements

Any laboratory documents on laboratory instrument shall meet DSN Guideline No.01

Sample handling shall consider the following aspects:

1. Any sample shall represent a batch, and sampling shall be taken by certified samplers.
2. Sampling shall follow established sampling methods.
3. Samples submitted to a testing laboratory shall be accompanied by a sampling report containing all available information on the samples.
4. The laboratory shall record all needed information, including information on samples' condition by the time they were received.
5. To ensure the accuracy of the testing, and to protect the samplers, any samples received by the laboratory shall be kept confidential.
6. The laboratory shall protect samples' condition from any possible changes which may affect the accuracy of the testing results.
7. In case it shall be needed and possible, the laboratory shall keep samples and test records in similar files for easier repeat tests, where individual tests shall represent individual batches.
8. The laboratory shall keep manuals of how to handle the remainder of samples and sample files.

Reactants and materials needed for individual tests shall meet established requirements.

Testing laboratory's management and organization

In general a testing laboratory's organization comprises of an officer responsible for the laboratory, a testing supervisor and testing staff. They shall different duties, jobs and qualifications in line with individual position and existing hierarchy.

d) Procedures to accredit the elements of the testing laboratories national network

Any testing laboratory under the testing laboratories national network shall publish authentic analysis reports. These procedures shall complete the requirements of the testing laboratories national network so that the system may smoothly operate. The elements under these procedures shall be : standard testing laboratories, accrediting institutes, assessing team or assessors and assessing team leaders, samplers, and testing staff.

Accrediting a testing laboratory

This shall be made by individual KAIT and shall report any accreditation to DSN represented by KAN.

Accrediting assessing teams and team leaders

1. Prospecting stage: KAIT shall aggressively prospect any experts considered capable and qualified to be assessors. These experts may be those independent ones and those under any technical institutions.
2. Establishing assessing teams: KAIT shall establish or form assessors or assessing teams and team leaders and shall notify the case to DSN represented by KAN.

Accrediting sampling institutes

1. Prospecting stage: KAIT shall aggressively prospect existing sampling institutes under any technical institutions. Any institute meeting the criteria of sampling institute may apply to KAIT for an accreditation. Any candidates shall include both government and private sampling institutes.
2. Assessing stage: KAIT and the assessing teams shall assess and study all prospects or candidates as well as applications: the assessment and study shall refer to the criteria decided by DSN and additional requirements by related technical institutions as far as the additional requirements shall not be contrary to those decided by DSN.
3. Accrediting sampling institutes: KAIT shall award or delay accreditation in consideration of the assessment and study findings or conclusion of the item above and shall notify the award or delay to DSN represented by KAN.

7) Other accreditation systems

Other accreditation systems cover quality control system organizations, product certification bodies, qualified personnel certification bodies, and technical inspection certification bodies.

(3) Accreditation system

This system is designed to develop standards and to accredit application organizations for the following purposes:

1) To coordinate standardization activities of technical organizations;
2) To establish a system and procedures for the formulation and implementation of basic standards at a national level; and
3) To encourage participation of representatives of the non-government sector such as professionals, producers and consumers, in the standards formulation and implementation process.

1) Type of accreditation

Accreditation is done at the following two levels:

a) DSN's accreditation of a specific technical institution implementing standardization work; and
b) Accreditation of a specific technical institution implementing standardization work by a technical organization accredited by DSN under its jurisdiction.

DSN's accreditation is granted to technical institutions that engaged in any of the following activities:

a) Formulation of standards;
b) Implementation of standards; and
c) Calibration and metrology.

Accreditation by the technical institution is concerned with the following activities:

a) Testing and technical inspection; and
b) Certification of quality control systems, certification of products and services, and certification of qualified personnel.

The above accreditation granted by the technical institution on behalf of DSN is carried out by KAN.

2) Accreditation for formulation of standards

Duties and authorities of technical institutions accredited by DSN related to the standards formulation process are as follows:

a) The technical institution establishes draft standards in accordance with regulations and procedures set forth in the SSN's standards formulation system. In the process, it assures national consensus among all the related parties, including the government,

the industries, the scientist and engineer community, procedures, consumers, and product/service users. Note that the authority of the technical institution is limited to the scope of work set forth on the basis of the scope of standardization for each organization, as determined by DSN.

b) Through the process, the technical institution establishes the draft SNI and enforces it on a national basis upon DSN's approval.

c) The technical institution reviews the established standard within five years after its establishment. The review process is designed to secure maximum benefits for users of each standard, and in consideration to possible updating of the standard in response to scientific and engineering advancements in the future, it evaluates the standards from the viewpoint that it still meet health and safety requirements.

Accreditation of standards formulation is granted to technical organizations meeting the following qualifications:

a) Having a full-time standardization organization such as a directorate, center, department, division, or committee;

b) Having a qualified expert in standardization in its field of specialization;

c) Having experience in formulation of standards;

d) Having interest in standards formulation;

e) Maintaining standards formulation procedures;

f) Accepting procedures adopted by DSN; and

g) Capable of preparing and submitting an annual report to DSN.

The above qualifications must be satisfied in the first stage of accreditation procedures.

3) Accreditation for implementation of standards

Duties of technical institutions accredited by DSN are as follows:

a) To supervise application of SNI by companies related to products and services;

b) To discourage companies that do not meet SNI's technical requirements from enforcing SNI;

c) To impose legal penalty on companies that do not meet SNI's technical requirements and continue to enforce SNI;

d) To encourage exports to export SNI-complied products;

e) To distribute reports on SNI application activity, ongoing activity and supervisory activity as the technical institution; and

f) To accredit and supervise testing laboratories under its jurisdiction and under DSN's

supervision.

The technical institution may be accredited for application of standards when it satisfies the following qualifications:

a) Having a full-time standardization organization such as a directorate, center, department, division, or committee;
b) Having a qualified expert in standardization;
c) Having a separate organization to supervise the application of standards, as well as a well managed system and relationship mechanism;
d) Maintaining a mechanism to record the management of standards application;
e) Maintaining a reporting system for testing, verification and certification results;
f) Having the authority of enforcement, management, and imposing penalty under the present legal system;
g) Accepting DSN's procedures, and ensuring that laws and regulations related to products under jurisdiction of the technical institution do not conflict with DSN's regulations; and
h) Capable of preparing and submitting an annual report to DSN.

4) DSN's accreditation procedures for technical institutions engaged in standardization activity

a) A technical organization meeting the above qualifications may apply for DSN's accreditation for a specific standardization activity.
b) PH-DSN (DSN's Executive Council), in evaluating the above application, represents DSN.
c) PH-DSN may designate a committee preparing the evaluation process including field survey and inspection schedule.
d) The committee designated so conduct field survey and inspection.
e) The committee prepares a report that contains the results of field survey and inspection, including any conflict with the technical institution's application, and recommendations, and submits it to PH-DSN as the committee's report.
f) PH-DSN makes necessary review and evaluation prior to recommendation to DSN.
g) PH-DSN may inform the technical institution of any unfavorable conditions to be corrected.
h) The technical institution feeds back any corrective measures to PH-DSN.
i) The committee reviews and evaluates the reported corrective measures.
j) Once the technical institution satisfies all the qualifications, DSN may accredit it for standardization activity in the applied field.

5) Accredited technical institutions

The following ministries and agencies have been accredited by DSN as technical institutions and are authorized to develop and enforce standards. (Note that LIPI and BPPT have been accredited for standards formulation only.)

1. Ministry of Industry
2. Ministry of Trade
3. Ministry of Health
4. Ministry of Agriculture
5. Ministry of Forestry
6. Ministry of Manpower
7. Ministry of Public Works
8. Ministry of Mining and Energy
9. Ministry of Communication [Transport]
10. Ministry of Tourism, Post and Telecommunication
11. Agency for National Atomic Energy (BATAN)
12. Indonesian Institute for Science (LIPI)
13. Agency for Research, Development and Assessment of Technology (BPPT)

6) Scope of standardization activity by technical institutions

DSN is responsible for coordination, harmonization, and maintenance of cooperative relations among technical institutions in their standardization activities. It also makes advice and recommendation to the president on national policy in the fields of standardization and national standards. Its major mission is to coordinate the scope of standardization activity in the project inception stage, attempts to harmonize standardization programs of different technical institutions, and establish an overall national standardization program. The scope of standardization activities of technical institutions is summarized in Chart 4–4.

4.1.3.2 Grade of SNI

The Standards consist of SNIs approved by DSN and Draft SNIs which are in the process of the approval as DSN. In addition, there are voluntary SNI and compulsory SNI.

(1) SNI

1) Mandatory SNI

Mandatory SNI are made up of specifications and classifications, which are

determined by a technical institute and approved by DSN, and it is obligatory to be applied throughout Indonesia. Standards which are health of consumers, product users or the public, and affect the environment, are mandatory. Other standards which are not directly related to this interest can also be made obligatory according to the needs. SNI that are directly related to the interest of public and environmental safety are applied on the following:

1. instruments related to high-pressure gas and electricity,
2. electrical installation and system,
3. land, sea and air transports to indicate their worthiness,
4. land, sea and air transports to indicate their safeties,
5. machinery and constructions such as buildings, bridges and lifts,
6. places of work to indicate vocational safety,
7. dangerous materials,
8. medical instruments
9. others.

SNI that are directly related to health and environmental interest include standards on medicinal materials, medicines including traditional Herb's, biological products, simple medical materials, food and beverages, supplemental food, cosmetics materials and preparations and pharmaceutical stocks, public hygiene, handling requirements, safety, health and dangerous materials, containers along with their medicinal contents which containers can affect the quality of the contents, environmental health such as sanitation installations, pollution treatment installations and household health preparations.

2) Voluntary SNI

Voluntary SNI are recommended in nature and is determined by a technical institution with the approval of DSN to be applied nationally for purposes not directly related to the safety and health of consumers, product users, or the public, and the preservation of life environment. The voluntary SNI can in the future be made mandatory by the technical institution concerned on technical or economic grounds and/or other considerations.

(2) Draft SNI

A Draft SNI is a standard agreed on by consensus at the technical institution level and submitted to DSN to be declared as a SNI.

4.1.3.3 Organizational setup, execution organizations, and procedures

SSN organizationally consists of a policy making and approval organization, DSN, and

execution organizations called technical institutions. General work flow involving DSN and technical institutions is summarized in Chart 4-5.

(1) Standardization implementation organization

To implement and develop SSN, this system is managed by DSN. Main duties/job and function of DSN is written down on Presidential decree No.20/1984 and No.7/1989. DSN has a main function to coordinate, synchronize and develop standardization activity cooperation among Technical institutions, and shall provide the President with recommendation and consideration of national standard policy. In the first place, DSN shall introduce the coordination and the scope of standardizing activities, and synchronization of standardizing programs, to establish integrated national standardization programs.

The scope of activities of DSN is summarized in Chart 4-6, the structure of DSN and its executive council (PH-DSN) in Chart 4-7, and supporting units in Chart 4-8.

Final decision on SSN matters is made at DSN's Plenary Meeting. As shown in Chart 4-8, DSN is chaired by the Minister of State for Research and Technology, with the Minister of Industry and the Minister of Trade serving as vice chairmen, and LIPI's Deputy Chairman as secretary. Other members are mainly representatives of ministries and agencies that serve as technical institutions of SSN.

PH-DSN is chaired by Secretary of DSN, vice chairmen are DSN members representing the Ministry of Industry and the Ministry of Trade, and members are mainly representatives of ministries and agencies that serve as technical institutions of SSN.

Committees supporting DSN from A through F are organized by 15 representatives of technical institutions (mainly ministries and agencies) each and are chaired by each of the following ministries and agencies:

Committee A : Ministry of Trade
Committee B : Ministry of Industry
Committee C : Ministry of Health
Committee D : Ministry of Agriculture
Committee E : BPPT
Committee F : Ministry of Manpower

Note that the Committee for National Physical Standards shown in the organizational chart in Chart 4-8 means a group of metrology exports.

(2) Execution organizations

Execution organizations for the national standardization system are technical organizations participating SSN (related ministries and agencies at present).

(3) Establishment of standards

General work flow in the SNI establishment process is shown in Chart 4-1. As seen in the chart, the formulation of a draft SNI is responsibility of technical institutions (ministries or agencies at present). The draft SNI formulation organization varies from one ministry to another, and it is roughly classified into those who have permanent technical committees and those who establish ad-hoc committees as required. Positioning of ministries and agencies closely related to the industry sector in SNI system is considered as follows.

Position for Ministry and Agency in SNI

Ministry and Agency	Voluntary Standard	Mandatory Standard
Ministry of Industry	X	X (Safety、Health)
Ministry of Mines and Energy	X	X (Safety)
Ministry of Public Works	X (Testing Method、Material Specification)	
Ministry of Agriculture	X (Local goods)	X (Export goods)
Ministry of Tourism, Post and Telecommunications		X (Public Interest)
Ministry of Trade	X (For Trade／Local goods Inspection)	X (For Trade／Local goods Inspection)
Ministry of Labor		X (Safety)
Ministry of Transport		X (Safety)
LIPI	X	

Many ministries and agencies are expected to enforce SNI as either voluntary or mandatory standards according to the principles of the SSN system. On the other hand, some ministries such as the Ministry of Public Works plan to establish testing methods and material standards as SNI, while incorporating design standards and their application methods into technical regulations under ministerial order.

The general standards formulation process of the Ministry of Industry that controls more than 70% of SNI is summarized as follows[1] (Charts 4-1,4-9):

[1] At present, 1 out of 13 ministries and agencies involved in draft SNI formulation maintains SSN-related laws and regulations, namely the Ministry of Industry.

1) DSN shows its policy to technical institutions (at present, ministries and agencies).
2) Each technical institution proposes subjects of standards formulation to PH-DSN.
3) PH-DSN requests DSN's Committee B or F for coordination of the standards formulation program.
4) DSN's secretariat notifies a technical organization of standard formulation.
   a) PUSTAN (industrial standardization center under the Ministry of Industry) instructs a sectoral R&D institute or a regional institute under the Ministry of Industry/BPPI to develop a draft SNI.
   b) The institute organizes a committee and develops and submits a draft SNI to PUSTAN (PUSTAN's staff prepare the minutes).
   c) PUSTAN has the received draft SNI reviewed by a technical meeting it organizes, consisting of representatives of the technical committee, working groups, testing laboratories, the industries, consumers and research institutes.
   d) The draft SNI reviewed by the technical meeting is further reviewed by a national consensus meeting organized by PUSTAN, consisting of representatives of the technical committee, working groups, testing laboratories, the industries, consumers and research institutes.

5) Upon agreement at the national consensus meeting, the technical institution submits the draft SNI to DSN's secretariat.
6) DSN's Committee B or P (to be held one per month) studies and analyzes the submitted draft SNI.
7) If the draft SNI is found to meet requirements, it is submitted to PH-DSN for approval.
8) PH-DSN (to be held once every other month, three months or biannually) refers the draft SNI that is found to meet requirements as a national standard to DSN's Plenary Meeting.
9) For the SNI adopted by DSN's Plenary meeting (once annually), DSN's secretariat assigns the number.
10) The list of approved SNIs is published by DSN's secretariat.
11) The technical institution that receives the notice of approval and the number of the approved standard is responsible for the issuance and dissemination of the standard, and implementation and supervision of SNI. In the case of the Ministry of Industry, related directorates are responsible for supervision of SNI implementation.

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.

(4) Standards review committee

As pointed out earlier, technical institutions that are currently ministries or agencies have permanent or ad-hoc committees. PUSTAN has permanent committees shown in Chart 4-10, which organization is shown in Chart 4-11.

4.1.3.4 Certification and accreditation system

The certification and accreditation system is primarily based on the SNI marking (product certification) system, as described later. Certification also covers quality control systems, qualified experts, and testing and inspection services. Then, accreditation is granted to organizations issuing these certifications.

The certification and accreditation scheme in Indonesia is illustrated in Charts 4-10, 4-11, and 4-12. This has the structure headed by KAN (National Accreditation Committee) that serves as a supreme organization to provide and supervise accreditation service and as an advisory organization for DSN's chairman. Accreditation service is supported by KAIT (Technical Accreditation Committee) established within each ministry and agency involved in management and operation of SSN, which reviews application for accreditation upon consultation from KAN. Accreditation is granted to five types of certification bodies which are authorized to issue certification for producers.

(1) Certification organizations

Organizations responsible for certification service are divided into the following five categories;

a) Quality System Certification Body
b) Product Certification Body
c) Personnel Certification Body
d) Testing Laboratory
e) Technical Inspection Body

(2) Purpose of Accrediting technical bodies in Standardization

Purpose of Accrediting technical bodies in Standardization is 1) to coordinate standardization of technical bodies, 2) to formulate the technical policy to be applied in standardization and quality control of commodities and services offered in the trade, 3) to encourage participation of representatives of the non-government sector such as professionals, producers and consumers, in the standards formulation and implementation

process.

(3) DSN's accreditation procedures for technical institutions specialized in standardization activity

DSN's accreditation procedures for technical institutions specialized in standardization activity are described in 4) of (3) Certification System, 4.1.3.1 "Project Structure."

(4) General work flow of accreditation

Standard implementation procedures can be found in 4.1.3.1(2) 5).

4.1.3.5 SNI marking system

At present, the Ministry of Industry is most advanced in the enforcement system, and the SNI marking system as part of its system is described below.

(1) General profile

Under the SNI marking system, a company manufacturing a product complying with a SNI standard: 1) receives certification from a quality system certification body shown in Chart 4-12 "Certification and Accreditation Scheme in Indonesia" that the company is capable of manufacturing the complied product on a continuous and stable basis, 2) receives verification on that the produce complies with SNI from a testing laboratory shown in the same chart, 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:

a) Compliance with product specifications
b) Quality assurance of products

1) Criteria for product specifications

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

2) Quality assurance criteria

Quality assurance criteria of products is indicated by any 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

Note that self-declaration in Module I, a set of standards comprising requirements for quality systems on the basis of ISO 9000 series, that are adjusted in consideration to technical and financial conditions of Indonesian companies. Their relationship with requirements of ISO 9000 series is shown in Chart 4-14 "List of Requirements for Standards." Also, Modules I - V are standards setting forth requirements for quality systems within the framework of product certification based on the SNI marking system.

a) Module I - Self-declaration model

As the name implies, Module I represents the manufacturer's self account of production facilities, production processes, and quality control systems based on its own review and evaluation.

b) Module II - Product quality assurance model

The manufacturer declares its own quality assurance capability on the basis of SNI 19-9003 (Quality System - Quality Assurance Standards for Inspection and Final Test) and in the form of quality system certification. This applies to the case where the manufacturer meets requirements that should accompany declaration of its quality assurance capability at the time of inspection and final testing.

c) Module III - Production quality assurance model

The manufacturer declares its own quality assurance capability on the basis of SNI 19-9002 (Quality System - Quality Standards for Production, Installation, and Servicing) and in the form of quality system certification. This applies to the case where the manufacturer meets requirements that should accompany declaration of its quality assurance capability through production, installation, and servicing.

d) Module IV – Total quality assurance model

The manufacturer declares its own quality assurance capability on the basis of SNI 19-9001 (Quality System – Quality Standards for Design, Development, Production, Installation, and Servicing) and in the form of quality system certification. This applies to the case where the manufacturer meets requirements that should accompany declaration of its quality assurance capability through design, development, production, installation, and servicing.

e) Module V – Quality assurance model

The manufacturer declares quality assurance capability on the basis of reputed quality system standards other than SNI 9000 Series, which are referred to in SNI 9000 Series.

3) Module I implementation manual

Module I is implemented in accordance with the guideline for SNI marking standards and procedures, which consists of the following:

1. Module I Industry (Self-evaluation) Inspection Manual
2. SNI mark application form
3. Documentation of quality systems

The industry inspection manual is not only used for self-evaluation by the manufacturer who adopts Module I, but by the quality system certification body for supervision.

4) Module I industry (self-evaluation) inspection manual

Module I industry (self-evaluation) inspection manual is outlined as follows.

Module I must be based on the DSN guideline related to Module I.

Inspection must be conducted in accordance with Module I check lists shown in the DSN guideline. Non-compliance of inspection results is divided into the following categories:

a) Major non-compliance

Major non-compliance seriously affects a complete form of quality system as well as product quality and falls under any of the following categories:

1. The quality system fails to meet requirements for The Module in which the quality system is adopted.
2. The quality system on documented procedures fails to meet requirements for The Module in which the quality system is adopted.

3. The quality system on documented procedures is not reflected in implementation.
4. There are a large number of minor non-compliance in a similar form in several organizational functions, indicating presence of systematic defect in a certain activity.

b) Minor non-compliance

Minor non-compliance slightly affects a complete form of quality system as well as product quality and should be attributable to non-compliance related to procedures for quality system application.

The industry inspection report consists of the following:

1. Module I industry inspection report
2. Module I checklist
3. Non-compliance report

The inspection report is evaluated as follows:

	Inspection item	Evaluation item
c	Major non-compliance	Quality system management fails to meet requirements for module I
2.	a. Compliance in major category	Quality system management meets requirements for Module I.
	b. Non-compliance in minor category	Minor non-compliance accounts for 40% or less of items in the checklist.

When a quality control system is found to meet requirements in n inspection report, the manufacturer declares compliance of its quality system.

(4) Application procedures for SNI marking system

Application procedures for the SNI marking system are shown in Chart 4-15. Also, to apply for the SNI mark, application forms for the implementation of the use of SNI marks shown in Chart 4-18 are used.

(5) Surveillance procedures for the SNI marking system

The surveillance for the SNI market system is generally conducted every 6 months or when a claim is made. Based on the product sample test as well as the check to see if the quality system in Module adopted by the manufacturer is consistent with the company's

actual quality control system, any of the following actions is taken:

a) Renewal
b) Suspension
c) Revocation

Surveillance procedures for the SNI marking system are shown in Chart 4-16.

(6) Process of corrective action

If the quality system is suspended after the review of its application or the surveillance, the manufacturer is given an opportunity to take corrective action, which process is shown in chart 4-17.

4.1.3.6 Export import commodities

Agreement of treatment of trade commodities is as follows:

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 import 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. At Oct. 1994, 193 standards have been promulgated of which 47 are mandatory implemented for export, and 15 for import and for domestic trade. The other standards to be used voluntarily by the trade community at large.

(1) For export

Based on a ministerial decree, every consignment for export of 47 commodities are to be declared by the exporter as being in compliance with the specified standard. The statement of quality is presented in a letter called Surat Pernyataan Mutu (SPM) which is an export document to accompany the Pemberitahuan Exsport Barang (PEB) or export notification. In the meantime, samples have drawn from the consignment to be analyzed by an accredited laboratory. If the analytical results confirm the declaration of the SPM, a Sertifikat Mute(SM) or Certificate of Quality is issued. If the test results do not confirm the stated quality in the SPM, a Laporan Hasil Analisa (LHA) or Test Result is issued. In compulsory implementation of the standard for export, the exporter must have a Certificate of Quality for each consignment for export, although the Certificate of

Quality itself is not mandatory export document. Exporting producers who have a satisfactorily established quality control management system are given the opportunity to apply for accreditation to issue Certificate of Quality for their own products.

(2) For import and domestic products

Based on a Presidential Decree, a consignment of commodities vaulted at US$ 5,000 or more shall first be surveyed by Society General de Surveillance (SGS) in the exporting country and a report of inspection called Laporan Kebenaran Pemeriksaan (LKP) is issued, which is a mandatory document for import. The LKP among others declare the quality of the commodity. For a consignment of less than US$5,000, the LKP is not mandatory and instead, inspection is done by customs upon entry. If a standard is mandatory implemented for import, the specified standard is used as guidance for the issuance of the LKP and testing of inspecting samples taken from the commodity already in the domestic market. If the imported commodity does not conform to the implemented standard, a public announcement is made of this fact, the goods are withdrawn from the market and the import license. The mandatory implementation of standards on domestically produced goods are also followed by inspection i.e. sampling and testing of the goods in the domestic market. If results or inspection show non compliance with the specified standard, a report is submitted to the responsible institution, to be used as reference for further steps to be taken in the quality improvement of commodity.

(3) Relative decrees

a) 872/Kp/VII/85 "Ministerial decree regarding quality control of export commodities"

b) Director General for Foreign trade decrees No.54, 55 and 56.

c) 1062/Kp/XII/85 "Ministerial decree regarding quality control of import and local production in market"

(4) Relation with SSN

Regarding Quality inspection system for export, import and domestic trade, the implementation system of standardization and certification is now considered. As in the SII system in which inspection was needed, the inspection policy for commodities is that they should be also obligated to be inspected.

4.1.3.7 Environmental regulation

(1) General

In June, 1990, the Environmental Impact Agency (BAPEDAL) was formed.

BAPEDAL is to assist the President to manage the impacts of population. At present time, Prof.Dr.Emil Salim, the State Minister of Population and the Environment is also the Head of BAPEDAL, and reports directly to the President. The mission statement of BAPEDAL is to "execute the government functions to control environmental impacts using ecological principles in the utilization of natural resources such that the negative impacts of development do not alter environmental functions".

The environmental management policies of BAPEDAL center around;

1) resource conservation and efficient utilization,
2) waste minimization, reuse, and safe disposal,
3) use of Environmental Impact Analysis(AMDAL) as a tool for sustainable development,
4) minimization of the use of hazardous substances, and management of hazardous wastes which are produced,
5) development of environmental management support systems like institutions, laws, incentives, training, laboratories, information systems, etc.
6) increasing public awareness and participation.

limited available resources and the desire to have initial success necessitate the designation of priority areas to be addressed by BAPEDAL. The seven areas of priority and initial focus are;

1) Surface water pollution – Clean River Program (PROKASIH)
2) Air pollution – mobile sources
3) Sanitation in urban areas – Clean City Program(ADIPURA)
4) Control of environmental destruction
5) Application of Environmental Impact Assessment(AMDAL)
6) Hazardous waste management
7) Small-scale activities

The Ministry of Environment has published standards similar to ones of ISO/TC207. There are 11 items(standards) to date. These standards are not products standards, but mostly system standards like for environmental audit. Organizational structure for the development of standards is not of standing committees but of temporary committees. Technical committees consist of members from universities, research centers, LIPI and relevant government ministries or agencies, and members for working groups are from relevant government ministry and/or agencies.

In order to respond to increasing concern about environmental issues, the major task of the Ministry of Environment at the moment is to establish an certification scheme in the field of environment to handle laboratory environment testing, standards and training with

environment. They say that the Ministry of Environment has already made the application to become a member of DSN under SSN and an organizational change in the near future is expected to accommodate the KAIT system.

(2) Laws and regulations related to environment are as follows;

1) Law (U.U.) No.4/1982 Regarding the regulations of environment management issues.
2) Law (U.U.) No.24/1992 Regarding space system/order.
3) Government regulation (P.P.) No.51/1993 Regarding analysis of environment effect with its implementation regulation regulated in Ministry of Environment decree.
4) Law (U.U.) No.5/1994 Regarding national resources variety.
5) Law (U.U.) No.6/1994 Regarding climate changes.
6) Government regulation (P.P.) No.20/1990 Regarding water pollution management impact system, also its implementation regulation regulated in Ministry of Environment decree.
7) Government regulation (P.P.) No.19/1994 Regarding management of hazardous and toxic waste which its implementation regulation is still in preparation.

4.1.4 SSN-related laws and regulations

Laws and regulations related to SSN (National Standardization System), currently in force, are as follows:

(1) National level:

1) Provision authorizing the government to establish standards: Article 19 of Law No.5/1984 concerning the industries
2) Penal provision for violation of Article 19 above: Article 26, ditto
3) Legal authority on industrial development, operation and maintenance: Cabinet Order No.17/1986
4) Provision related to SNI: Cabinet Order No.15/1991
5) Provision related to duties and functions of DSN: Presidential Decree No.20/1984
6) Provision related to duties and functions of DSN (revised): Presidential Decree No.7/1989
7) Provision related to the establishment, implementation and supervision of SNI: Presidential Decree No.12/1991
8) provision related to the use of SNI for government procured goods: Article 24(2)d of Presidential Decree No.16/1994

Presidential Decree No.7 above will be revised to introduce a technical certification committee ("KAIT") on metrology that supports KAN responsible for the national certification system.

(2) LIPI-DSN level

1) Provision related to SSN (National Standardization System): 18/.2.06/HK.01.04/5/92 (This provision is under revision to adopt the KAIT system for calibration of measuring instruments)
2) Provision related to KAN: 465/.2.06/HK.01.04/9/92
3) Appointment of KAN members: 486/.2.06/HK.01.04/10/92
4) KAN's work procedures: 854/.2.06/HK.01.04/10/92
5) KAIT's work procedures
6) Certification and accreditation guideline: 23 approved, 15 pending, with a final goal of 70; based on ISO/IEC Guides

(3) Ministerial level

As of November 1994, SSN regulations for most ministries and agencies related to the industry, except for the Ministry of Industry, were pending the approval of the minister or under consideration. Many of these ministries and agencies develop regulations based on MOI regulations as a model. SSN regulations issued by the Ministry of Industry, as of November 1994, are as follows:

1) Provision related to standardization, certification, and accreditation: 203/M/SK/11/1992
2) Provision related to organization and work program of KAIT: 192/M/SK/9/1993
3) Appointment of KAIT's members: 236/M/SK/10/1993
4) Provision related to regulation and method for accreditation of quality system certification body: 18/BPPI/SK/X/1993
5) Regulations and methods for the use of SNI mark for industrial products: 192/M/SK/8/1994
6) Implementation guidance for regulations and methods for the use of SNI mark: 12/BPPI/SK/IX/1994

4.1.5 Division of functions and responsibilities among related organizations

4.1.5.1 Division of functions between DSN and technical institutions (ministries and agencies)

Division of functions between DSN and technical institutions (ministries and agencies) are as follows.

(1) Executor procedures

Under the Standards Job Description and Scope of Standards Work established by DSN, the assigned Technical institutions shall start their respective standards work. The assigned Technical institutions are required to establish a mutual understanding and a coordinated cooperation oriented to an amicable solution of any possible disputes.

(2) Duties between DSN and Technical institutions (TI) in the SSN organization relationship regarding scope of work;

1) Characteristics and activities
   TI: According to its field
   DSN: National
2) Function
   TI: Standardization management in its field
   DSN: Coordinating the synchronization and building team work
3) Policy
   TI: Standardization policy in its field based on national policy determined by DSN
   DSN: National standardization activities
4) Program
   TI: Formulating and organizing standardization implementation program in its field based on national policy determined by DSN
   DSN: The coordination and synchronization program nationally
5) Ordering and organizing
   TI: According to its field
   DSN: The coordination and synchronization of the Technical institutions activity in the standardization field
6) Standards formulating
   TI: Formulating draft standard that will be concensused and proposed to the Council to get the approval
   DSN: – Organizing and approving standards formulation procedure

- Approving draft standard resulted form consensus becoming national standards

7) Determining standards

TI: - Determining the application national standard rules
- Application national standards
- Giving penalty in the implementation of the standardization activities
- Implementing accreditation, certification and signing on behalf of the DSN

DSN: - Organizing and approving criteria
- Application national standards
- Organizing and approving accreditation, certification and signing system
- Through Technical institutions carry out accreditation, certification and signing

8) Developing and supervising standards

TI: According to the field

DSN: Building activity and team work between Technical institutions in standardization field

9) Researching and developing standards

TI: According to the field

DSN: As national standardization central research and development

10) Metrology

TI: Become the member of national calibrating network

DSN: Coordination of calibrating activity

11) Team work and information standardization

TI: Creating international relationship, publication, publicity, popularization, education and training of standardization in its field

DSN: - Implementing international relationship, coordinating and synchronizing Technical institutions participation in various international institutions and technical team work at bilateral, regional and international level for standardization
- Developing pattern and building technical institution role and team work between Technical institutions in international, regional, and bilateral standardization activity.
- Central standardization information and "Clearing house"
- Publication, publicity, popularization of national standardization

12) Accreditation

TI: Accrediting unit/laboratory/third party on behalf of the Council according to its field

DSN: Accrediting Technical institutions to run subsystem from SSN.

4.1.5.2 Division of responsibilities between technical institutions (ministries and agencies)

(1) Working rules

DSN's committee on standardization policy and planning (DSN–Committee A) receives report on standardization program and its scope from technical institutions and is required to prepare detailed manuals for the scope and program of standardization activity of each technical institution.

a) Legal matters

1. Compliance with existing laws and regulations
2. Clarification of activity areas
3. SSN

b) When duplication exists, the simplest solution is to follow Cabinet Order No.7 (Authority Related to Management, Maintenance, and Development of the Industries) The standardization plan of each technical institution is expected to be operated in a smooth and coordinated manner and on the basis of mutual understanding and overall cooperation within the framework of SSN.

(2) Division of standard–related activities

To avoid repeating of standardization activities and duties in Indonesia, it is decided to allocate activities described in Chart 4–4 in accordance with general rules.

4.1.6 Major implementation body

4.1.6.1 LIPI

As discussed earlier, DSN plays a central role as the policy making and approval organization in the establishment of Indonesian standards and the certification and accreditation system. Its secretariat is LIPI's Institute for Standardization (LIPI–PUSTAN). Its organization as of October 1994 is shown in Chart 4–19. The organization has 55 employees and consists of the following five divisions:

1) Division of R&D
2) Division of System Development & Standards Implementation
3) Division of Scientific Invention
4) Division of Information and Services
5) Division of Administration

Division of responsibilities of DSN's secretariat is as follows:

1) R&D Department serves as a secretariat for DSN–Committee B (standards formulation) and Committee F (safety evaluation).
2) System Development/Standards Implementation Department serves as DSN–Committee A (policy and planning), Committee C (standards application, testing, and certification), Committee E (metrology), and KAN (national accreditation committee).
3) Information/Service Department acts as the secretariat for international organizations such as ISO, IEC, CODEX, regional standardization, and standard code.

The staffing will be increased from 55 to 80 over the next five years.

The annual budget was 850 million Rps. in 1994, consisting of:

Labor cost and administrative expenses: 350 million Rps.
Meeting and other project costs: 500 million Rps.

4.1.6.2 Center for industrial standardization (PUSTAN)

The Ministry of Industry is an enforcement body accounting for more than 70% of national standardization projects. Within MOI, PUSTAN (Center for Industrial Standardization) under BPPI (Agency for Industrial Research and Development) is responsible for day–to–day operation and management of the standardization program. Organizational charts of MOI, BPPI, and PUSTAN in 1994 are shown in Charts 4–20, 4–21, and 4–22, respectively.

PUSTAN has 55 staff (as of October 1994) and 3 departments, reduced from 60 staff and 5 departments in 1994 as a result of organizational reform in the ministry. In response to staff reduction, it was decided to transfer the formulation of draft SNI to research institutes and testing laboratories under BPPI. Major duties and functions of PUSTAN are summarized as follows:

1) Functions of PUSTAN are as follows;
   a) Formulation of the draft Indonesian National Standards (SNI) for industrial sector,
   b) Operation of assessment of quality system certification bodies and testing laboratories,
   c) Formulation of standards implementation system and operation of industrial product certification through SNI marking scheme.
2) PUSTAN has following Divisions (See Chart 4–22);
   a) Division of industrial standards formulation,
   b) Division of accreditation,

c) Division of product certification,

d) Functional group.

3) Functions of division of industrial standards formulation are as follows;

a) identification and preparation for formulation program of SNI for industrial sector,

b) preparation draft SNI for industrial sector,

c) draft finalization and recommendation for stipulation of SNI for industrial sector,

d) operation of documentation and duplication.

4) Functions of division of accreditation are as follows;

a) identification and formulation of development plan for quality system certification bodies and testing laboratories,

b) assessment of quality system certification bodies and testing laboratories,

c) surveillance of quality system certification bodies and testing laboratories,

d) operation of administration services for the center.

5) Functions of division of product certification are as follows;

a) assessment of standards implementation system and operation of industrial product certification through SNI marking scheme,

b) surveillance of standards implementation system and operation of industrial product certification through SNI marking scheme,

c) operation of development for certification cooperation,

d) dissemination of information and promotion of SNI for industrial sector.

6) Functional groups consist of a number of functional personnel which regulated with the applicable regulations. Functional group is chaired by a senior functional personnel whom will be appointed by the Head of Pustan, The number of functional personnel is determined based on the needs and works loads, Type and hierarchy of functional position are regulated in accordance with the applicable regulations.

7) Budget trends

PUSTAN's budget trends over the past five years between 1990/91 and 1994/95 are as follows.

(Unit: million Rps.)

Year	Ordinary expenses	Development expenses	Total
90/91	229.8 (34%)	437.4 (66%)	667.2
91/92	307.9 (35%)	570.8 (65%)	878.7
92/93	336.0 (25.5%)	979.7 (74.5%)	1,315.7
93/94	433.2 (29%)	1,059.3 (71%)	1,492.5
94/95	526.8 (32%)	1,119.3 (68%)	1,646.1

Note: ( ) denotes percentage share for each fiscal year.

4.2 Current State of the Standardization Project and Major Issues

4.2.1 General

At the time of the present study, SSN is in the suspension period until April 1995, during which laws, institutional arrangement, organizational structure, manpower, and facilities and equipment are set up for official implementation. Thus, the general structure of the project, as discussed above, contains many elements that are to be completed in the future. The following section describes the current state of the project (as of December 1994) together with major achievements and issues to be resolved.

4.2.2 Current state of basic guidelines and major issues

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 requires individual guidelines that are referred to in the basic guideline. Approximately 70 guidelines plan to be formulated under the current plan, and nearly one half is in the preparation stage. Thus, early formulation of the remaining guidelines is important.

To enable technical institutions to implement SNI, operating rules such as those for MOI's SNI marking system are needed for persons who are actually engaged in day-to-day enforcement. At present, no other operating rules are available.

Finally, implementation of SSN in accordance with basic rules will require manpower for certification service, and resources to conduct compliance tests including equipment and manpower. In fact, mobilization of such resources is much more important than other activities.

4.2.3 Current state of legislation, institutional arrangement, and organizational setup, and major issues

4.2.3.1 Legislation

Laws and regulations required to make SSN operational are currently under preparation as follows.

(1) National level

The presidential decree defining duties and functions of DSN is being revised to introduce the KAIT system for meteorological calibration.

(2) LIPI-DSN level

1) The provision related to SSN is being revised to incorporate the KAIT system for meteorological calibration.

2) KAIT's work procedures are under preparation.

3) As of December 1994, 23 SSN guidelines were approved, and 15 pending. Ultimately, approximately 70 guidelines will be adopted.

(3) Ministerial level

At ministries related to the industrial sector other than MOI, the Ministry of Trade, the Ministry of Mining and Energy, the Ministry of Environment, the Ministry of Communication, the Ministry of Public Works, the Ministry of Agriculture, the Ministry of Tourism, Post and Telecommunications, and the Ministry of Manpower, SSN-related laws and regulations waited for the minister's signature or under consideration at the time of the present study. Many ministries are using MOI's regulations as a model.

4.2.3.2 Institutional arrangement and organizational setup

(1) Institutional arrangement and organizational structure for standardization

The establishment of SNI is the key to the success of the national standardization project. The Ministry of Industry has the committee organization for SNI establishment in accordance with SSN's basic rules. The ministry, that is responsible for 70% of all SNI, anticipates that the shortage of resources to meet workload required by the draft SNI formulation process, which will further increase in 1995, including the shortage of working space, office equipment, and funds. Thus, mobilization of resources seems to be essential in ensuring smooth formulation of SNI.

On the other hand, the above problem has not been heard in other ministries. This is because most ministries and agencies except for the Ministry of Industry do not have plans to develop standards at a pace that requires a permanent technical committee.

(2) Certification and accreditation system

1) Certification and accreditation scheme

At present, the Ministry of Industry is far ahead of other ministries in development of the scheme. In fact, MOI is only one ministry that has KAIT (as of October 1994).

2) DSN guidelines related to certification and accreditation

DSN plans to establish approximately 70 guidelines for the certification and accreditation scheme. As of October 1994, 23 guidelines have been approved, and 15

pending approval. These guidelines are based on ISO/IEC Guides and have been modified according to local conditions.

Approved DSN guidelines are listed in Chart 4–23.

Those waiting for approval are listed in Chart 4–24.

4.2.4 Current state of establishment and revision of standards, and major issues

(1) Priority in standards formulation

Under the SNI formulation system, anyone can propose SNI. In practice, however, most of standards have been proposed by ministries and agencies that serve as technical institutions.

Standards are classified into basic standards, methods, and products. Proposed standards are first evaluated by each ministry in terms of urgency and priority and are submitted to DSN with proposal for incorporation into the standards formulation plan. However, evaluation criteria and methods for proposed standards have not been established, and an annual business plan based on standardization policy has still to be formulated.

PUSTAN under the Ministry of Industry plans to develop 2,250 standards including revisions by the end of the REPELITA VI period (1994/95 – 1998/99). Since approximately 250 standards have been developed, 500 standards are expected to be formulated annually starting in FY1995. This means, 25 research institutes under MOI/BPPI are required to develop 20 standards annually. A plan specifying these standards by field and category has not been revealed. Priority of standards formulation, in the case of MOI, is set forth by Steering Committee (TKSI) organized by representatives of research institutes under BPPI.

(2) Current state of standards formulation

As of October 1994, SNI contains a total of 3,550 standards. In addition, 200 have been reviewed and wait for approval. 3,550 standards include 15 revised standards. As shown in Chart 4–25, SNI is divided into 19 divisions[2)]. The number of SNI standards (as of 1993) under jurisdiction of MOI, by field, is shown in Chart 4–26.

(3) SNI mandatory standards

SNI primarily consists of voluntary standards. However, as pointed out in the SNI

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2) JIS is divided into 18 divisions within categories A – Z.

implementation system under SSN, standards related to safety, public health, the environment, and similar categories may be designated as mandatory standards upon decision by technical institutions. 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 (Ministry of Mining and Energy standards).

(4) Language

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

(5) Number of national standards

MOI's long-term plan envisages the reviewing of 2,250 standards by the end of REPELITA VI (1994/95 - 1998/99), while the basis of estimation has not been identified. Nevertheless, compared to currently available 3,550 standards, the plan seems to indicate the reasonable figure[3)].

Also, MOI states that 6,000 standards will be required in the industry sector, with no detailed breakdown.

(6) Current state of standards development by field

Chart 4-27 compares the number of SNI standards and that of JIS/JAS by field.

As of March 31, 1994, there were 8,184 JIS standards that are divided into 18 divisions. Note that JIS is a set of national standards focusing on mining and industrial products, and does not include pharmaceuticals, agricultural chemicals, and chemical fertilizers that are under special standards and are regulated by different laws. Also agricultural goods including foodstuff, which fall under the definition of "Law Concerning Standardization and Proper Labeling of Agricultural and Forestry Products" are incorporated into JAS (Japanese Agricultural Standards), totaling 395 standards as of 1994.

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3) The total number of standards at present is close to that of JIS in 1954. Over a ten year period after 1954, 500 JIS standards on average, were either established or reviewed annually.

(7) Priority areas in standards development

Measured by the number of standards according to industrial field, relative weight seems to be placed on chemical engineering, mechanical engineering, agricultural and food products, metals, building and construction, and textile. Overall, the establishment of standards is progress at more or less the same pace in all the areas except for information processing and aircraft and aviation.

To ensure smooth development of standards, setting priority in particular areas is needed to utilize limited resources effectively. Under close cooperation with industry policy divisions of MOI, priority areas of standards development should be established for export and import substitution industries as well as their suppliers. In particular, since these industries are sensitive to product quality, factory management standards need to be established as basic standards so that they can be cited in corporate testing and inspection standards.

In addition, technical terms and symbols commonly used in each field should be incorporated into standards as early as possible before a complete set of standards is established in order to avoid confusion among users.

4.2.5 Current state of certification and accreditation, and major issues

4.2.5.1 Accreditation

(1) Accreditation of quality system certification bodies

Accreditation of quality system certification bodies is carried out partly based on the review and registration scheme of quality systems under ISO 9000 series and the SNI marking system. In April 1994, DSN-KAN accredited B4T-OSC, one of sectoral R&D institutes under BPPI, as the first quality system certification body. Then, two more organizations, SROA (Sucofindo) and ABIOA (BBIHP) were accredited by November 1994. As of November 1994, 2 organizations (KEMa-Indonesia and Textile Institute-TIOA) are under review.

By the end of REPELITA VI, the Ministry of Industry needs 20 quality system certification bodies.

(2) Accreditation of organizations in other categories

As of October 1994, no accreditation has been issued in four categories other than quality systems. MOI states that, by the end of REPELITA VI, it will need accreditation of 25 testing laboratories/calibration bodies.

4.2.5.2 Certification

(1) Quality system certification

As mentioned earlier, B4T is accredited as a quality system certification body and certifies quality systems under ISO 9000 series. By November 1994, B4T accredited 4 companies under ISO 90001 "Quality Systems – Model for Quality Assurance in Design, Development, Production, Installation and Servicing," and one company under ISO 9002 "Quality Systems – Model for Quality Assurance in Production, Installation and Servicing," totaling 5 companies. In addition, 30 companies are under review or wait for review. In addition, 35 companies in Indonesia have received ISO 9000 certification from foreign certification bodies.

The Ministry of Industry plans to certify 350 companies under ISO 9000 series by the end of REPELITA VI.

(2) Product certification

The existing product certification system in Indonesia consists of SII marking (MOI), SIR marking (MOT), and SPCN marking (MOME), all of which are transferred to the SNI marking system.

The SNI marking system requires sample tests for products and certification of quality systems. As of December 1994, however, there is no testing laboratory accredited to perform sample tests and issue certificates.

According to MOI, quality systems under the SNI marking system are checked at the time of application as well as surveillance.

At present, around 1,500 companies have SII marks, and the Ministry of Industry have notified them that they will be certified under the SNI marking system if they follow required procedures by March 1995. In this connection, corporate systems (production and quality control systems) will be checked at the time of surveillance conducted every 6 months according to the provisions of 192/M/SK/8/1994.

The Ministry of Industry intends to certify 1,700 companies under the SNI marking system by the end of REPELITA VI.

(3) Certification of assessors

As of December 1994, no organization has been accredited to certify assessors, and foreign certification bodies are used.

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.

Under the SII marking system of MOI, 517 mandatory marks and 983 voluntary marks were issued by the end of 1993. If all of them are to be shifted to SNI marks, MOI has to conduct 3,000 cases of six-month surveillance annually (1,500 x 2). If 2 persons are assigned to handle 100 cases annually, 60 persons will be required.

4.2.6 Current state of promotion of standards, and major issues

National standards contribute to the national economy only when they are fully used by manufacturers and other related persons and organizations. In this sense, promotion and dissemination of standards are as important as the establishment of standards. Major promotional activities currently underway are as follows.

(1) Information service on establishment of standards

The establishment of standards is published on DSN's quarterly bulletin "standardization News."

At present, information revealed is limited to approval results. It will be useful if more detailed information including the plan for standards establishment and the current status of draft standards in the review process is published. Furthermore, coverage should be expanded to information on establishment and revision of international and foreign standards, accessibility and other information needed by the industries. Also, disclosure of information on the SNI marking system, e.g., announcement of companies who have obtain SNI mark, is considered to be one of effective ways to promote the SNI marking system.

(2) PR activity

Information on standardization including SSN-related activity is published on "Standardization News."

(3) SNI catalogue

Every two years, DSN issues 1,000 copies of SNI catalogue "Indonesia National Standards – SNI Catalogue (Indonesian and English versions)." Also, PUSTAN under MOI issues "Indonesian Standards catalogue (Indonesian and English versions)" covering standards under jurisdiction of MOI.

In the future, these catalogues should cover more detailed information, including identify of a technical institution developing each SNI and personnel to make inquiry, identify of corresponding international standards, adoption of international unit systems (SI), record of SNI mark indication, index, and SNI-related laws and regulations.

(4) Issuance of SNI standards

SNI standards are issued by ministries having jurisdiction with free of charge. PUSTAN issues 100 copies of each standard that can be freely copied. The Ministry of Public Works prints their standards through contractors and sell them at economical prices.

(5) Place of inquiry

Inquiry on SNI and SSN is accepted by LIPI that serves as the secretariat of DSN and refers each question to a responsible technical institution (ministry or agency).

It is desirable to specify technical institutions responsible for standards on SNI catalogues to allow users to make direct inquiry to each institution who has developed a particular standard.

(6) Quality month

DSN is sponsoring Quality Month in every November under cooperation of related ministries and agencies for the purpose of promoting quality improvement, including National Meeting. In 1994, National Meeting was held between November 1 and 3 under the theme of "Activities for Quality Month and National Productivities." In the preparation stage, it was planned to attract around 800 participants including representatives of related ministries and agencies, as well as those of the industries accounting for an estimated 60% of the total. The meeting consisted of various sessions focusing on major topics related to certification and accreditation, including SNI, ISO 9000 series, and metrology and calibration.

Quality Month should be actively promoted by a leading organization, including preparation and distribution of posters and slogans.

Chart 4-1 Working Flow of Formulation and Approval SNI

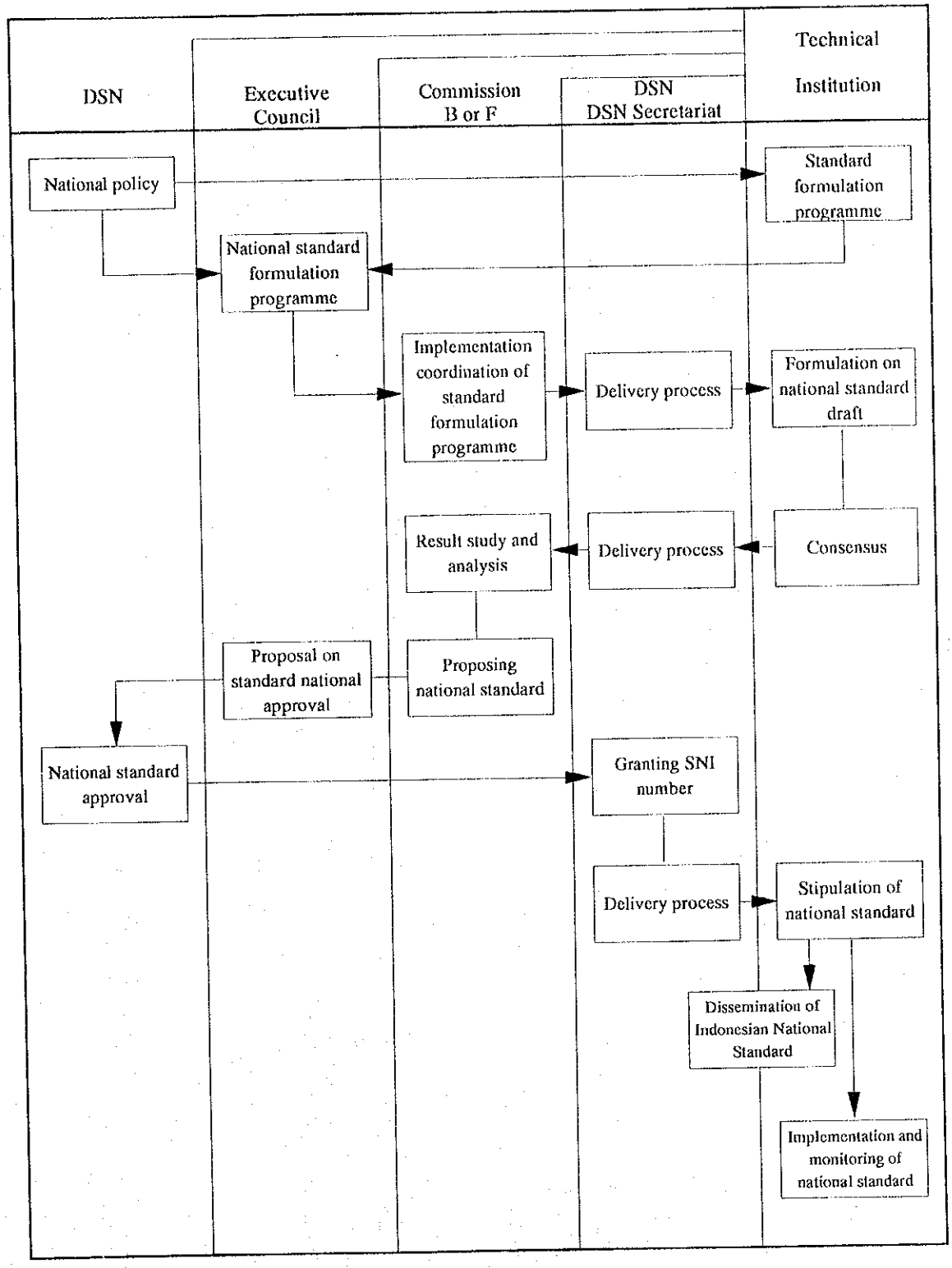
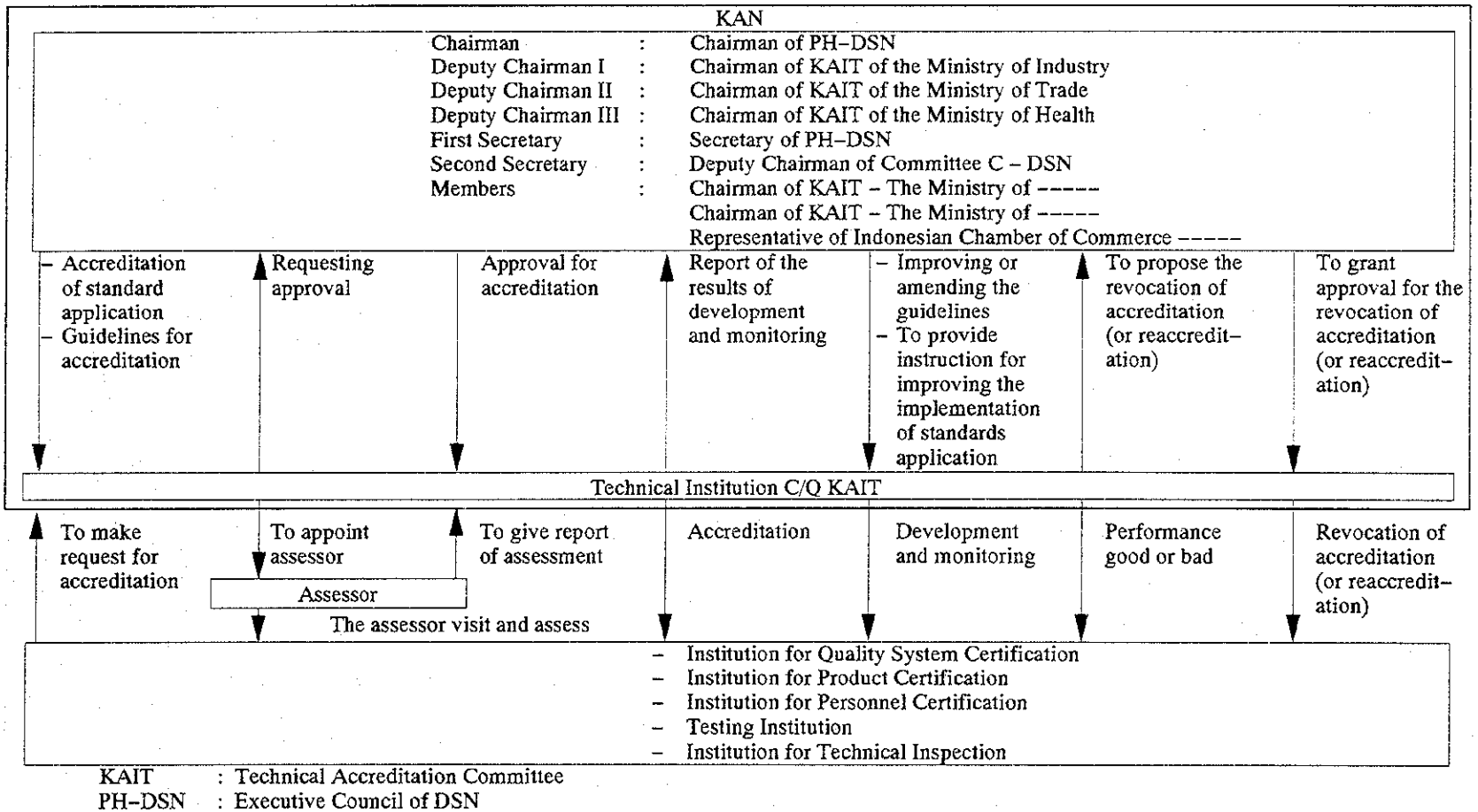


Chart 4-2 Flow of Accreditation by KAN on behalf of DSN for Standard Application



KAIT : Technical Accreditation Committee
PH–DSN : Executive Council of DSN

Chart 4-3 Flow Chart of Accreditation of Testing Labs

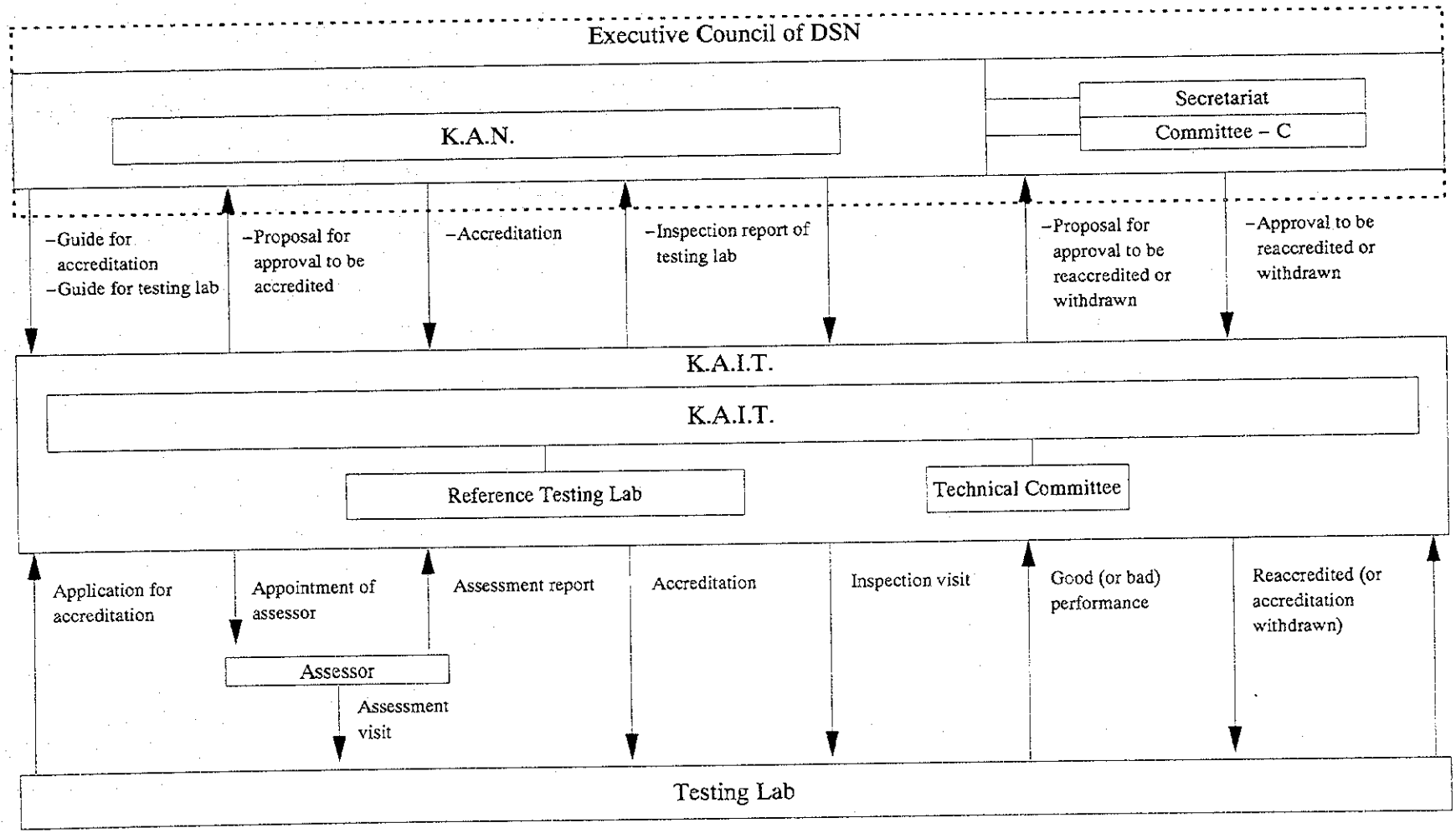


Chart 4–4 Standard Job Description, SSN (1/4)

Responsibilities	Standard Activities	Products/detailed activity areas included
a. Ministry of Industry	1. Agrochemicals	urea, ammonia, active pesticides, etc.
	2. Textiles	yarns, textiles and woven fabrics, garments and other textile products
	3. Electric and metal appliances	electric equipment, electronics, data processors, controls and instruments, electronic components and subassemblies, appliances, etc.
	4. Basic metal	iron, steel, aluminum and copper products
	5. Mechanical and electric machines	equipment machines, plant equipment machines, electrical machines
	6. Land, sea and air transport	motorized vehicles, trains, air planes, heavy equipment, ship,
	7. Foods	cigarettes, processed tobacco, foods & drinks, and agro industrial product in general
	8. Cellulose, rubber and chemicals	pulp, paper, rayons, tires, plastic containers, palm oil, rubber products
	9. Construction and public materials	processed woods, ceramics, hides & leather, rattan, etc.
	10. Organic and inorganic chemicals	chemicals, petrochemicals, olefin, aromatics, intermediate organic products, cement, manufactured gas, basic inorganic materials (soda, chlorine, chloride aids, etc.)
	11. Industrial designs and engineering	
	12. Sport articles, office equipment and utensils	
	13. Petroleum and natural gas exploitation equipment	
b. Ministry of Health	1. Medical preparations, general and generic medicines, biological products including sera, vaccines, biological preparation and blood products	
	2. Medicines of simples (simlicia)	
	3. Food additives	
	4. Cosmetic ingredients and preparation	
	5. Pharmaceutical instrument and supplies meeting Indonesia Pharmacopeia	

Chart 4-4 Standard Job Description, SSN (2/4)

Responsibilities	Standard Activities Products/detailed activity areas included
	6. Hygiene of public utilities 7. Food and drink safety, healthy, quality and other requirements 8. Handling, safety, healthy and other requirements of hazardous materials 9. Medicinal containers which may affect the medicinal quality such as capsules, ampuls, vials
c. Ministry of Mines and Energy	1. Crude oil and refinery products 2. Natural gas and liquified natural gas 3. Minerals of not certain metals 4. Lead ingots 5. Bauxite, alumina 6. Precious metals 7. Copper ingots 8. Other precious metals, metal ingots 9. Nickels ingots 10. Mining work, environment, health requirements 11. Mining techniques 12. Geologic maps, mining geophysics, and energy 13. Electricity basic standards 14. Electric systems 15. Safety aspects of electric appliances and use 16. Electric installations
d. Ministry of Agriculture	1. Sugar cane ugar 2. Oil palm extracts 3. Hullers 4. Sea food processing 5. Black and green tea

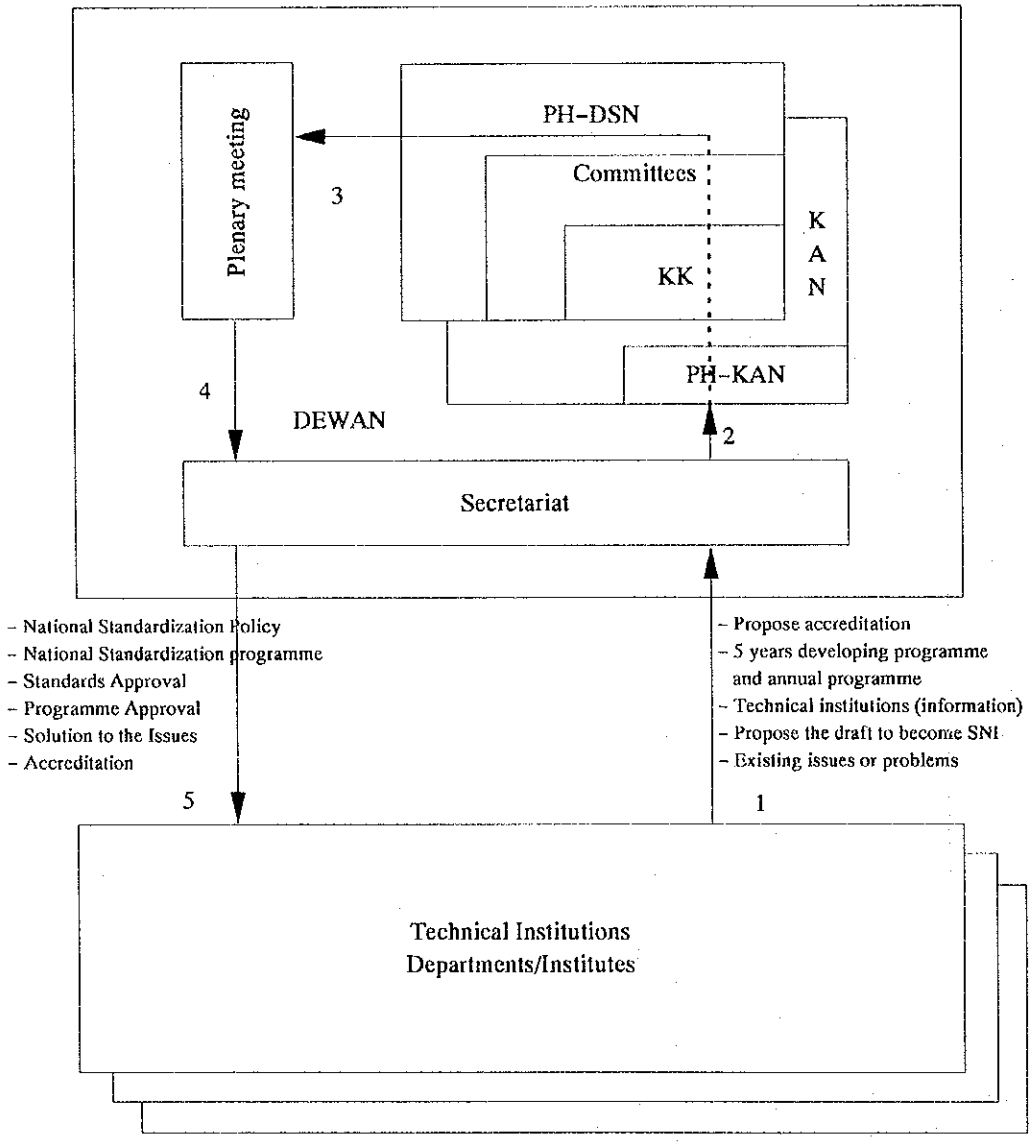
Chart 4-4 Standard Job Description, SSN (3/4)

Responsibilities	Standard Activities	Products/detailed activity areas included
	6. Vaccines	
	7. Sera	
	8. Biological diagnostics for animals	
	9. Raw & processed materials and derivatives	plantation products, husbandry products, food crop products, fish products
	10. Seeds	
	11. Experimental animals and plants	
	12. Agricultural technical basic facilities	
e. Ministry of Trade	1. Domestic, export & import commodities & services	
	2. Legal metrology	
f. Ministry of Transports	1. Land, sea and air worthiness	
	2. Land, sea and air transportation safety	
g. Ministry of Tourism, Post and Telecommunications	1. Telephone cable & accessory systems	
	2. Telephone set system	
	3. Radio & wind sounding systems	
h. Ministry of Labour	1. Work safety at any work place, except mining, both on land, on water surface, underground, underwater and in air	production equipment, production materials, work environment (noise, lighting, dusts, climate or weather), production processes, occupation or job characteristics, operational methods
	2. Work health and company hygiene	
i. National Atomic Energy Commission	1. Atomic energy & materials, nuclear energy fuel, radioactive materials, atomic reactors & installations	
	2. Work safety against radiation	
	3. Nuclear metrology	facilities, personnel, equipment
	4. Radioactive material transportation	

Chart 4-4 Standard Job Description, SSN (4/4)

Responsibilities	Standard Activities	Products/detailed activity areas included
j. Indonesian Science Centre (LIPI)	1. Standard R&D 2. Basic standards 3. Scientific & technical calibration metrology	
k. Ministry of Forestry	1. Material stand 2. Forestry-related standard methods 3. Raw & processed material nomenclatures	forest originated raw and processed materials
l. Ministry of Public Works	Indonesian Structure Constructing Standards	Standardization of non-mass construction works

Chart 4-5 Working Flow of DSN and Technical Institutions



1. Incoming and administration by secretariat
2. To be processed by PH-DSN through committees and KK and/or KAN
3. To be reported to the Council (Plenary) and discussed, decided/approved
4. Administration by secretariat
5. Sent to/given to related technical institutions

Chart 4-6 Scope of Activities of DSN

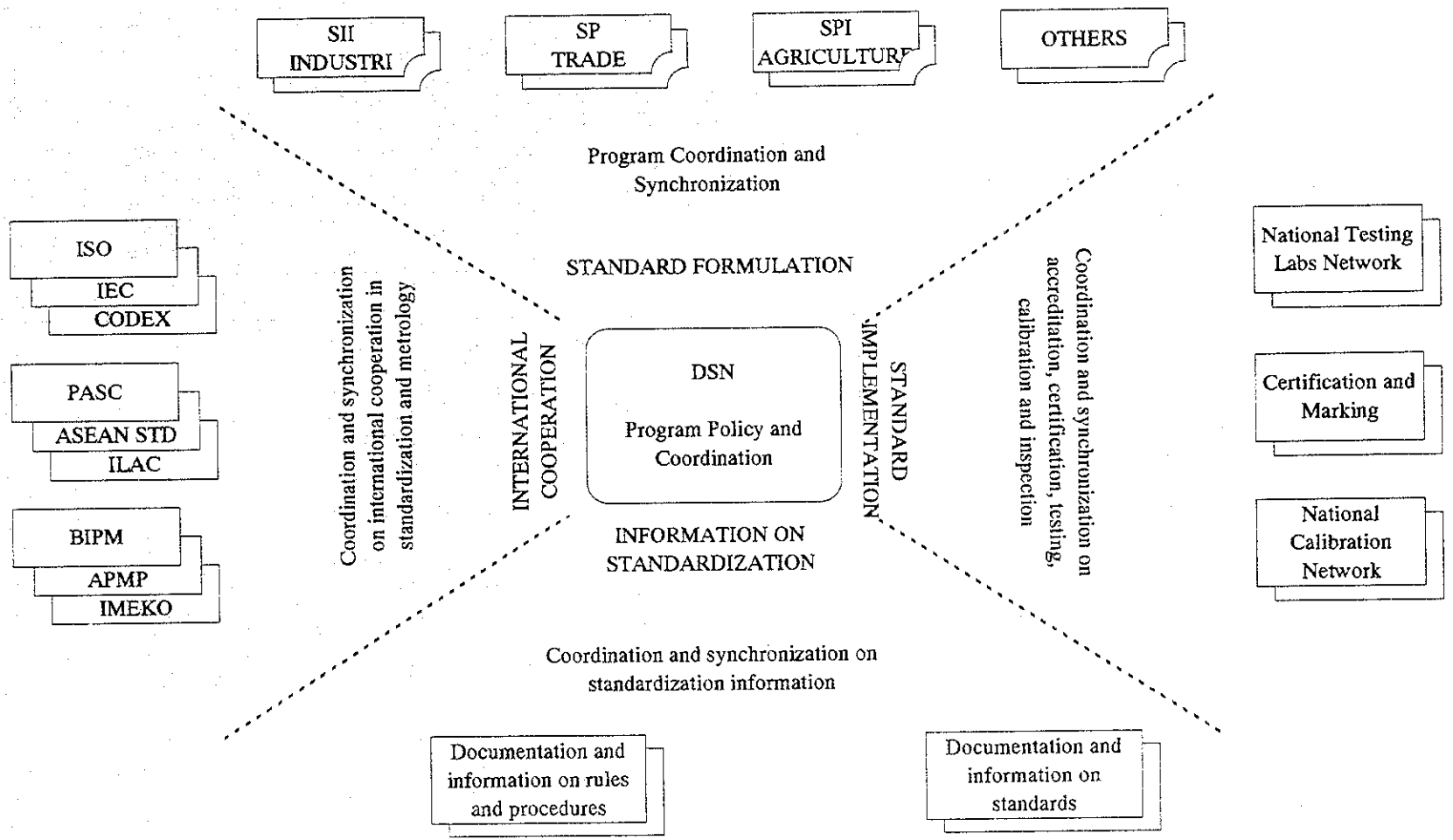


Chart 4–7 Structural Organization of DSN

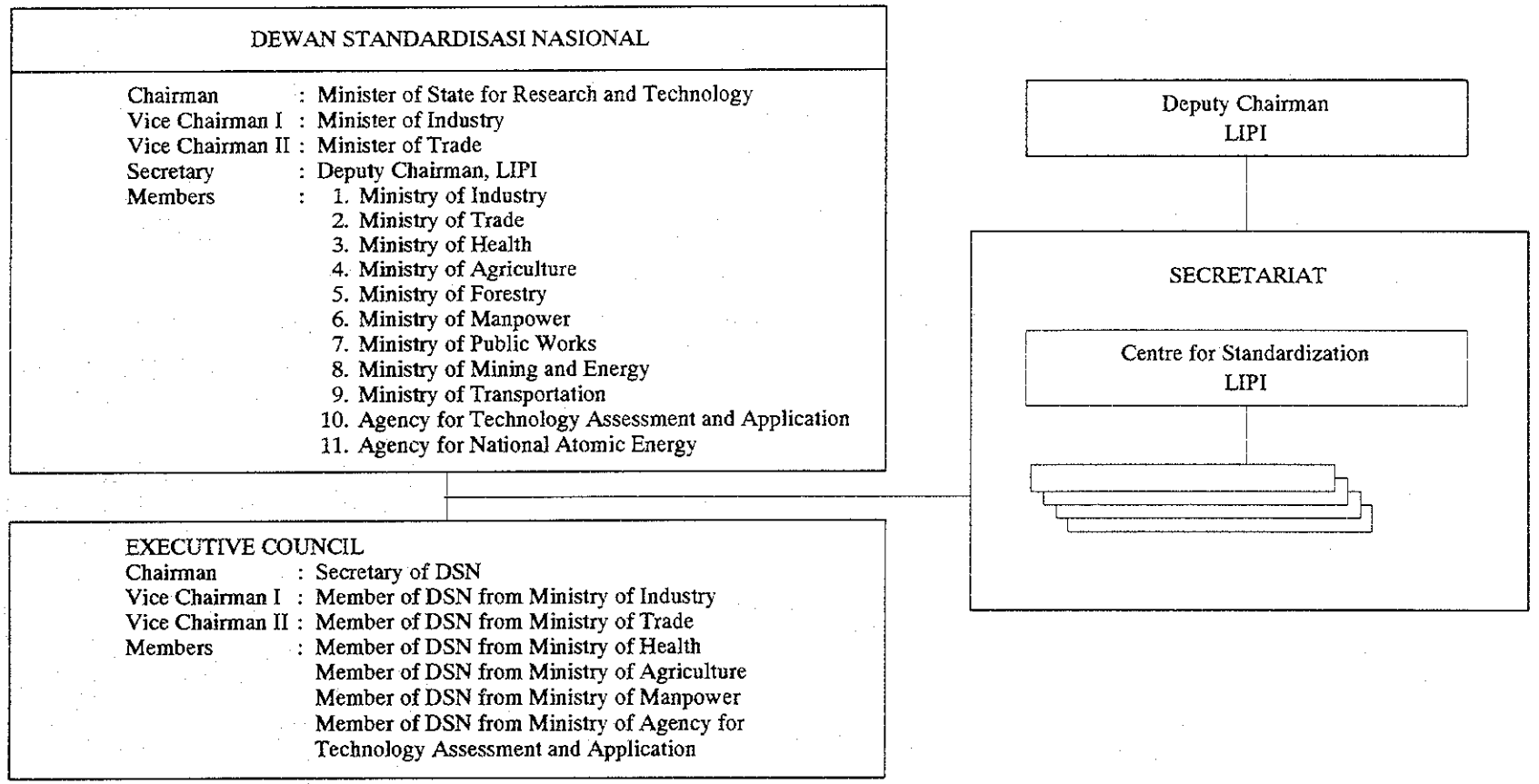


Chart 4–8 Supporting Units of DSN

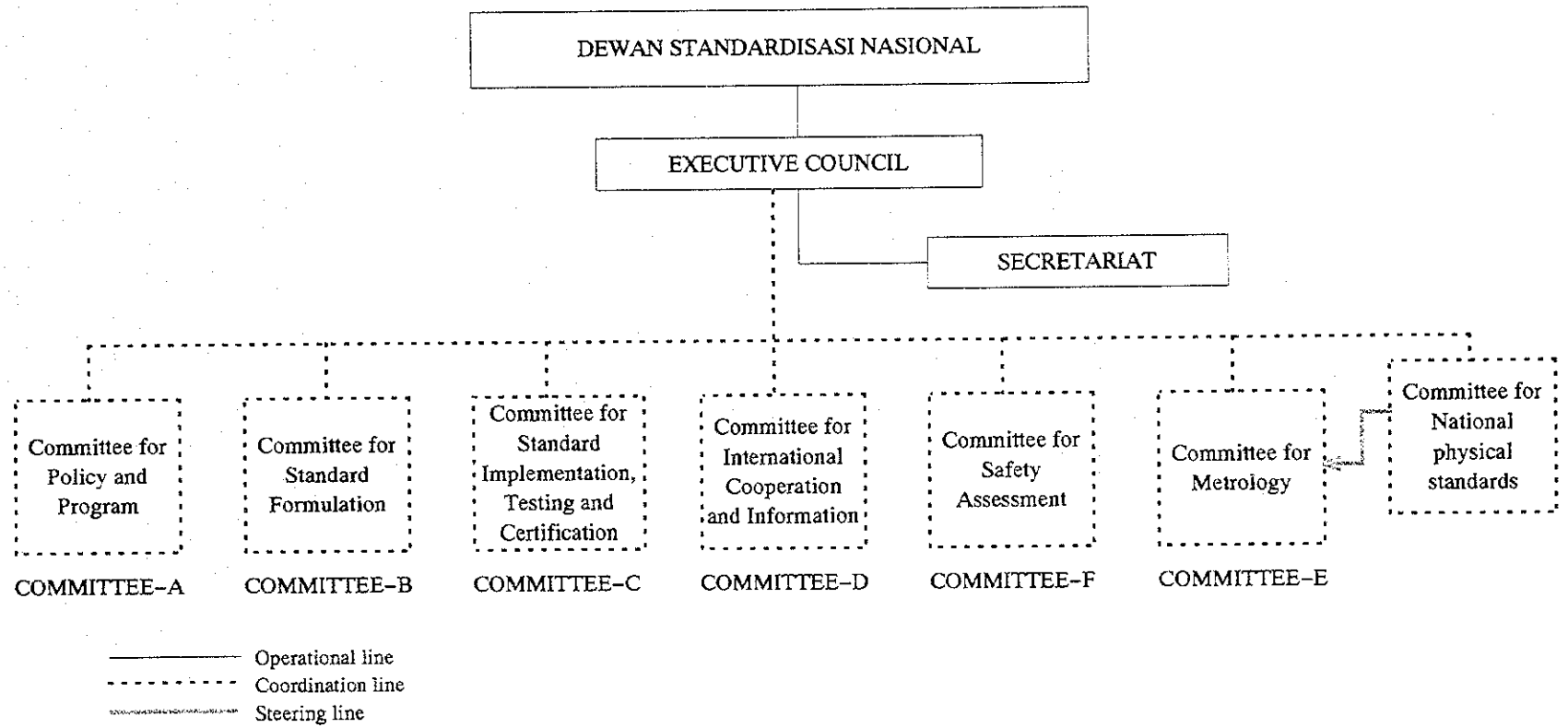


Chart 4-9 Standard Formulation

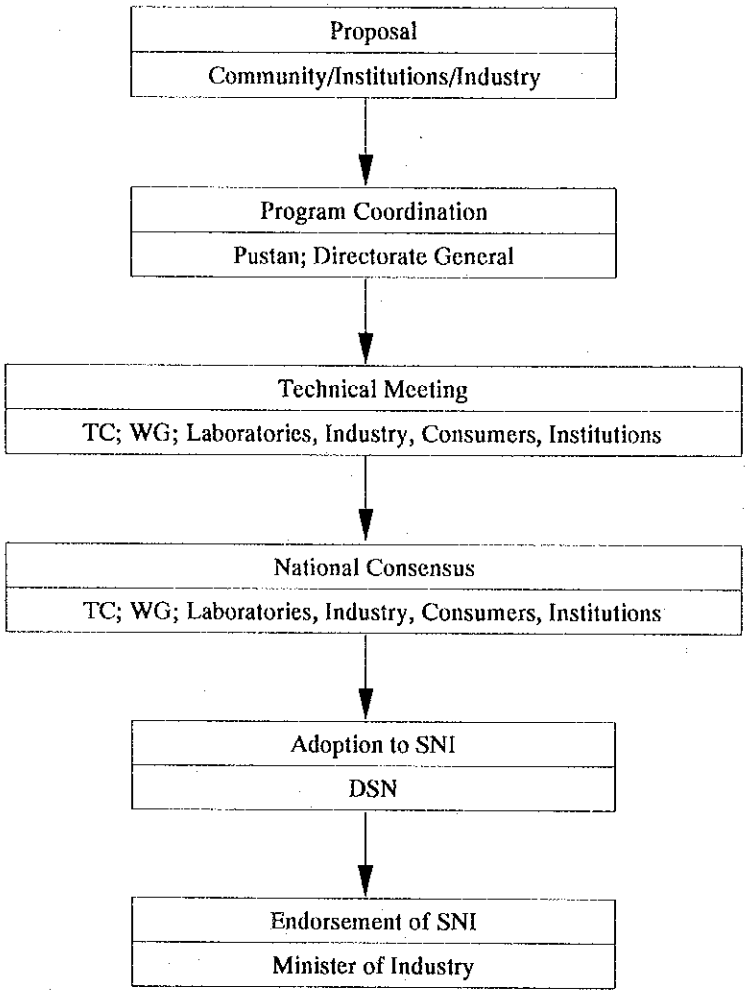


Chart 4-10 Technical Committees of PUSTAN

1)	Machinery
2)	Shipbuilding & offshore construction
3)	Automobiles
4)	Textiles
5)	Electrical
6)	Electronic
7)	Agrochemical
8)	Metallic materials & products
9)	Food and beverages
10)	Rubber, leather & plastic
11)	Chemicals
12)	Sports, office & school equipment
13)	Pulp & paper
14)	Packaging
15)	Non-metallic building

Chart 4-11 Typical Composition of TC Membership, PUSTAN

Representative	Number	Party	
Machinery & equipment TC			
Ministry of industry staff	7	Administration	(Neutral)
Related ministry staff	4	Administration	(Neutral)
Institutes	4	Expert	(Neutral)
Chamber of commerce and industry	10	Expert	(Commerce)
Association	6	Expert	(Producer)
Private company	3	Expert	(Producer)
Consumer association	–		(Consumer)
Rubber, leather & plastic TC			
Ministry of industry staff	11	Administration	(Neutral)
Related ministry staff	6	Administration	(Neutral)
Institutes	1	Expert	(Neutral)
Chamber of commerce and industry	8	Expert	(Commerce)
Association	18	Expert	(Producer)
Private company	4	Expert	(Producer)
Consumer association	1		(Consumer)

Chart 4–12 Accreditation and Certification Scheme in Indonesia

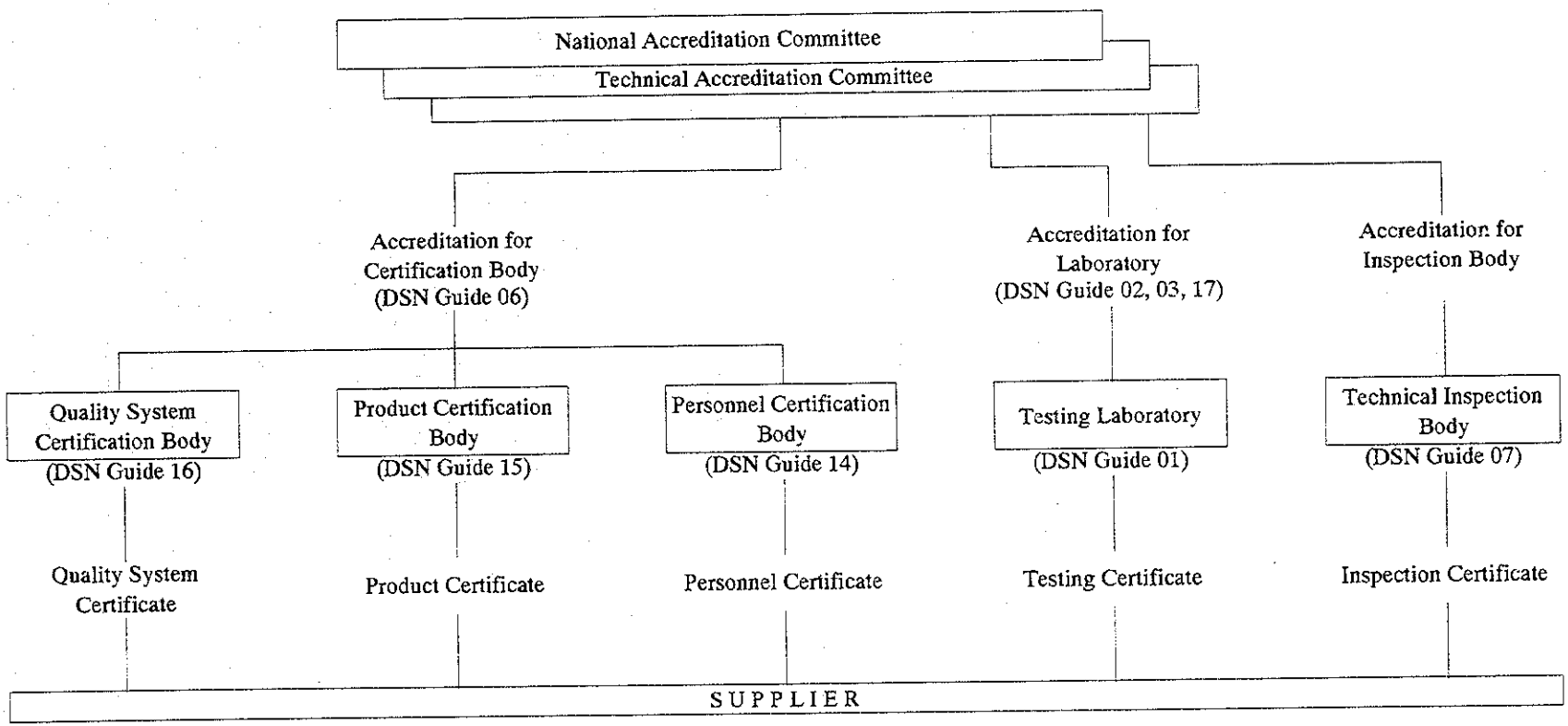


Chart 4-13 General Work Flow of SSN's Accreditation

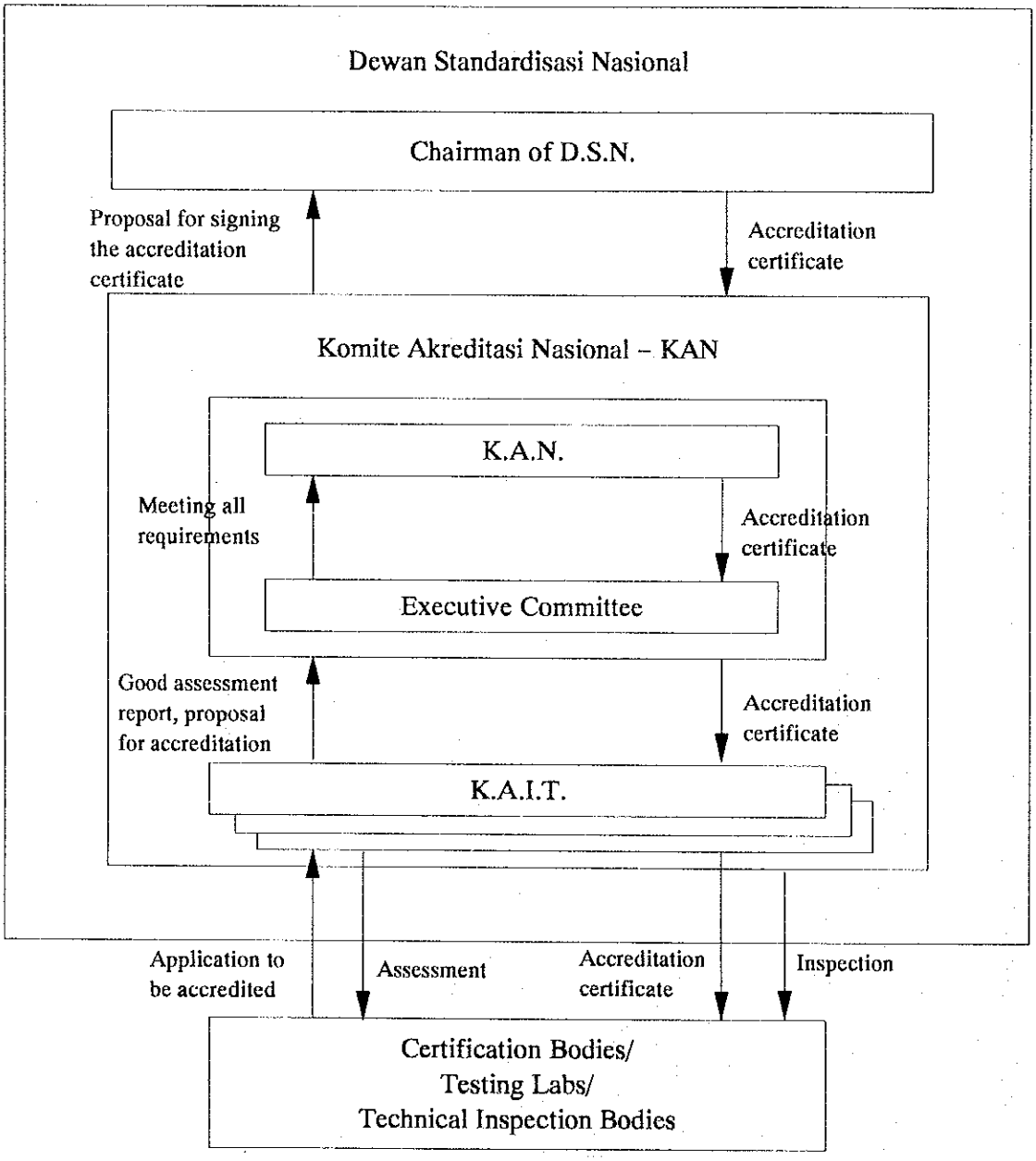


Chart 4-14 List of Element Conditions Module

Element Titles Conditions/Terms	Module IV 9001	Module III 9002	Module II 9003	Module I P-DSN
Management requirements	4.1 *	4.1 <	4.1 o	4.1 <<
Quality system	4.2 *	4.2 *	4.2 <	4.2 <<
Contract review	4.3 *	4.3 *	–	–
Design control	4.4 *	–	–	–
Document control	4.5 *	4.4 *	4.3 <	4.3 <
Purchasing	4.6 *	4.5 *	–	4.4 o
Purchaser supplied product	4.7 *	4.6 *	–	4.5 o
Product identification and traceability	4.8 *	4.7 *	4.4 <	4.6 <<
Process control	4.9 *	4.8 *	–	4.7 o
Inspection and testing	4.10 *	4.9 *	4.5 <	4.8 <
Inspection, measuring and test equipment	4.1 *	4.10 *	4.6 <	4.9 <<
Inspection and test status	4.1 *	4.1 *	4.7 <	4.10 <
Control of nonconforming product	4.1 *	4.1 *	4.8 <	4.1 <
Corrective action	4.1 *	4.1 *	–	4.1 o
Handling, storage, packaging and delivery	4.2 *	4.1 *	4.9 <	4.1 <
Quality records	4.2 *	4.2 *	4.10 <	4.1 <
Internal quality audits	4.2 *	4.2 <	–	–
Training	4.2 *	4.2 <	4.1 o	4.2 o
Servicing	4.2 *	–	–	–
Statistical techniques	4.20 *	4.2 *	4.1 <	4.2 <<

Remarks:
- * Full conditions
- < Not too tight compared to SNI 19-9001
- o Not too tight compared to SNI 19-9002
- << Not too tight compared to SNI 19-9003
- – This element is not exist

Chart 4-15 Application Procedure of SNI Marking System

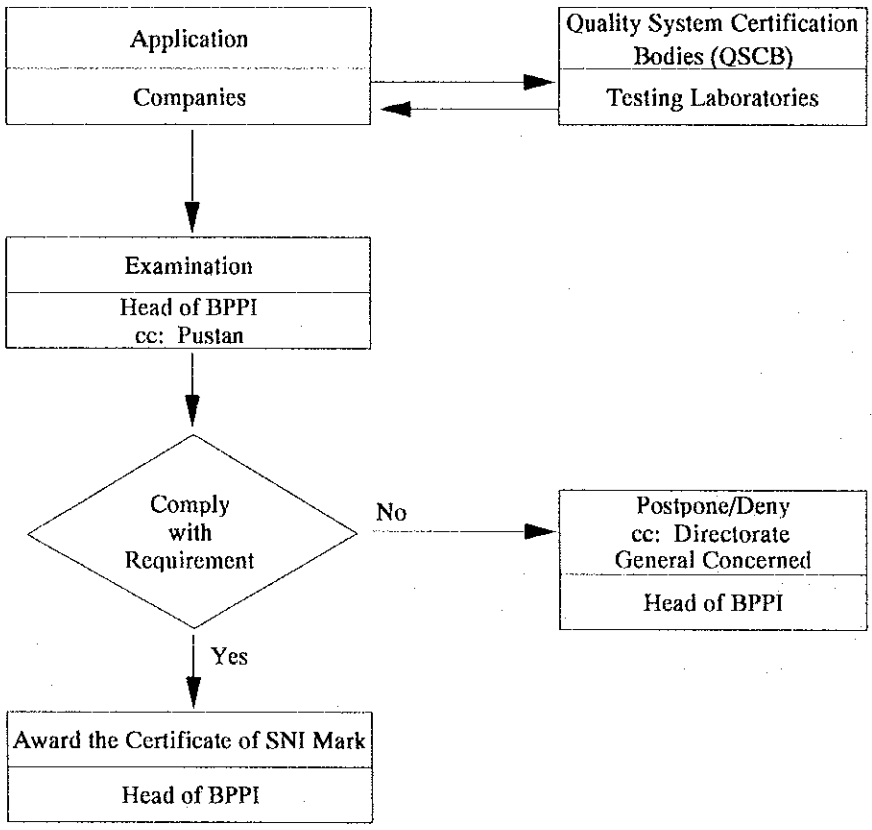


Chart 4-16 Surveillance Procedure of SNI Marking System

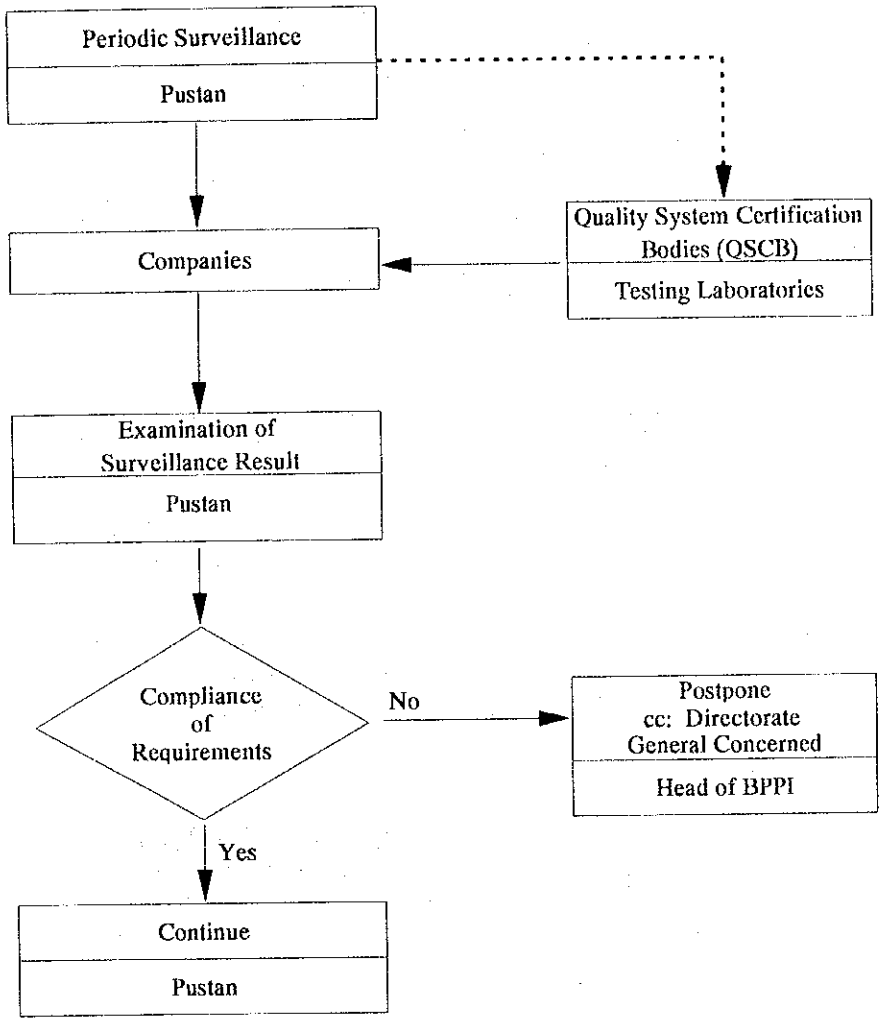


Chart 4-17 Flow Process of Corrective Action

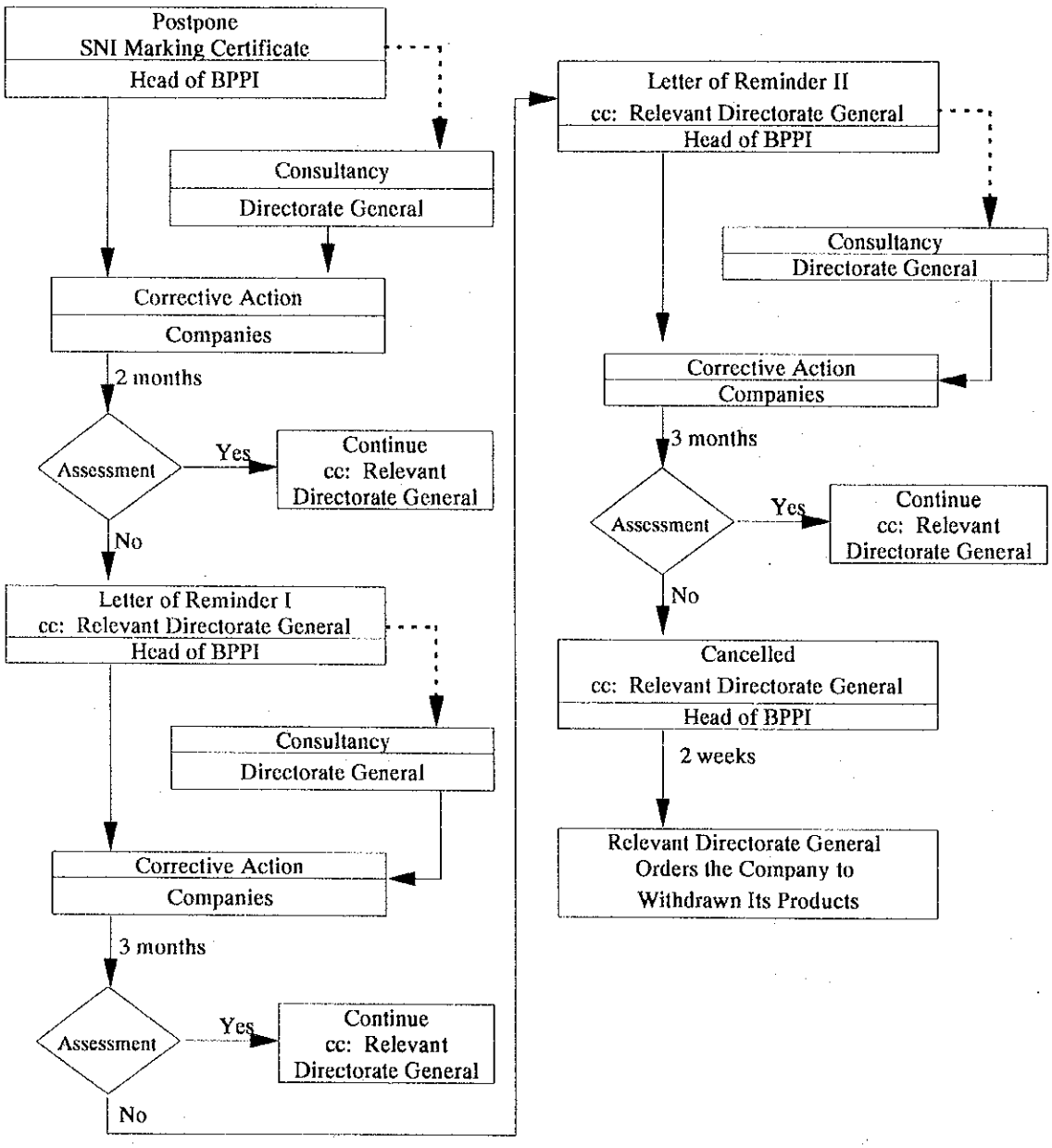


Chart 4-18 Forms for Implementation of Use of SNI Mark

No.	Forms
STD-01	Application for SNI mark certification
STD-02	Application form
STD-03	Quality control qualification
STD-04	Product quality control
STD-05	Training of quality and production controlling staff
STD-06	Raw & substitute material quality control
STD-07	Subcontract work quality control
STD-08	Production process and processing quality control
STD-09	Production equipment
STD-10	Testing equipment
STD-11	Consistency or compliance statement
STD-12	Module I industrial inspection report personal statement, initial supervision
STD-13	Sample taking reports
STD-14	Test sample labels
STD-15	Examination report of application for a SNI mark certificate
STD-16	Suggestion to award, refuse and suspense the SNI mark certificate
STD-17	Suspension of refusal to the application for a SNI mark certificate
STD-18	Module I check list
STD-19	Report of listed inconsistencies
STD-20	Notice of periodic supervision
STD-21	STD-21 Supervision reports
STD-22	SNI mark certificate suspension proposal
STD-23	SNI mark certificate suspension
STD-24	Re-award of SNI mark certificate
STD-25	The Re-awarded of the SNI mark certificate
STD-26	Proposal of first or second warning to industries
STD-27	The first or second warning
STD-28	Obligatory or voluntary SNI mark certificate revocation proposal
STD-29	Revocation of obligatory or voluntary SNI mark certificate
STD-30	SNI marked product deviation report
STD-31	Inspection report of SNI marked products

Chart 4–19 Organization Charts of the Institute for Standardization of LIPI

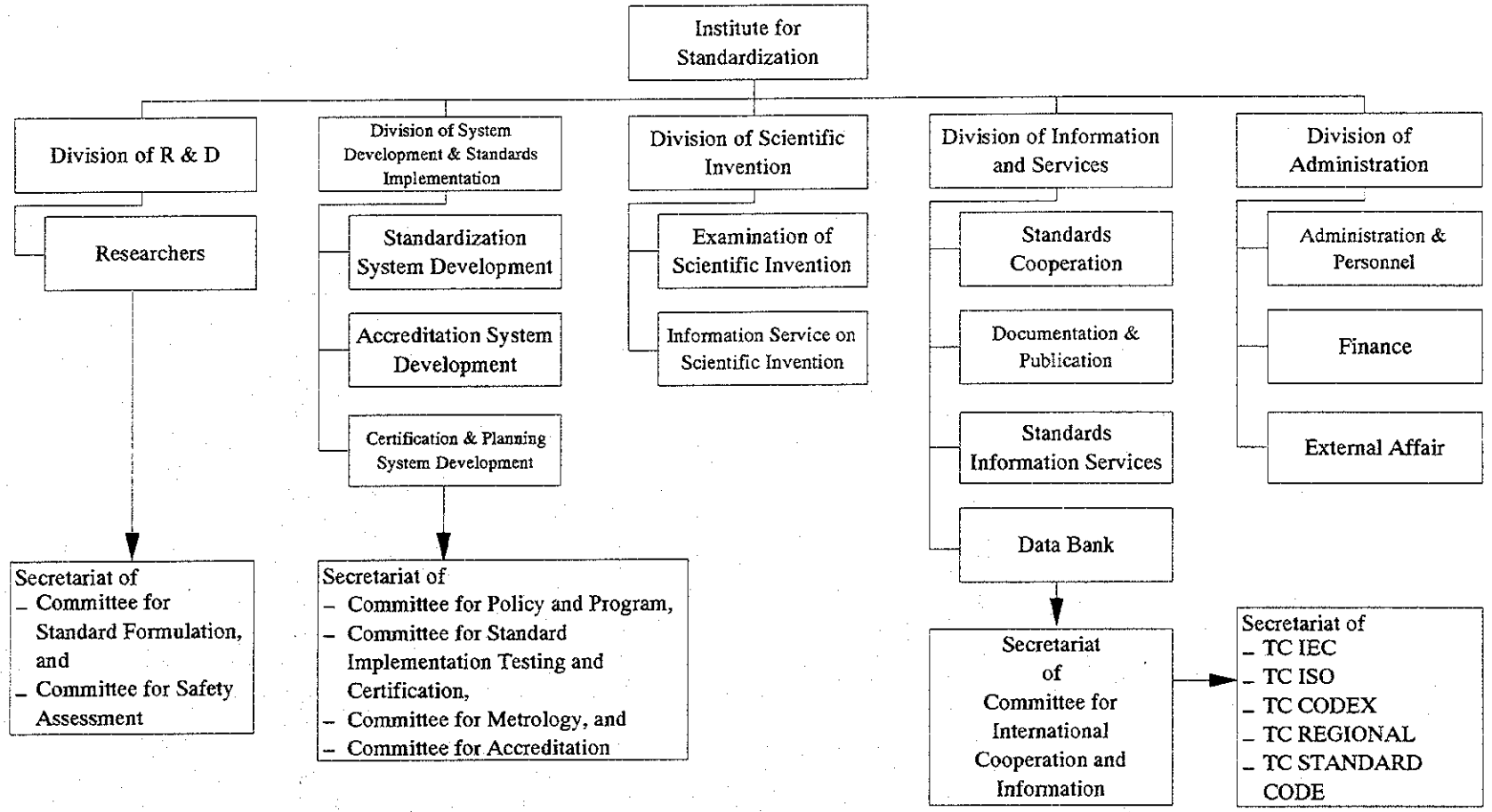


Chart 4-20 Organization of Ministry of Industry

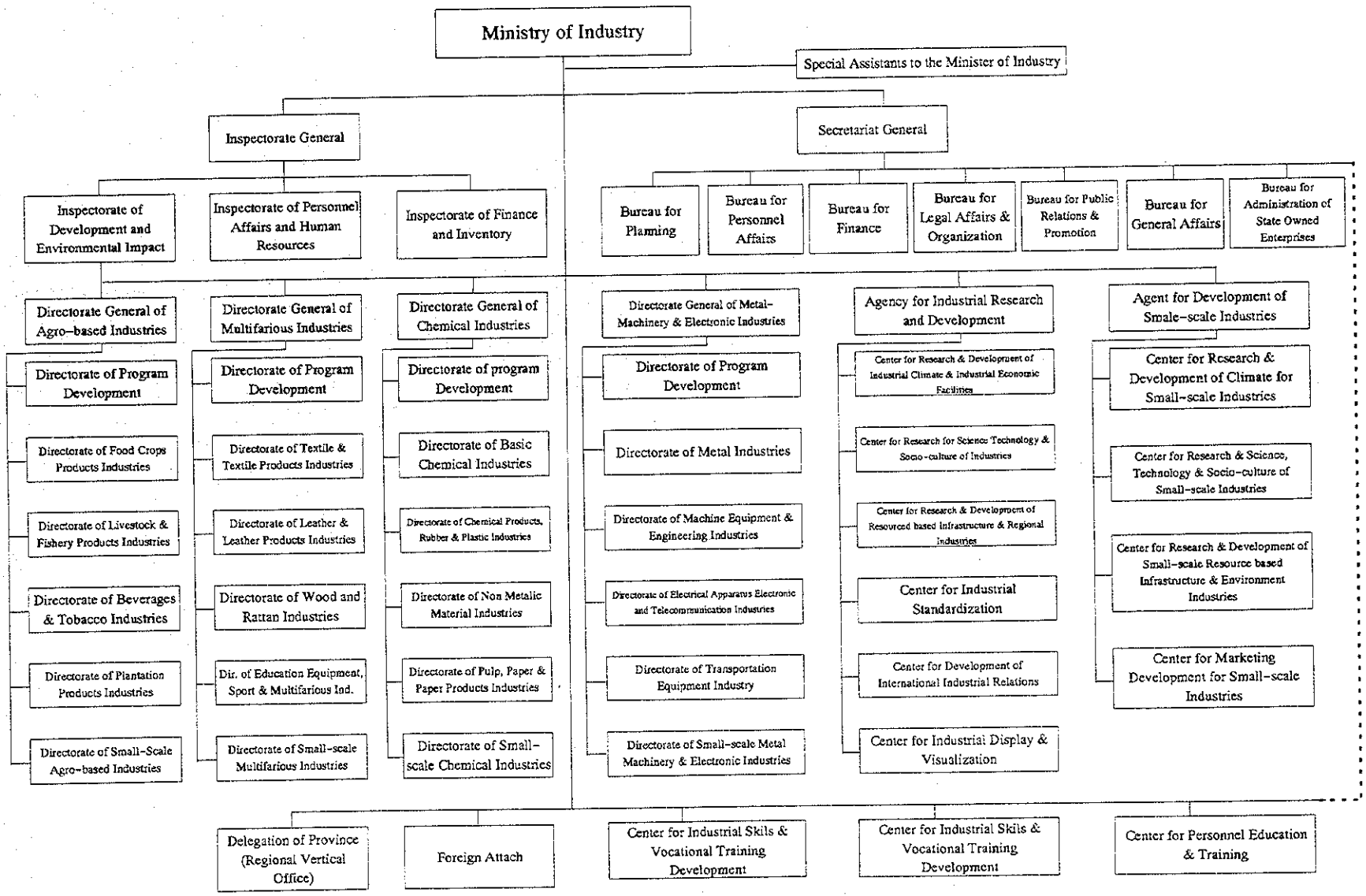


Chart 4-21 Organization of BPPI

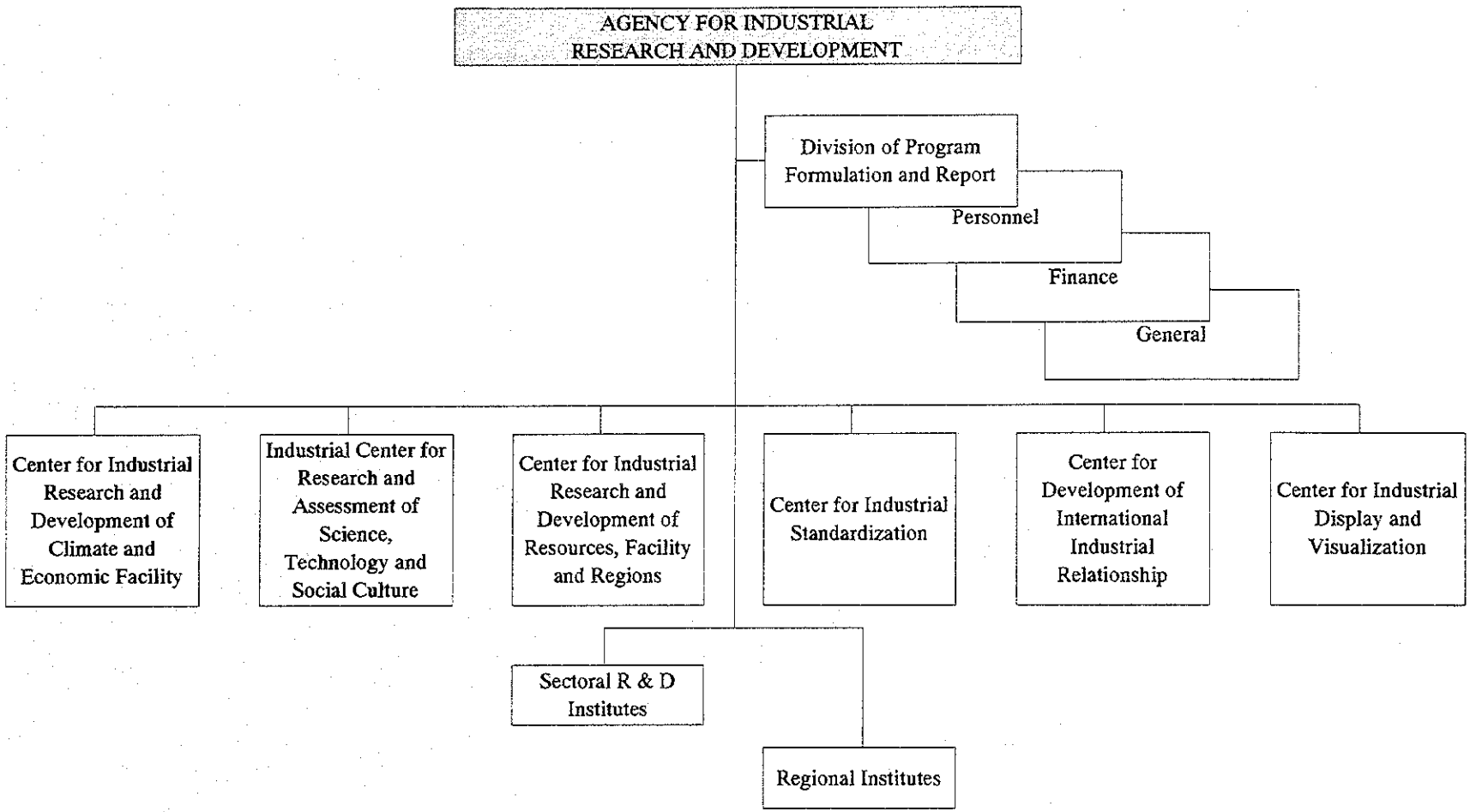


Chart 4-22 Organization of PUSTAN

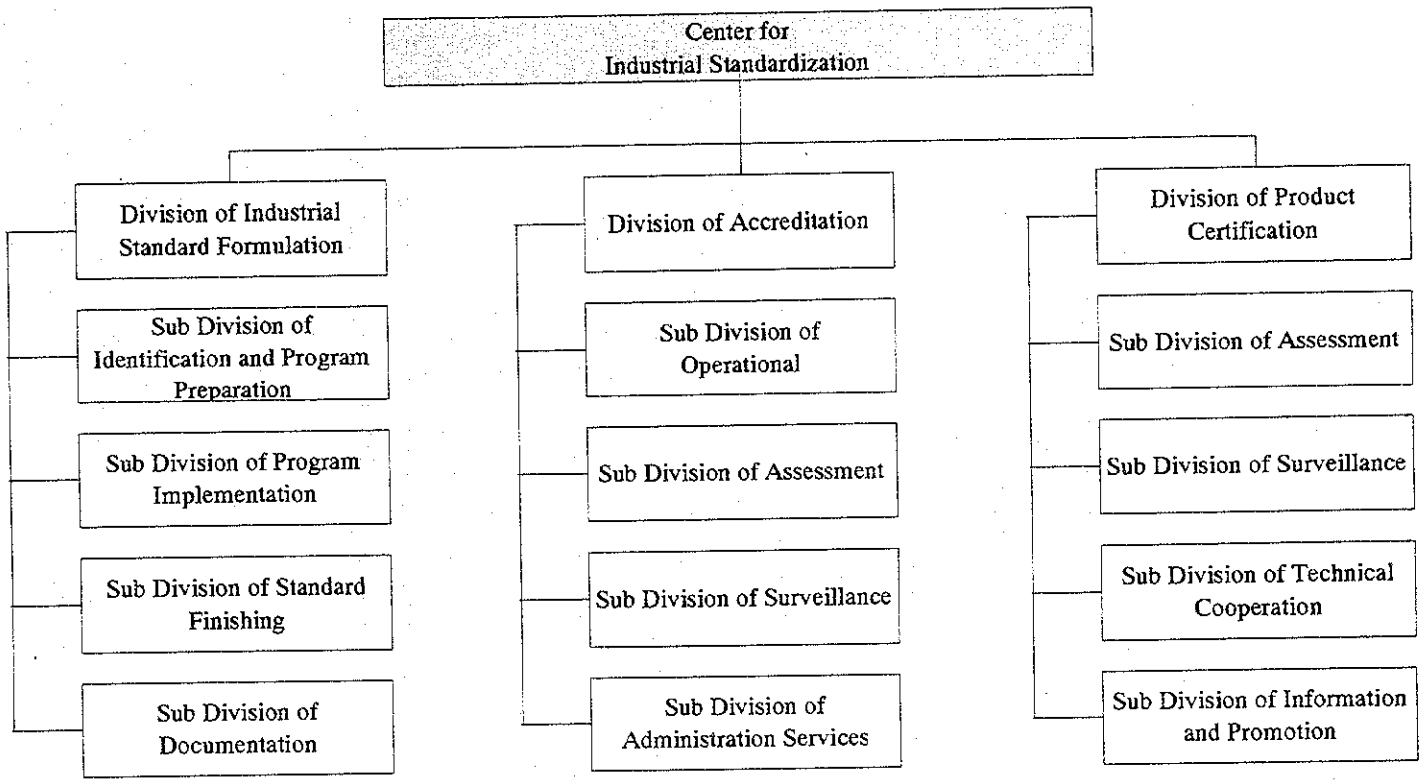


Chart 4-23 Approved DSN Guideline

Guideline No.	Content
01-1991	• General requirements for capability of calibration laboratory and testing laboratory
02-1991	• Testing laboratory accreditation system - Accreditation Board requirements
03-1991	• Testing laboratory accreditation system - Implementation instructions
04-1992	• Guideline for presentation of test results
05-1992	• General requirements for acceptance of testing laboratory
06-1992	• General requirements for acceptance of certification unit
07-1994	• General requirements for acceptance of inspection body
08-1994	• Guideline for presentation of inspection results
09-1993	• Guideline for compilation of quality guideline for testing laboratory
10.1-1993	• SNI revision and amendment procedure
10.2-1993	• Safety SNI revision and amendment procedure
11-1992	• Guideline for popularizationof standardization
12-1993	• Guideline for standardization training towards standard technical profession
13-1992	• General rules for members of national calibration network
14-1994	• General criteria for certification body performing personnel certification
15-1992	• General criteria for certification body performing product certification
16-1992	• General criteria for certification body performing quality system certification
17-1993	• Accreditation system for calibration laboratory and testing labolatory - General requirements for implementation and recongnition
18-1994	• Criteria for laboratory assessor
19-1994	• Guideline for standard requirements for product certification purpose
21-1994	• Guideline for implementation of laboratory evaluation
24-1994	• Guideline for development and execution of laboratory proficiency test
25-1994	• Requirements and procedure for field test and calibration accreditation

Chart 4-24 DSN Guideline to be Approved

Guideline No.	Content
20-19xx	• General terms and their definitions related to standardization and related activities
26-19xx	• Guidelines for the use of the KAN logo and the KAN accreditation system mark – For laboratories having obtained KAN accreditation
00-19xx	• General procedure for the evaluation of testing laboratories and calibration laboratories
29-19xx	• Requirements and rules in laboratory accreditation system
30-19xx	• Guidelines for the handling of complaints from accredited laboratories
31-19xx	• Guidelines for the education and training of natural oil and gas pipeline inspection
32-19xx	• Method of statement of conformity based on the standard for third party's certification system
33-19xx	• ISO or IEC general rules on third party's certification scheme for products
34-19xx	• National registration system for quality system assessor
35-19xx	• Requirements and rules in accreditation system of quality system certiffication body
00-19xx	• Requirements and rules governing quality system pattern
00-19xx	• Guidelines for the use of KAN logo or KAN marks for accredited quality system certification body
38-19xx	• Guidelines for third party assessment and registration of supplier's quality system
40-19xx	• Assessment of certification body or registration body and accreditation system – General requirements
50-19xx	• Module I – Self-declaration module

Chart 4-25 Classification and Number of SNI

	Classification	Number of SNI (*)
1.	Agricultural and food products	260
2.	Material and implements used in agriculture	96
3.	Building and construction	227
4.	Electrotechnical engineering	227
5.	Mechanical engineering	449
6.	Chemical engineering	486
7.	Metals	250
8.	Textile	222
9.	Automotive engineering	144
10.	Shipbuilding	186
11.	Railway engineering	11
12.	Domestic wares	116
13.	Mining	0
14.	Pulp and papers	114
15.	Ceramics	118
16.	Medicine and medical equipments	24
17.	Medicine, cosmetic and medicine equipments	0
18.	Energy and radio activity	12
19.	Basic standards and miscellaneous	173
	Total	3,115

Note: (*) As of February 28, 1994

Chart 4-26 Number of SNI under Responsibility of MOI

	Industry/Product	Number of SNI (*)
(1)	Food, beverages and tobacco	140
	1. Food	123
	2. Beverages	11
	3. Tobacco	6
(2)	Textile, garment, and leather industries	326
	1. Spinning, weaving, and finishing textile	189
	2. Garment industries and leather	45
	3. Leather and leather goods, excluding for foot-weals	68
	4. Foot-wears good	24
(3)	Wood industries	27
	1. Wood and articles of wood	17
	2. Printing and publishing	10
(4)	Paper industries	117
	1. Articles of paper	113
	2. Printing and publishing	4
(5)	Chemical	441
	1. Chemical industries material	257
	2. Other chemical industries	87
	3. Refined petroleum oil	11
	4. Articles of petroleum oil and coal industries	9
	5. Rubber and articles of rubbers	36
	6. Plastics industries	41
(6)	Mining goods non-metal	203
	1. Porcelain	28
	2. Glass and glass wares	35
	3. Lime cement industries and concrete line goods	49
	4. Clay industries	59
	5. Other mining goods, non-metal	32
(7)	Basic metal industries	248
	1. Ferro and steel metal industries	182
	2. Non-ferro metal industries	86
(8)	Metal goods, machine industries and equipment	608
	1. Metal working machinery and equipment	223
	2. Machinery and equipment industries except electric machine	243
	3. Machinery electrical equipment and electrical appliances	142
	4. Vehicles industries	329
	4.1 Ship	194
	4.2 Train	10
	4.3 Automotive	108
	4.4 Bicycles	17
(9)	Others	350
	1. Other processing industries	40
	2. Basic engineering standard	32
	3. Engineering standard	209
	4. Test method for pollution	69
	Total	2,460

Note: (*) As of 1993

Chart 4-27 Comparison of Number of SNI with JIS & JAS by Industry/product

SNI		JIS & JAS		
Industry/Product	No.		Industry/Product	No.
1. Agricultural and food products	260	JAS	Agricultural stuff	395
2. Material and implements used in agriculture	96			
3. Building and construction	227	A.	Civil engineering and architecture	476
4. Electrotechnical engineering	227	C.	Electronic and electrical engineering	802
5. Mechanical engineering	449	B.	Mechanical engineering	1,290
6. Chemical engineering	486	K.	Chemical engineering	1,506
7. Metals	250	G.	Ferrous metals and metallurgy	331
		H.	Non-ferrous metals and metallurgy	411
8. Textile	222	L.	Textile engineering	282
9. Automotive engineering	144	D.	Automotive engineering	324
10. Shipbuilding	186	F.	Shipbuilding	520
11. Railway engineering	11	E.	Railway engineering	206
12. Domestic wares	116	S.	Domestic wares	230
13. Mining	0	M.	Mining	202
14. Pulp and papers	114	P.	Pump and paper	88
15. Ceramics	118	R.	Ceramics	248
16. Medicine and medical equipment	24	T.	Medical equipment and safety appliances	318
17. Medicine, cosmetic, and medicine equipments	0			
18. Energy and radio activity	12	Z.	Miscellaneous (including basic standards, packaging, welding and radioactivity)	628
19. Basic standards and miscellaneous	173			
		W.	Aircraft and Aviation	80
		X.	Information Processing	242
			JIS Total	8,184
			JAS Total	395
Total	3,115		Total	8,579

5 Testing and Inspection System Related to Industrial Standardization and Calibration System Related to Industrial Metrology

5.1 General Profile of Testing and Inspection System

5.1.1 Introduction

Testing and inspection areas that are generally related to industrial standardization and quality control promotion include the following:

1) Areas related to the national certification system; and
2) Areas certified by third party organizations and those that are conducted for need of quality control which cannot be done by each company.

From these viewpoints, the current state of the testing and inspection system in Indonesia is analyzed.

Testing and inspection organizations in industrial fields include 9 central research institutions (Balai Basar Industri) and, 14 regional research institutes (Balai Industri)[1] under BPPI of the Ministry of Industry (MOI) (Chart 5-1), PPMB under the Ministry of Trade, and local testing laboratories[2]. In addition, a central electric power research institute (LMK-PLN) in the field of electrical equipment, and the agricultural machinery research institute under the Ministry of Agriculture in the field of agricultural machinery exist.

In the private sector, Pt. Sucofindo serves as a quasi-government testing organization.

5.1.2 Testing and inspection resources related to national certification system

5.1.2.1 Testing and inspection system under SSN 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. Certification also covers quality control systems and product compliance with standards. Testing and inspection organizations are responsible for checking products in compliance with specific standards.

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1) In the near future, two research institutes will be added.
2) There are 20 regional testing laboratories.

To secure testing organizations that are capable of performing such certification service, a testing laboratory accreditation system was 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 are KAIT (Technical Accreditation Committees) established in each ministry and agencies involved in SSN which conduct reexamination.

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

5.1.2.2 Testing and Inspection system under the traditional scheme

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

Both SII and SP contain mandatory certification. SII 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[3].

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[3] 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.

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 organization, PT. Sucofindo. Certification of products in compliance with national standards that mainly cover 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. It is responsible for cross checking to maintain testing accuracy.

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

5.1.3 Testing and inspection system related to contract testing and certification services

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

Certification service for test results from 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, ad local testing laboratories controlled by state governments.

The testing and inspection system in each of the subsectors subject of present study, and the current state of testing organizations are described in relevant sections on each of the subsectors.

5.2 Outline of the Calibration System Related to Industrial Metrology

The legality of the metrology system in Indonesia is governed by the Metrology Act that covers overall legal and industrial metrology systems. The entire system is based on OIML and is further specified through the ordinances of the Ministry of Trade. A principal management organization is DOM (Directorate of Metrology) under the Ministry

of Trade, which has 47 branch offices throughout the country[4]. DOM has primary standards and provides legal metrology service[5].

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

Under the new system, national standards having traceability with international standards were established, under which are secondary standards which provide the formation of 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[6].

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[7]. As shown in Chart 5-2, each member organization performs calibration service in each field of specialization. These organizations are accredited under the accreditation system of ISO 25/38/40, but they will be accredited by KAN/KAIT under the new system.

5.3 Present Status of Main Individual Testing and Inspection Institutions

5.3.1 Institute under BPPI

5.3.1.1 B4T

(1) Services and activities

B4T consists of 5 departments, these are Material Research, Product Technology Research, Material Development, Product Technology Development, and Administration. It is staffed by 195 persons, of which 124 persons (63%) belong to R&D divisions. 13 (10%) belong to research divisions and 104 (84%) development divisions, There are 4 assessors, 13 inspectors, and 6 calibrators.

B4T's services and activities are as follows.

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4) In December 1994, 8 branches were added to total 55 in November 1995.

5) Legal metrology (commercial metrology) is designed to "secure fair commercial trade" and industrial metrology to "furnish accurate values." The following section covers only industrial metrology service.

6) According to source materials furnished by DSN (LIPI).

7) At present, 22 research organizations apply for the membership of Committee E, which will be determined by December 1995.

1) Testing and inspection service

B4T conducts a wide range of material tests including analyses of cement, concrete, building materials, organic and inorganic materials, metal, and water related to chemistry, corrosion, and environmental pollution. It also provides testing and inspection services for a variety of products including metals and metallic products, machinery, automotive parts, rubber and rubber products, plastics. B4T conducted 17,288 tests in 1991, 17,841 in 1992, and 18,661 in 1993.

2) Calibration service

B4T is a member of National Calibration Network and renders calibration services for production equipment of private enterprises in terms of force, pressure, temperature, mass, and volume. The results of calibration are recorded in a calibration report (see Appendix 1) stating the date of calibration, the name of a calibrator, type of calibration, equipment calibrated, standards used, and their traceability. Upon completion of calibration, a certification label is affixed to equipment. 585 calibrations were conducted in 1991, 648 in 1992, and 650 in 1993.

3) Others

Other major activities and services are as follows.

a) Quality System Certification
b) Product Certification
c) Technical Inspection Service
d) Training Service

(2) Facility and equipment

The facility has total floor area of 13,230m^2, and laboratories account for 10,016m^2 (76%). B4T recognizes the shortage of laboratory space and is considering facility expansion by adding a new floor above the existing laboratory building. Buildings are 11 - 32 years old after completion. Although partially deteriorated, they are fairly well maintained and interior space is tidied up and cleaned. On the other hand, air-conditioners are installed in only small portions of the facility, and ventilation and lighting are not sufficient. A problem already recognized by B4T is that special laboratories, such as a thermostatic chamber, a clean room, and a shield room, which require precise testing conditions, are not air-conditioned except a dark room for an incandescent lamp testing. Also, some laboratories are fully packed with testing equipment and leave little working space. Clearly, testing environment is not sufficient and needs various improvements.

The facility has a variety of testing equipment, most of which are outdated. Some are

unserviceable as these become obsolete. For instance, non-destructive testing equipment including X-ray, ultrasonic testing, magnetic particle testing, and crack depth measurement were all purchased between 1975 and 1982. Destructive testing equipment include a large horizontal tensile testing machine (300 tons), universal testing machines of varying size, Charpy impact tester, and hardness tester. Calibration and daily maintenance of these equipment seem to be sufficient. However, all of them were purchased between 1912 and 1979. Most of universal testing machines for instance are of old type. Material testing equipment such as universal testing machines, impact testers, and hardness testers are not flexible to adapt to abrupt changes in mechanism and measurement method, despite the fact that old equipment can still produce reliable results if it is well maintained and calibrated. Nevertheless, rapidly advancing industrial technology demands quick availability of accurate measurement results, which requires latest testing and inspection equipment that can meet these needs. Metallographic testing equipment and corrosion testing equipment, such as microscopes, salt spray testing equipment, and gas corrosion testing equipment, were purchased from 1970 - 1973. Chemical analysis of metallic materials is conducted by flame photometer, spectrophotometer, emission-spectrometer, infra-red spectrometer, and gas chromatography, all were purchased between 1972 and 1982. Electrical testing equipment, the relatively new among B4T's testing equipment, include power factor meters, high voltage meters, and discharge testers, which were procured between 1977 and 1980. Testing equipment related to cement includes soil tester, mortar compression testing machine, mortar bending testing machine, and fluidity testing apparatus, and their procurement years vary between 1930 and 1980. Concrete testing equipment including crushing strength testing machine, specific gravity hydrometer, compression testing machine, bending testing machine, abrasion testing machine, and workability test apparatus were purchased between 1930 and 1980. In summary, B4T has a variety of testing equipment capable of performing a wide field of tests, which are also well maintained. However, these equipment is 10 - 60 years old and cannot meet high level testing and inspection requirements under latest standards. Thus, they should be upgraded to latest ones if B4T is to meet industrial needs. Given a large stock of equipment at B4T, it is very difficult to replace or upgrade existing equipment within a short period of time. Instead, it is important to establish long-term plans for upgrading and adding of equipment that should be selected according to the importance and frequency of use.

5.3.1.2 Institute for research and development of metal and machinery industries

(1) Services and activities

BBLM consists of 4 divisions, namely Process and Product Technology Research,

Process Technology Development, Product Technology Development, and General Service. It is staffed with 220 persons, of which 124 (56%) belong to research and development divisions. Of total, 8 staff (6%) are responsible for research, and 116 (94%) are engaged in development projects. Within the development division, 79 persons (68%) are working on process technology development. BBLM has one assessor.

BBLM's services and activities are as follows.

1) Testing service

BBLM renders a wide range of testing service including destructive testing of materials involving tensile, bending, or compression, nondestructive testing using ultrasonic waves, mechanical running tests, and tool shape tests. In 1993, it conducted 10 tests.

2) Calibration service

BBLM is a member of National Calibration Network and provide calibration services for production equipment of private enterprises in six categories namely, length, force, pressure, hardness, shape, and torque. The results of calibration are recorded in a calibration report stating the date of calibration, the name of a calibrator, type of calibration, equipment calibrated, standards used, and their traceability. Upon completion of calibration, a certification label is affixed to equipment. Calibration contracts increased rapidly from 65 in 1991 to 150 in 1992, and 439 in 1993. BBLM maintains traceability of its own calibration equipment by KIM-LIPI.

3) Process and product technology development service

4) Training service

(2) Facility and equipment

BBLM's facility has total floor area of 9,220m^2, with laboratories and testing areas of 5,620m^2 (61%). The facility was completed in 1973. Despite more than 20 years after their completion, laboratories and other rooms are well maintained. Experiment facilities fields used for research and development, testing, and training related to casting, forging, welding, and other operations, however, are large in size and produce large amounts of heat, vibration, noise, dust, and exhaust gas, which go beyond the capacity of the existing ventilation system. Together with poor lighting, these factors make the facilities less suitable for reliable testing. Furthermore, some laboratories are not air-conditioned and do not have sufficient working space, suggesting the need for improvement.

Existing equipment was supplied by the Belgian government and mostly installed in

1975 and 1976. The major purpose of BBLM is to improve product quality and productivity in metalworking and machinery industries. It has a casting shop, a metalworking shop, a welding and sheet metal working shop, and a heat treatment/plating shop, each of which has a training shop and related testing rooms. Major equipment of each shop are summarized as follows.

Casting shop: cast iron and non-ferrous metal melting furnaces, thermometers, and CE meters for melting operations; green sand molding machine, core molding machine, and sand mixer for molding operations; shot blasting machines and grinders for after-treatment; and various woodworking machines for model making.

Metalworking shop: lathes, grinding machines, boring machines, electric spark machines, cutter grinding machines of various types, and dimension and shape measuring instruments.

Welding and sheet metal working shop: including oxygen/acetylene gas cutters, welding machines, plasma-arc cutting machines, electrical welding machines, TIG/MIG welding machines, spot welding machines, stud welding machines, bending machines, and cutters.

Heat treatment/plating shop: heat treatment furnaces, salt baths, plating tanks, and shot blasting machines.

Testing equipment for metallic materials includes universal testing machines, impact testers, and hardness testers for destructive testing, and X-ray equipment, magnetic inspection equipment, ultrasonic flow detector, and metallographical microscopes for nondestructive testing. Testing equipment required for inspection of casting sand is also provided. Between 1991 and 1994, BBLM purchased coating thickness gauges, rotary bending fatigue testing equipment, hardness testers, ultrasonic thickness gauges, micrometers, surface roughness testers, lathes, dynamic distortion amplifiers, and distortion gauge foils. Despite such efforts to increase testing equipment, new equipment accounts for a very small portion with most equipment nearly 20 years old and has become obsolete. Clearly, it is difficult for the existing equipment to achieve testing and inspection levels required by latest standards, and the upgrading and strengthening of equipment stock to meet latest needs is called for, including internal stress measuring instruments. Also, analytical equipment which checks chemical components of metallic materials seems to be in shortage. Emission spectrometers and other instruments are

needed to analyze chemical components quickly and accurately.

5.3.1.3 Institute for research and development of ceramic industry

(1) Activities and services

BBK has 7 departments and 202 employees, consisting of Director General (1), Administration Department (63), Ceramics Research Department (21), Fine Ceramics Research Department (25), Ceramics Development Department (37), Fine Ceramics Development Department (36), Maintenance Service Department (12), and Documentation and Information Department (7).

BBK's major activities and services are summarized as follows.

1) Research and study on general and special ceramics, and mortar
2) Fine ceramics, glass, and enamel
3) Research and study on economics, engineering, standardization of tests, and certification related to general and special ceramics, and the ceramic industry
4) Development activity related to items in 3) for the fine ceramic industry

BBK received 635 requests for testing service in 1993, of which tests related to materials account for the largest portion (379 cases, 60%). It also reviews applications for SNI certification.

(2) Facility and equipment

BBK has total floor area of 8,538m^2, the laboratory area of which accounts for 727m^2. The present condition of major equipment is described as follows.

1) Chemical analysis

BBK owns a variety of equipment for chemical analysis including AAS, a flame photometer, an X-ray fluorescence spectrometer, which are calibrated every month. Nevertheless, most of them are relatively old and were procured between 1974 and 1992. All the balances, the most basic weighing scale for chemical analysis, are of direct-reading type, and there is even an absence of electronic balance. Also, the balances are kept in chemical analysis rooms where precision equipment may be eroded by acid vapor affecting precision levels. So they should be isolated from such corrosive environment by separating measurement rooms from those for analysis. In addition, chemical analysis rooms are not equipped with fans in draft chambers, allowing acid vapor to flow into the room in the evaporation and exsiccation process. There are other problems that are perceivable in modern chemical analysis. This indicates the need not

only for upgrading of analytical equipment, but also retraining of analytical engineers or hiring of qualified experts.

Analysis of chemical components of raw materials is conducted through the gravimetric method which involve burning them by gas in a platinum crucible. However, gas burning results in poor accuracy levels of analysis, and the number of platinum crucibles is limited to hinder efficient analysis. While the X-ray fluorescence spectrometer is capable of performing quantitative determination of raw chemical components quickly and in large quantities, the model owned by BBK was manufactured in 1980 and is not currently use. Since chemical analysis of raw materials accounts for the most frequent requests made to BBK, it is important to procure a latest model of X-ray fluorescence spectrometer or to obtain additional crucibles and a high performance electric furnace.

2) Micro-structure test

BBK owns an X-ray diffractometer, a SEM, and an IR spectrometer which were procured in 1978, 1982, and 1983, respectively. Among them, the X-ray diffractometer is essential in analyzing crystal structure of ceramic raw materials, but the existing equipment is rarely used. The C-ray diffract chart shows poor resolution making it difficult to conduct crystal analysis with high accuracy, explaining why a new X-ray diffractometer should be procured immediately.

3) Thermal analysis

BBK has a large number of equipment related to thermal analysis, including DTA/TGA. However, DTA is more than 20 years old (purchased in 1973) and other equipment is generally old.

4) Optical test

A wide variety of optical testing equipment including microscopes are available. These equipment can be used as long as they are well maintained.

5) Mechanical test

BBK has 5 models of strength testers, of which 2 are currently unserviceable.

6) Physical test

Physical testing is required for testing final products including ceramic building materials. BBK has 23 types of physical testing equipment, accounting for the largest percentage of existing equipment stock. However, the abrasion tester and the Vicat

hardness tester are unserviceable. Since these equipment are not owned by private companies, quick repair and replacement is recommended.

Note that the above equipment are all foreign made, e.g., Japan and Germany, and are not well maintained. Since it is difficult to obtain spare parts for foreign-made equipment, reliable standards for daily inspection and maintenance need to be adhered and followed faithfully in the field. Then, as new equipment is obtained in the future, consideration should be given to the structure and environment of the room in which the equipment will be installed, together with training of engineers and technicians who will use it.

5.3.1.4 Institute for research and development of chemical industries

(1) Services and activities

BBIK has 5 departments, namely Petrochemical and Fertilizer Research and Development, Fermentation and Organic Chemistry Research and Development, and Administration. Its primary objectives are improvement and proliferation of technology related to chemical industries, the development of human resources, preparation and propagation of SNI standards. To accomplish these objectives, it conducts research and development in the fields of packaging technology, fertilizer testing, composition of insecticide, pollution control, plastic processing, fermentation technology, perfume and dye production technologies, metallic material testing technology, and calibration technology.

BBIK's services and activities are as follows.

1) Testing service

BBIK's testing services include the analyses of fertilizers, industrial gases, plastics, packing materials, fermented products, food and beverage, exhaust gas, and waste water, and metallic materials. The latter has been conducted under BBLM's technical assistance since 1993, and 12 tests were conducted in that year.

2) Calibration service

As seen in testing of metallic materials, BBIK has been providing calibration service for testing equipment of private enterprises since 1993, in areas of length and pressure. The results of calibration are recorded in a calibration report stating the date of calibration, the name of a calibrator, type of calibration, equipment calibrated, standards used, and their traceability. Upon completion of calibration, a certification label is affixed to the equipment. In 1993, 16 calibration contracts were performed. BBIK maintains traceability of its own calibration equipment by BBLM.

3) Product technology development service

(2) Facility and equipment

BBIK's facility has total floor area of 13,032m^2, of which 8.928m^2 (68%) are occupied by laboratories and testing areas. Of the total, laboratories for metallic material testing and calibration account for 437m^2, occupying a large area compared to a relatively small number of equipment. Each laboratory is well maintained, tidied up, and cleaned. However, ventilation, air-conditioning, and laboratory tables are less than satisfactory.

As for testing equipment, analytical equipment for raw materials and products include flame photometers, ultra-violet/visible spectrophotometers, infrared spectrophotometers, gas chromatography, Karl Fisher moisture meters, and atomic absorption spectrometers, which were purchased between 1983 and 1986. For research and development of insecticide, fertilizer, fermentation, and polymeric materials, infrared spectrophotometers, microscopes, softness testers, impact testers, hardness testers, colony counters, polarimeters, viscometers, refractometers, calori meters, color meters, plastic cutting instruments, are used, and were purchased between 1975 and 1985. For testing of metallic materials, universal testing machines, ultrasonic testing machines, hardness testers, impact testers, tensile testing machines, and surface roughness testers were relatively newly purchased between 1991 and 1992. Calibration equipment include micrometers, gauge blocks, vernier calipers, and pressure gauges which were purchased in 1992. Thus, testing, inspection and calibration equipment are relatively new, but not sufficient in quantity. Also, the existing equipment is not capable of performing measurement in new areas of technology.

5.3.2 Other government and public organizations

5.3.2.1 The centre for testing and quality control

(1) Services and activities

PPMB is a technical service organization established by the Ministry of Trade in 1979 for the purpose of promoting the improvement and maintenance of quality of Indonesia's non-oil export products. It operates 20 local laboratories (LPMs) and more than 400 sampling organizations responsible for export inspection (BPCs), that are located throughout the country, and accredits and supervises private enterprises who are authorized to inspect and certify their own products Also, PPMB forms a network system with LPMs, BPCs, and the accredited private enterprises to maintain quality control of export products.

PPMB consists of 5 laboratories, namely Standards, Physics and Chemistry, Microbiology, Mechanical, and Electrical, and 2 administration departments, Technical

and General.

PPMB s services and activities are as follows.

1) Testing service

Since export inspection needs to be completed within a relatively short period of time due to shipment and departure schedules, actual inspection service is conducted by the network member organizations. Export inspection mainly covers agricultural products such as rubber, pepper, vegetable oil, and coffee beans, while only covering three types of industrial products, electrical cables and wires, batteries, and incandescent lamps. Instead of direct product inspection, PPMB provides a variety of testing services required to maintain the accuracy levels of testing and inspection by the member organizations, including cross-checking tests such as round-robin and parallel tests, and proficiency tests.

2) Calibration service

PPMB is a member of National Calibration Network and provides calibration services for testing equipment of the network member organizations in three categories, namely length, mass, and temperature. The results of calibration are recorded in a calibration report that specifies the date of calibration, the name of a calibrator, type of calibration, the name of a person requesting calibration, equipment calibrated, and standards used, and finally leads to the issuance of calibration certificates. BBLM maintains traceability of its own calibration equipment by DOM and KIM-LIPI.

3) Others

a) Technical development service

b) Training service

(2) Equipment

PPMB's facility consists of four laboratory buildings where testing and inspection on agricultural products are conducted, a laboratory building for testing of product quality, and a main administrative building.

Testing equipment may be divided into chemical analyzers for raw materials and products, and testing and inspection equipment. The former include ultraviolet/visible spectrophotometers, gas chromatography, liquid chromatography, and atomic absorption analyzers. The latter include various distillation test apparatus, autoclaves, washability apparatuses, and firing/ignition testers. Overall, testing and inspection equipment for agricultural products are sufficient in quantity and variety.

5.3.2.2 Center for development of agricultural engineering

(1) Services and activities

BBP has 4 divisions, Administrative Division, Development Planning Division, Technical Assistance and Support Division, and Functional Group. It is staffed with 116 employees in total, of which 81 belong to the three technical divisions, 12 in Development Planning, 18 in Technical Assistance and Support, and 51 in Functional Group. These 81 persons in the technical divisions are divided into 11 with Master's degree, 39 with Bachelor's degree, 27 senior high school graduates, 2 diploma holders, and 2 division managers.

Major activities of the three technical divisions are summarized as follows:

1) Development planning division
   a) To study the progress of the agricultural mechanization process and analyze the result for the purpose of developing agricultural machines and implements suitable for local conditions peculiar to Indonesia
   b) To provide policy makers with information useful for policy making in the field of agricultural mechanization in Indonesia
   c) To make recommendations and provide guidance for evaluation of the development of agricultural machines and implements

2) Technical assistance and support division
   a) Accumulation of technological resources and management of facilities and equipment;
   b) To conduct joint research and demonstration projects on agricultural machinery;

3) Functional group
   a) Design of agricultural machinery and prototype development;
   b) To conduct testing and evaluation services for standardization, approval and regulation of agricultural machinery.

BBP ALSINTAN conducted 8 and 19 performance tests on agricultural machinery in 1993 and 1994, respectively.

(2) Equipment

The facility is located within a 35,000m^2 site containing experimental farms and laboratories.

Major test items are as follows:

1) Hand tractors

Axle force, durability, fuel consumption, normal clutching force, field performance test, and work capacity, etc.

2) Four-wheeled tractors

PTO (power take-out) force, full connecting rod test, axle force, field performance test, etc.

3) Pumps

Total head, discharge, pump efficiency, etc.

4) Sprayers

Spray pattern, discharge, droplet size, etc.

5) Power threshers

Capacity, height of loss, grain quality, etc.

6) Rice milling units

Capacity, milling quality, etc.

5.3.2.3 Materials research and testing institute

(1) Services and activities

BPBJ is one of the regional laboratories operated by state governments. Its primary role is to assist in fostering the development of local industries from the viewpoint of the testing and research institute specialized in construction materials and metallic materials. BPBJ consists of 6 departments these being Construction Materials, Metal, Physics/Chemistry, Research, Development Promotion, and Administration. It is staffed by 23 persons, of which 18 (78%) belong to operational departments.

Major services and activities are as follows.

1) Testing service

Testing services include testing and chemical analysis of construction materials including cement, clay, asbestos, marble, ceramic, as well as construction steel bars, steel structures, welded wire mesh. BPBJ conducted 183 tests in 1989, 283 in 1990, 270 in 1991, 616 in 1992, and 814 in 1993, indicating rapid increases from 1991 to

1992 (2.3 times), and 1993 (3 times) mainly because of the increase in testing service for construction of steel bars.

2) Others

Technical development service

(2) Facility and equipment

The facility has total floor area of 1,260m^2, of which laboratories account for 820m^2 (65%). While laboratories are well maintained, air-conditioning and lighting and floor space seems to be in shortage. BPBJ is planning to add a second floor (1,200m^2) to the existing laboratory building to make up for space shortage. The facility is fully equipped with testing equipment for metallic materials and cement including universal testing machines, hardness testers, impact testers, water compression testers, wrapping test machines, welding cutter machines, thickness gauges, hammer test machines, and machine tools and equipment to process a variety of samples. While these equipment are well maintained, some of them are nearly 20 years old and outdated. To meet various testing requirements under new standards, they need to be upgraded. Calibration is done by B4T on a contract basis to maintain accuracy of test results.

5.3.3 Private institutes

5.3.3.1 PT. Sucofindo

(1) Services and activities

Sucofindo is the largest private testing, inspection and quality control organization in Indonesia. It has 7 bureaus, Operations 1 and 2 responsible for testing and inspection, Total Quality Improvement in charge of quality control and ISO 9000, Administration, Jakarta Laboratory performing actual testing and inspection services, 20 Branches and Strategic Business Unit.

Jakarta Laboratory consists of 7 departments, namely General Chemistry, Petroleum/Petrochemical, Environment, Mining, Physics, General Affairs, and Personnel Management. It has 143 employees, of which 105 (73%) work for operational departments. 13 out of 20 branches have their own laboratories.

Major services and activities are as follows.

1) Testing service

Sucofindo renders broad-based testing and inspection services: including inspection, control, and analysis of petroleum and petrochemical products in the transportation,

storage or production process including crude oil, refined oil, heavy oil, liquefied gas, chemicals, and petrochemical products; the analysis and testing of coal including water content, volatile content, ash content, element analysis, and calorific value; chemical analysis of inorganic materials including ores, limestone, dolomite, clay, slaked lime, gypsum, silica, bentonite, kaolin, feldspar, zeolite, and bauxite; chemical composition analysis of metals and alloys; measurement of gold, platinum, and palladium contents; physical strength tests such as tensile and bending of metals; environmental tests including the analysis of water quality, chemical/physical properties, toxicity, residual agricultural chemicals, and microorganisms in drinking water, industrial water, irrigation water, and fishing water, the analysis of SOx, NOx, NH_3, H_2S, and dust in atmosphere and various exhaust gases, and noise analysis; nondestructive tests including radioactive and ultrasonic testing in the construction and maintenance processes of power plants, oil/gas pipelines, petroleum refineries, chemical plants, and offshore oil rigs; general chemical analysis including quality inspection on textile and apparel products, and raw materials and equipment for medicines: safety tests on toys; the analysis of chemical composition and residual agricultural chemicals in agricultural products including essential oil, vegetable oil, cocoa beans, and tea; and quality inspection and chemical analysis of foodstuff including frozen shrimp, sugar, milk, fish, meat, and fruit.

2) Calibration service

Sucofindo is a member of National Calibration Network and provides calibration service in two categories of pressure and water content. It asks KIM-LIPI to maintain traceability of its own calibration equipment.

3) Others

a) Technical development service

b) Training service

(2) Equipment

Laboratories are well equipped with ventilation, air-conditioning and lighting systems and kept in good and clean working condition. The only problem is the shortage of floor space that affects safety of researchers conducting tests. This will be in December 1995 when a new laboratory building currently under construction, is completed in the suburbs of Jakarta.

Sucofindo has a variety of new testing equipment required for the above testing services, including atomic absorption spectrometer, ultraviolet/visible spectrophotometer,