

● **Part III**

Conclusion and Recommendations

1 Conclusion

1.1 Major Emphasis of the Master Plan

It is necessary that the major emphasis of the Master Plan be placed on the following two points, in consideration of the present status of industrial development in Viet Nam, and the need to meet the requirements of future development (Figure III-1):

- 1) Promotion of company standardization and dissemination of the new concept of quality control (or quality management), conducive to the development of industrial strength which can function under the new economic system.
- 2) Enhancement of the system for promotion of standardization, to contribute to easing the adverse impact on the domestic economy created by introduction of an open economic system, and to building the technological infrastructure, which will help making full use of the open economy system on behalf of industrial development.

The necessity to improve industrial strength is particularly keen in view of the following points.

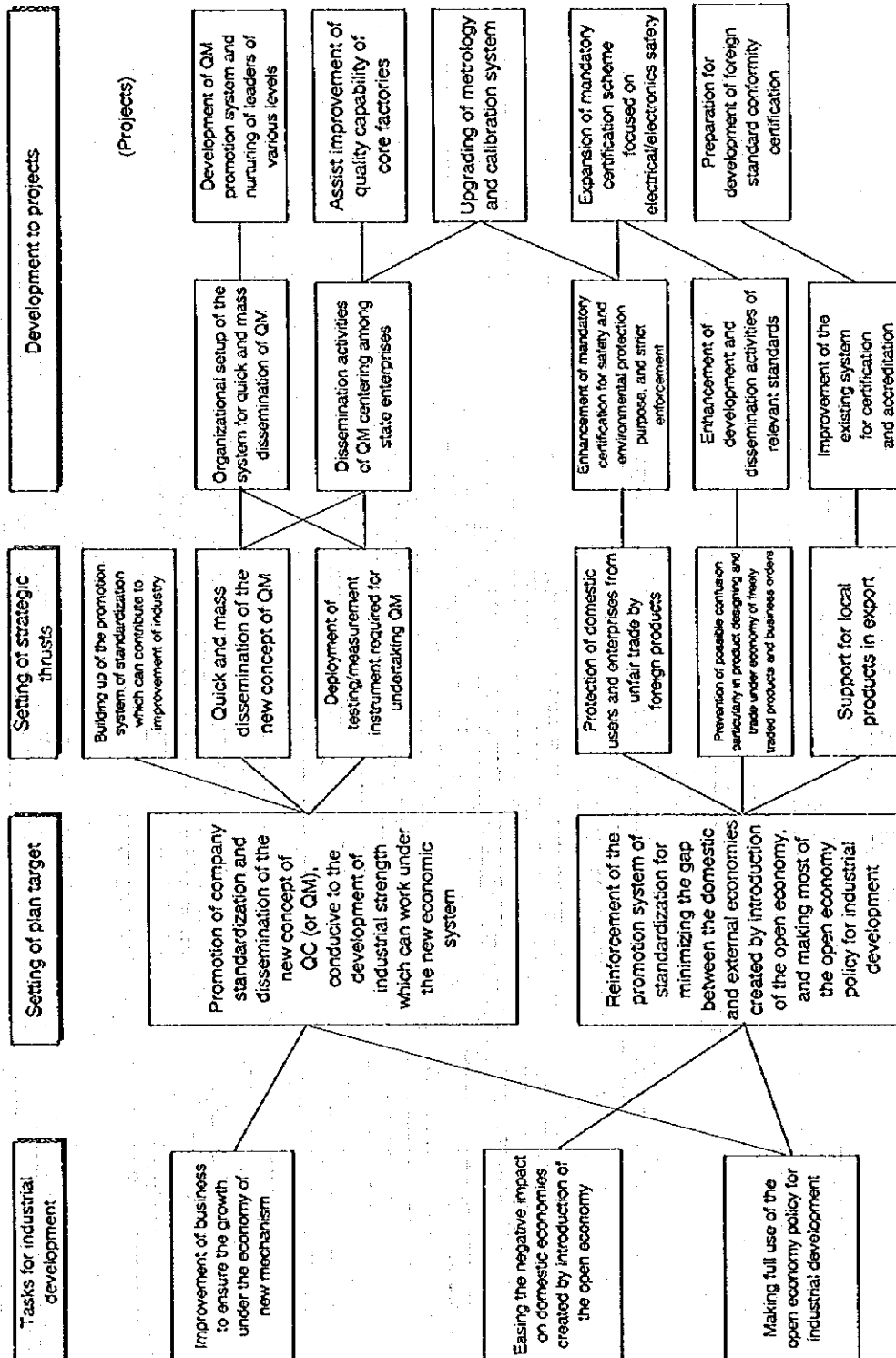
The industrial sector is considered as a major engine for the future industrialization and modernization drive, being allocated 43% of total development investment in the Five Year Development Plan for 1996 through 2000. However, it is questionable whether the industrial sector at present has the potentiality to meet such an expectation. The challenges are seen as particularly great for the state-owned enterprises, which are expected to play a major role in leading industry. The growth of state-owned enterprises without tie-ups with foreign capital has stagnated in recent years, while the foreign investment that have received enterprises have continued to show high growth.

One of the major factors attributable to the above fact is the lag in business improvement. Production facilities and equipment in the country are 20-50 years behind the present world level. Factories are characterized by high levels of per-unit consumption of energy and raw materials, including electricity, and low productivity. Quality control is at a very early level of development, and productivity is said to be 25%-30% of the world level, except for some industries¹.

In order to complete their business improvement, the individual enterprises (or the industry as a whole) have to make progress in the following areas as the first step:

¹ MOI Vice Minister, Dr. Le Quoc Khanh, cited from *Viet Nam News*, May 25, 1997.

Figure III-1 Setting of Plan Target, and Development to Project



- 1) Acquisition of industrial technology specific to each industrial area, accompanied by modernization of facilities and equipment
- 2) Acquisition of technology for management of manufacturing
- 3) Acquisition of marketing and management know-how
- 4) Fostering of research and development capabilities

The standardization and related activities will be able to help address these issues by providing better industrial management technology which is the basis for strengthening industrial competitiveness, e.g., more efficient consumption of raw materials by means of company standardization, work streamlining, and reduction of the rejection rate through proper quality management. Also, they will help in the learning of management know-how.

The negative impact on the domestic economy caused by the opening of the economy is, in the short run, manifested as increased pressure on domestic enterprises by (1) products which are illegally imported without paying import duties and sold at low prices, and (2) low-priced but low-quality products which are legally imported, in addition to which there is a the lack of international competitiveness of the domestic enterprises.

The standardization and related activities can help prevent market distribution of substandard products, which are detrimental to consumer safety, worker safety, and environmental preservation. It will contribute to assist domestic enterprises by limiting their competition only to fair competition with imported products having acceptable quality.

Further, in the area of industrial development that directly benefits from the open economy, the standardization and related initiatives can contribute to the anticipated use of CEPT by Vietnamese industries and expansion of export markets under ASEAN industrial cooperation projects by: (1) forming the technological infrastructure of testing and inspection service, thereby to provide reliable certification for local enterprises in export markets, and (2) contributing to the fundamental strengthening of industry, through standardization and quality control dissemination, to enable competition in the free competition market.

1.2 Current State of Industrial Standardization and Quality Management in Industry

The performance of industrial standardization and quality management in the subsectors under study is featured as follows:

(1) Standardization

- 1) Manufacturers generally satisfy a certain quality standard declared in advance by themselves for their products, owing to the existing quality registration requirement. The TCVN is mostly used as the standard for this aim. The producers have established their company standards also, if necessary. The larger-scale manufacturers often request their material suppliers to use TCVN as a standard to be met by their materials.
- 2) The standards, however, are regarded as nothing but statements of the requirements for satisfying quality regulation under the quality registration scheme. The standards are not used for rationalizing production activities through standardizing their working procedures, etc.
- 3) The international or foreign standards, instead of TCVN, are increasingly used among joint ventures and the manufacturers seeking to do business in export markets.
- 4) Manufacturers have difficulty in obtaining updated information related to technology.

(2) Quality management

- 1) Manufacturers are strongly conscious of the quality of their products, but their quality management is limited to quality inspection only. A high rejection rate of finished products and high rate of products sent back to be re-worked are left without remedial measures, resulting in deteriorating production efficiency and reducing competitiveness.
- 2) Almost no resource is available in industry at present for implementing quality management through a precise understanding the concept of quality management.
- 3) Technicians in industry have high potential for development of skills, and wide dissemination of quality management will be highly possible, so long as the concept of quality management is disseminated successfully, and the top and middle management of manufacturers are well trained about the method of organizing the quality management effort.

(3) Testing facilities and equipment required for quality management

- 1) Only few manufacturers own their testing facilities and equipment required for undertaking quality management. Most manufacturers do not have testing equipment of the minimum requirements, except for the larger-scale manufacturers.
- 2) Mostly calibration of measuring instruments of manufacturers, particularly in the case of joint ventures, is undertaken abroad.

(4) Other features relevant to quality and industrial development

- 1) Improvement of product design has not been carried out for many years, especially in the case of the state-owned companies. Their production facilities are also obsolete in general.
- 2) The rates of capacity use of production facilities are significantly low, due to the severe competition with products that enter the country illegally (without paying import duty), imported products, second-hand imported products, and low-priced but low-quality imported products, etc.
- 3) Manufacturers who intend to produce quality products rely on imports when they procure materials, resulting in shrinkage of the domestic market due to the decrease in inter- and intra- industrial linkage.

1.3 Major Issues for Improvement and Enhancement of SMTQ System

In consideration of the current state of standardization and quality management in industry (discussed in 1.2), and as a result of evaluation of the current system of SMTQ in view of the major emphasis of the master plan (discussed in 1.1), further efforts are considered essential in the process of improving, reinforcing, and building the SMTQ system, recognizing the problem areas of the existing system precisely as follows:

- 1) The country has developed a system to promote standardization and related activities, which primarily is intended for administrative control and regulation. As a result, there is the apparent lack of understanding on standardization and quality management as a means to strengthen enterprises and their competitiveness.
- 2) Some of the existing systems are not fully enforced. Some of them may function primarily in a symbolic way, to show the government's attitude, while others impair the reliability of the entire system due to their insufficient enforcement.
- 3) Testing and calibration equipment, and measuring instruments owned by public testing laboratories, are insufficient in number and variety, and/or are deteriorated due to aging, making them unable to meet current let alone future industrial needs.

- 4) There is a shortage of engineers, who are experienced in design development and modification of process and product, resulting in the shortage of human resources who can participate in development and revision of standards suitable for technology levels in the country.
- 5) There is a shortage of qualified certification auditors as well as of testing and inspection personnel, who are essential to develop the system fit to international recognition.

1.4 Recommendations for Improvement and Enhancement of SMTQ System by Field of Activities

Following are the recommendations for improvement and enhancement of SMTQ System on the basis of major issues raised in 1.3. Figure III-2 illustrates relations and positions of each recommendation for improvement and enhancement, and the scenario of contribution for the industrial development.

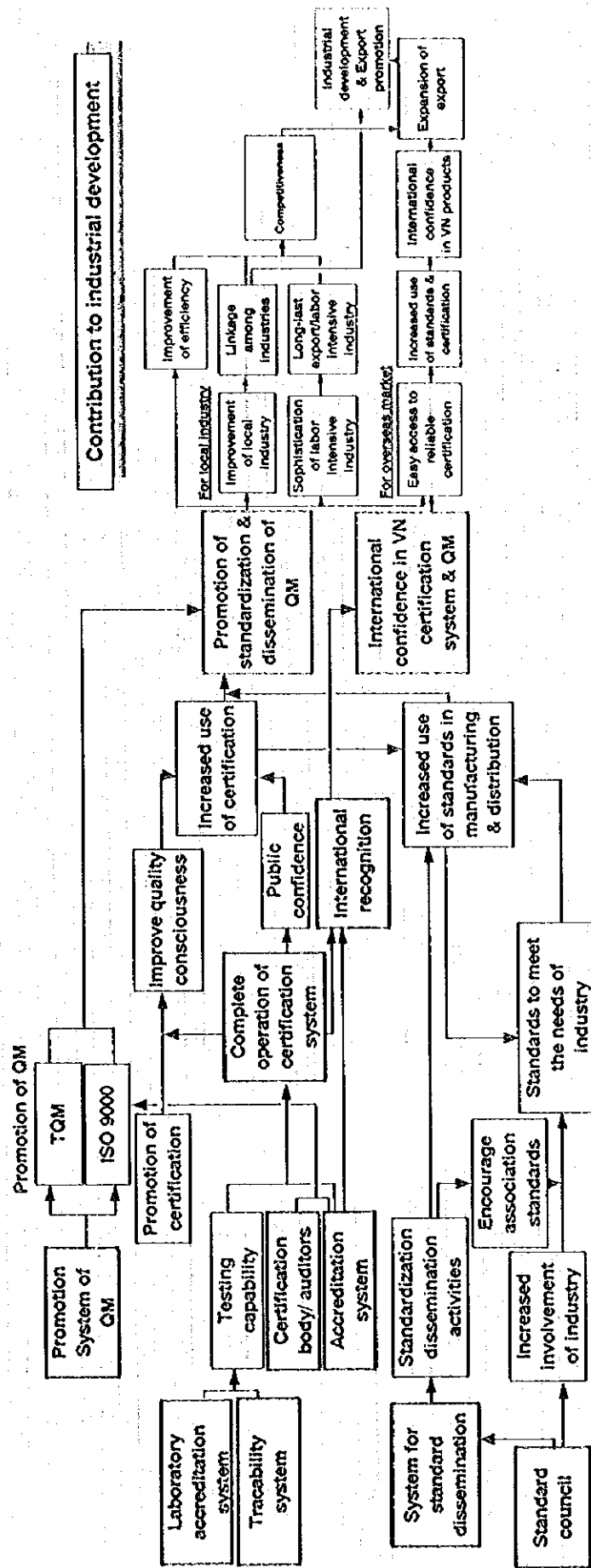
1.4.1 Public Administration System Related to Standardization and Quality, and Organizational Setup

Recommendation 1-1: Review of basic concept of standardization, and establishment of a public forum to reflect opinions of industries, consumers, and academe in standardization and promotion activities of quality management

To promote standardization and quality control, it is imperative to develop a system which can reflect not only the intent of the government, but also that of industry.

In this context, the major objectives of activities should include (1) participation of industry and enterprises in the national standardization and quality activities, and (2) promotion of standardization activities in industry and in enterprises. To insure that the strategic direction for standardization is made to reflect the needs of the industries, it is recommended to create a standardization advisory committee, with a broad-based membership representing industry, consumers, and academe. The committee will confer on STAMEQ's basic policymaking and planning. For the time being, STAMEQ will continue to retain its position and role as the principal organization in these areas, while it will pursue the above concept through forming the committee.

Figure III-2 Recommendations & Contribution of SMTQ to Industrial Development



Note: Recommendation for strengthening/improvement.

When the industries can assume leadership in standardization activity, STAMEQ's role should be shifted to that of a supporting organization having expertise and experience in standardization activity, and the committee should be converted to a council. The council will have research and study divisions to assist in planning policy for standardization activity, and not only depend on members' knowledge.

Government-led standardization activity generally assumes the following roles: (1) to conduct activities related to the establishment of standards and certification, which cannot be carried out by private sector, (2) to promote the private sector's standardization activities, and (3) to participate in and contribute to international standardization activity. In other words, the private sector is responsible for basic standardization activities, whereas government is expected to be active in the areas which have significant social impact, require high levels of reliability, require public participation because of specific conditions that mean private sector cannot make much progress, where there is a risk of unfair practice under conditions of free competition, and where there is a requirement for coordination by a neutral organization.

Recommendation 1-2: Promotion of regional cooperation in standardization and quality control initiatives

There are a number of areas such as certification and accreditation, testing and inspection, metrology and calibration, and human resource development, required for promotion of standardization and quality control, where there can be joint development, say with ASEAN countries, to enjoy benefits from scale of economy and cooperation in sharing or joint activities. These areas should be clearly identified and opportunities for regional cooperation should be pursued. In addition positive participation in international and regional standardization activities is recommended.

The recommended areas of action for the above include (1) joint establishment of human resource development programs and institutions, (2) avoiding possible trade barriers through establishment of common criteria for mandatory certification related to safety, (3) joint implementation of schemes to upgrade testing technology, and (4) maintenance of advanced measurement standards under a joint scheme.

1.4.2 Development and Dissemination of Standards

Recommendation 2-1: Establishment of standards as voluntary standards

It is recommended to establish all the standards as voluntary ones for two reasons. Firstly, to do so will help regain confidence in the existing standards and certification,

which has been lost due to insufficient enforcement of mandatory standards. Secondly, it is intended to develop standards on the basis of reviewing them as technology infrastructure. To make the standards completely effective, instead of establishing them as mandatory ones, it is recommended (1) to incorporate standards, by reference to them, into applicable laws and regulations setting mandatory requirements, or (2) to set forth mandatory requirements as the basis of the mandatory certification system.

Establishment of standards as voluntary ones has the advantage in the following:

- a) The strict process required for mandatory standard development can be avoided, so that technological advancement is easily reflected in standards, and
- b) Measures are taken by the competent authorities specialized in the field, in case of a violation. It is difficult in practice for the agency responsible for standardization (STAMEQ in the case of Viet Nam) to take all the necessary measures in every field covered by standards.

Recommendation 2-2: Review of TCVN standards using GOST/COMECON as technical base

TCVN based on GOST/COMECON standards needs to be revised and updated to insure consistency with ISO/IEC standards.

GOST is still used by some parties, particularly those active in the domestic market. Nevertheless, the major sources of foreign investment, and raw materials (increasingly procured from outside sources as a result of market opening), as well as export destinations for joint ventures, are Western Europe, the U.S., Japan, and East and Southeast Asia, so that diverse standards, including ISO/IEC, ASTM, BS, DIN, and JIS, are used accordingly.

GOST participates in ISO/IEC and thus be expected to be updated to comply with them. In practice, however, Viet Nam has failed to obtain the latest versions of GOST on a continuous basis, so that updating has not been consistently carried out. COMECON standards have presumably ceased to be updated. Thus, TCVN based on these standards may well be outdated.

In the review process, it is recommended to give priority to standards which belong to the priority areas proposed below.

Recommendation 2-3: Adjustment of national standards to the local technological level

Consistency of TCVN with international standards needs to be insured step by step. However, in the coordination process, adjustment to domestic technology levels is very important.

Due consideration should be given to technologies which are widely used within the country and for which no serious problem is reported in regard to safety, public health, environment, and/or consumer protection, so as to ensure that they are excluded on account of not being in need of coordination with international standards. In particular, the coordination process should be carried out after domestic conditions are studied in detail, including quality and performance levels of raw materials and products distributed within the country, the scope and extent of their specifications in standards, and differences in classification.

Recommendation 2-4: Promotion of standards development of strong needs

Most TCVN standards developed recently have been made on the basis of public administration needs. There are many fields where the needs of development or revision of standards are strong, in the interest of industrial development, and thus it is recommended to carry out the activities with an organized plan dedicated to these needs.

The areas for which there is a strong need for standards development, as identified in the study, are summarized as follows²:

- a) Development of standards which contribute to prevent confusion in trade and product design
- b) Review of GOST- and COMECON-based standards to insure consistency with international standards
- c) Adjustment of TCVN with international standards when adaptation to international standards alone would not match domestic technology levels
- d) Standards required for expansion and reinforcement of mandatory product certification
- e) Basic standards used for quality control promotion
- f) Standards used in international trade
- g) Standards related to environmental protection

Recommendation 2-5: Strengthening of dissemination activities of standards

To undertake intensive dissemination activities regarding the contents of standards, particularly focusing on the following areas:

- a) Public information and educational activities related to the transition from TCVN to ISO/IEC base -- Seminars and similar activities to deepen the understanding of contents of standards and testing methods, etc. They should also include preparation

² The present study primarily covers machinery, metalworking, and electrical and electronic subsectors, with secondary focus on textile and apparel, construction materials, and petroleum products.

and dissemination of comparison tables showing foreign standards and TCVN of metallurgy fields.

- b) Technical seminars and similar activities for familiarization of ISO/IEC base standards in the fields of machinery and metallurgy, in coordination, for consistency of GOST/COMECON-based standards with ISO/IEC standards.
- c) Public information and educational activities related to standards used in enhancement of mandatory product certification -- To promote the understanding of standards and testing methods, and to provide consulting for manufacturers to assist in improvement of their production technology
- d) Promotion activities of company standardization as a tool for qualitative improvement of business operation

Recommendation 2-6: Enhancement and expansion of technical information centers

To collect the updated information and data to meet a high potential need for technical information, while conducting public information activities on information available at the centers.

Since these activities are carried out under constraints of limited resources, those in Hanoi and HCMC should be planned in an integrated manner for efficient use of resources.

There is a strong need for technical information in industry. Particularly, industrialists have difficulty in obtaining technical information on foreign standards, international standards, and quality control. Foreign standards and international standards are furnished by customers, but such supply of information is limited to that of relevant portions, when the standards are asked to be used by customers. However, basic standards as well as related standards are not made available.

Recently ISO began to provide technical information useful for standardization, even though the development of those standards is premature. Many industrialized countries similarly are making available in-progress information on national standards and accessibility to these information sources is important.

In addition, information on CE and certification in EU and other countries is important for facilitating export trade in the future.

1.4.3 Certification and Accreditation System

Recommendation 3-1: Activation of the TCVN conformity product certification scheme

Focusing on the products shipped to the domestic market, the competent authorities should activate the TCVN conformity product certification scheme, under conditions of

limited human resources, time, and budget, so as to insure that the scheme is effectively built and accepted by users.

The present voluntary certification system in the country covers all the products for which product standards are established, going beyond national standards. However, successful operation of certification scheme so that it enjoys a good reputation, will require preparation of the corresponding infrastructure including development of standards, establishment of certification and accreditation bodies, preparation of testing, and inspection facilities and equipment, etc. And it is very difficult, if not impossible, to satisfy all these conditions at once. If all products are to be covered under the limited-resources constraint, the ability to manage the certification process including paperwork will soon reach its limits. Also, the inspection system itself cannot cover everything.

Thus, it is recommended to implement the certification only for selected, high-priority products, at the initial stage of operation, with clear definition and announcement to the general public about the criteria of selection.

The standards applied under this scheme should be limited to TCVN only. The foreign standards will be increasingly used in Viet Nam in the future, but it is not realistic to expect that every local enterprise will be able to meet such quality and performance requirements. On the other hand, some customers accept products with substandard quality and performance, by placing priority on price. It is therefore important to develop standards that support the certification process in such a way that fosters domestic industries. In an effort to insure consistency with international standards, which will be increasingly required in future, the development of new standards which are appropriate for technology levels in the country is essential while efforts must be made to avoid conflict with international standards, rather than seek mere application of international standards.

In order to encourage enterprises in applying for the certification, the government should take appropriate measures as much as possible; e.g., provision of preferential treatment for the products with certification in the government procurement.

Some applicants will not have adequate testing equipment and measuring instruments. Thus, a necessary test of testing equipment must be insured by the certification scheme for all the product items to be tested. To achieve this, the system of accreditation of testing laboratories should be expanded and maximum possible use should be made of the existing equipment. New equipment that is needed should be installed in QUATEST.

Recommendation 3-2: Leveraging positive roles of the quality registration system

To encourage enterprises having obtained quality registration to participate in the quality certification scheme is the best way to leverage the positive roles played by the quality registration system; to incorporate standardization and quality control practices into design, manufacture, and other business activities; and to efficiently operate the current certification system by making the effective use of limited resources available.

Recommendation 3-3: Promotion of foreign standards conformity certification (marking) scheme

Manufacturers who serve the international market or foreign companies operating in the country generally follow foreign standards and require certification (or verification) by an organization acceptable to their customers. In other words, certification which does not meet customers' requirements is useless.

In this case, it is more appropriate to the existing, but not operated, product certification system which bases on conformity with foreign standards. The base standards for this scheme will be the one which the customers request to follow, which will be foreign standards, or equivalent TCVN in most cases. More precisely, STAMEQ should apply for qualification of the auditing or inspection body under the scheme operated by foreign countries, and provide the service to the local enterprises which apply for the certification.

Recommendation 3-4: Expansion of mandatory certification

To improve and enhance the existing mandatory certification scheme through the following:

1) Strict enforcement

As the country further opens the economy and foreign products become more widely available in the domestic market, mandatory inspection described above will be essential from the viewpoints of consumer safety and health, and the environment. To accomplish the objective, the mandatory inspection system must first gain public confidence, as seen in voluntary certification. In particular, it must be enforced consistently throughout the country.

This issue needs to be addressed from three aspects. First comes the question of urgency: How critical is a safety factor for a product subject to mandatory inspection? If most products do not bear the safety mark and few problems occur, the product item should no longer be required to undergo mandatory inspection, so as to allocate scarce resources to other important items.

Secondly, if full-scale enforcement is difficult due to the shortage of human resources, consolidation of various schemes (including similar ones) should be considered. Primary candidates are import and export inspection systems.

Thirdly, a question must be asked about division of responsibility and delegation of authority in relation to the scope of mandatory certification. At present, the Ministry of Health designates product items under its jurisdiction for mandatory quality registration and export/import inspection. Such decentralization should be extended to other areas. If all the standards are established as voluntary standards, and enforced mandatory referred in a law, in case of necessary, it will serve both unification of establishment process of standards, and division of responsibility in carrying out the control on a mandatory basis among the competent agencies.

2) Expansion of product items and securing of the enforcement resources

The list should be expanded by selecting products according to an order of priority within a specified period of time.

As for the expansion of product coverage, the highest priority should be given to the updating of safety standards for consumer protection with the view of preventing electric shock and fire hazards, by establishing the relevant standards.

The method of factory investigation should be introduced for the assessment process, to insure stable quality. Other matters related to the expansion of the scheme are as follows:

a) Development of standards

Standards used as the basis of mandatory certification should be established as national standards. TCVN standards currently available are particularly lacking in standards for electric and electronic products. For products which are not domestically produced, imports are expected to grow in terms of both variety and quantity. Standards should be developed for these products also, as early as possible, with an emphasis on safety for consumer protection.

b) Provision of technical support

In addition to the development of safety standards, production technology to insure reliable supply of products on the basis of the standards is required. In particular, a product subject to mandatory certification should not be permitted to be sold to the market when it fails to pass the certification test. In consideration of the potentially serious impact on the manufacturer, the mandatory certification system must be combined with technical support to improve technology levels of those manufacturers in strong need of technical improvement.

c) Provision of testing and inspection equipment

As seen in the voluntary certification system, testing and inspection equipment at QUATEST and accredited laboratories is available. In this case, technology levels of the accredited laboratory are not necessarily world class so far as mandatory certification is intended for domestic industries. On the other hand, QUATEST is required to own the minimum set of equipment and provides guidance for maintaining and improving technology levels of these laboratories through comparative tests and other means.

d) Strengthening of publicity activities

In enforcing mandatory certification, efforts should be made to publicize it widely among consumers and users to encourage non-certified products to be driven out of the market as a result of autonomous effort, in addition to regulatory control.

Recommendation 3-5: Toward internationally acceptable certification and accreditation system

It is recommended for the each certification scheme to be established so as to be acceptable internationally, by building up the following:

1) Human resource development

Development of human resources is essential for the successful operation of the certification schemes for the required certification auditors, accreditation auditors, and internal auditors, etc. At present no system is available in Viet Nam to develop these resources. At present, there are 20 auditors who have completed the training course approved by IRCA, and they have to be fully utilized at the initial stage, and then, develop the resources further according to an established development plan.

2) Insuring an accreditation body

Insuring a qualified accreditation body is one of the most urgent issues for completing the organizational set-up.

An issue concerning establishment of an accreditation body in Viet Nam is the fact that both BOA and QUACERT are under the sole authority of STAMEQ.

ISO/IEC Guide 61, the international guide for establishing accreditation organizations, sets forth the required conditions for insuring impartiality of an accreditation body. The accreditation body in Viet Nam is also necessary to be established on the basis of the Guide.

Following are two options to meet the above requirement in the case of Viet Nam:

1. Transfer BOA out of STAMEQ (out of MOSTE if possible) and make it an independent entity
2. Transfer QUACERT out of STAMEQ (out of MOSTE if possible) and make it

an independent entity

Of these options, if preference must be assigned to one over the other, QUACERT is better to be organized out of STAMEQ in that a certification body can function independently more easily than an accreditation body can, because of having higher revenue potentiality, and that there will be more than one certification body operating in the country in the future. In this case, QUACERT should be operated as one of certification bodies, instead of a newly-established, special organization.

Further, if both BOA and STAMEQ remain under MOSTE (though one of them must be out of STAMEQ), it is important to gain assurance that the impartiality requirement is met according to the Guideline.

1.4.4 Quality Management

Recommendation 4-1: Quick and mass promotion of the new concept of quality control (or quality management)

Under conditions of the previous centrally planned economy, factories gave priority to the manufacture of products in specified target quantities, which met specific quality standards. Under conditions of the new market economy, quality standards must be constantly adjusted upward according to customers' needs. To meet customer demand and compete with others, enterprises must improve their management. In the new business environment, it is very difficult, if not impossible, for the Vietnamese manufacturing sector to sustain growth by relying on the traditional quality control method.

Given the anticipated pace of industrial development and the importance of promotion of quality control, the strategic focus should be placed on human resource development in the field, including personnel engaged in promotional activity, which must be carried out quickly and on a large scale by establishing an appropriate system having adequate resources.

Conceptually, quality control expanded gradually from product inspection in the early stage, to the improvement of business operation and management from designs, departmental communication, to chain of command and division of responsibility, which has been defined as TQM, or Total Quality Management.

Even in the quality control practice according to a narrow definition, which aims to prevent the occurrence of defective products, emphasis should be placed on proper management of each process, including design, production, and inspection so as to prevent the occurrence of any defect in product, thus give high weighting to preventive aspects.

Unfortunately the modern concept of quality control was not introduced during the centrally planned economy era, and the country has few persons who profoundly understand quality control as practiced in industrialized countries. Although foreign-affiliated enterprises and joint ventures are striving to implement the new concept, they have a hard time in disseminating it to managers and workers who still espouse the old concept.

Increased acceptance of the ISO 9000-based quality system and the certification system is important in the context of international assistance for Vietnamese enterprises. More importantly, however, they should learn and understand the new concept of quality control as the first step.

Recommendation 4-2: Procurement or upgrading of testing equipment, measuring instruments, and calibration equipment to support quality control practice

Except for foreign-affiliated companies and joint ventures, local enterprises do not have a sufficient set of testing equipment and measuring instruments required for quality control, without which data collection and analysis -- essential activities leading to quality improvement -- cannot be performed.

In principle, testing equipment and measuring instruments need to be located near the place of production and should preferably be owned by each enterprise or a third party organization which gives easy access to individual enterprises. In Viet Nam, two methods seem to be viable. The first method is to encourage large enterprises to procure necessary equipment and allow it to be used by nearby enterprises. In this case, large enterprises will receive service fees which will help pay the cost of upgrading equipment in the future. The second method is to install equipment at public organizations in major industrial areas for use by enterprises. Such a public organizations can be QUATEST. Since the contemplated equipment is not very large, and as testing equipment is necessary to be located to be easily accessed by many enterprises, it should be flexibly allocated, e.g., branch offices are to be established in industrial estates, in addition to existing laboratories and other organizations.

Recommendation 4-3: Dissemination of quality management to key enterprises

In addition to establishment of the promotion system, initiatives to make focused promotion to selected enterprises (key enterprises) on a pilot basis are expected to be an effective means to ensure quick and high-volume dissemination of quality management in concept and practice. This way, other enterprises can learn from the key enterprises by

taking them as a model.

The process should start from diagnosis and evaluation of the key enterprises to develop improvement plans. After that, based on the plan, financial assistance, technical guidance, and, if required, intermediary service to introduce a potential partner should be provided. Then, testing equipment and measuring instruments should be installed (as discussed earlier, they will be shared by nearby enterprises) and standardization and quality management practices will be learned through actual experience.

It should be reemphasized, however, that the above initiatives will not produce much results unless concurrent efforts are made to upgrade production technology, another important element of quality capability. In this sense, promotion of standardization and quality control at key industries should be carried out as part of an overall project to modernize factories.

Recommendation 4-4: Development of certification guideline for SMEs' quality system

Certification of the quality system based on ISO 9000 Series will increasingly become a business imperative for enterprises who primarily serve the export market, and foreign companies operating in the country. In contrast, local enterprises mainly serving the domestic market are seldom required to obtain the advanced level of certification. The country is now moving toward the factory investigation system for assessment of product certification (particularly, mandatory and TCVN-based voluntary certification), but it is not realistic to demand every applicant to have an ISO 9000-based quality system without modification.

One realistic solution is to develop a guideline and promote a system following the guideline which can be followed by small- and medium-sized enterprises with reasonable efforts and produce tangible benefits. Such a guideline has already been published by ISO secretariat. The accreditation body should show the guideline to the certification body, and the certification body develop a guidebook to be referred to by the applicants. In such a way, the criteria applicable to SMEs may be defined and clarified.

At the same time, the government should commit itself fully to the promotional efforts of the system, and make the system one of the requirements for mandatory product certification, while giving incentives for the applicants by making the certificate a requirement for government's procurement.

1.4.5 Testing and Inspection System

Recommendation 5-1: Development of the Testing and Inspection System to Reinforce the Product Certification System

In many industrialized countries, the testing and inspection system to maintain the accreditation system is operated in such way that an assessment body makes final decision, while the results of testing and inspection by private organizations are utilized as far as possible to provide operational flexibility.

In Viet Nam, the development of the testing and inspection system is necessary to be carried out taking into account the availability of facilities and equipment as a whole.

It is certain also in Viet Nam that demand for testing and inspection will grow and become diverse in keeping with industrial development, and at the same time, an increasing number of private enterprises will have or add their own testing equipment. In addition, the number of laboratories will increase, and small- and medium-sized enterprises, who can not always afford to have their own equipment, will increasingly commission testing service to other enterprises.

On the other hand, it will become increasingly difficult for QUATEST and other public laboratories to handle every testing and inspection service for certification, as growth, diversification, and sophistication of the future certification demand will have the following impacts: (1) the need for large capital investment; (2) difficulty in keeping abreast of advancement of technology and human resource development; and (3) difficulty in keeping up with the progress of industrial technology in terms of equipment.

To produce the maximum result under resource constraints, the certification system must assume the effective use of existing organizations and facilities (including those to be established in the future). Then, public organizations established to provide testing and inspection service required for certification are expected to assume the following functions: (1) supplementing of the existing organizations; (2) provision of assistance and guidance for them; and (3) fulfillment of the roles which cannot be given to the existing organizations, in order to insure fairness and neutrality.

QUATEST's testing and inspection system should be developed, in view of the above, as follows³:

³ Note that the focal point of discussion here is the roles related to testing and inspection service conducted in connection with certification, and does not include the roles related to legal metrology, calibration, and other functions.

1. To conduct tests and inspection, on a supplemental basis, which are required to build testing and certification capabilities for the certification system and which the designated laboratories of public enterprises and universities are unable to conduct;
2. To conduct tests as part of guidance to maintain and improve testing skills of the "designated" laboratories related to mandatory certification (comparison tests, etc.); and
3. To conduct forward-looking testing and inspection required to maintain an internationally acceptable certification system, i.e., the ability to serve as an international-level, accredited laboratory and the ability to serve as the core accredited laboratory in the country.

In addition to the basic rules, it should be accepted that QUATEST will be able to provide other services, such as mandatory certification tests and inspection with relatively large demand and verification of equipment related to legal metrology, for the purpose of maintaining sustainable management of QUATEST, in consideration of actual trends in testing and inspection demand.

Recommendation 5-2: Development of the laboratory accreditation system

In developing the laboratory accreditation system, two systems must be built up concurrently, one intended for product certification covering the domestic market (TCVN-based voluntary and mandatory certification) and the other suitable to the internally acceptable certification system.

In the former case, certification by an organization authorized in the country should suffice. However, the latter requires certification by an organization acceptable to the customer, usually an internationally accepted organization.

The current (new) laboratory accreditation system is assumed to become an internationally (mutually) recognized, which uses ISO/IEC Guide. In practice, however, sufficient experience has not been accumulated in an effort to move toward "mutual recognition" of test results on a multilateral or bilateral basis.

To insure the success of mutual acceptance, there are two basic elements: (1) Do testing and inspection facilities in each country have equipment, manpower and procedures according to ISO/IEC Guide?, and (2) Can testing skills be reliable? It is therefore important to initiate efforts to build these foundations.

Recommendation 5-3: Development of the testing system to promote company standardization and quality management

To insure performance of testing and inspection critical for quality management by using a limited number of equipment and instruments, it is recommended to develop and upgrade the testing and inspection system by a combination of the following two methods.

- 1) Deployment of testing equipment to QUATESTs and SMQs in provinces and designated cities

Testing equipment supporting quality management practice will be deployed to major industrial areas for use by nearby enterprises. The implementation organization can be QUATEST, while equipment should be flexibly deployed, regardless of present locations of QUATEST facilities, to provide easy access to potential users, i.e., the establishment of new branches in industrial estates as required. In addition, training will be provided for staff of these facilities to improve testing skills.

- 2) Accelerated procurement of testing equipment by core enterprises

As seen in the cement industry, a viable solution which is realistic for the country's economic conditions is to encourage large enterprises to procure necessary testing equipment and let it be shared by neighboring enterprises. As an incentive, the government will provide financial assistance for equipment purchase. At the same time, an official program will be launched to improve testing skills, with the assistance of QUATEST, foreign enterprises and universities. Furthermore, tax incentives will be granted to enterprises who purchase testing equipment and provide testing service for others.

1.4.6 Industrial Metrology and Calibration

Recommendation 6-1: To meet the immediate needs

The following actions are considered to be immediate needs to be dealt with:

- a) Mass standards: Measurement standards in the area of mass are frequently used. The existing E₁ class standards, however, are low in accuracy in terms of international level, and the scope of measurement is limited. Further, the accuracy of the balance used for calibration is unsatisfactory, resulting in difficulty in displaying accuracy of E₁ class. The unsatisfactory accuracy level of the balance is a particularly serious problem.
- b) Electrical standards: The existing national standard can only output a single value, making it unsuitable for practical use. At the same time, the measuring

instruments used by industry are not being calibrated in Viet Nam, since almost no calibration facility is available in this technical field. Further, it would be difficult to meet the needs of calibration if the certification system is expanded to the field of electrical safety.

- c) Flow standards: Flow standards are frequently used in verification of measuring instruments related to legal metrology, including water meters, and petroleum trade. However, there is a shortage of standards for calibration of large capacity flow meters used in the petroleum industry, resulting in serious problem of significant error in their transaction. Further, the standards for calibration of gas flow meters, which is not available at present, will be increasingly needed in the future.

In particular, scales for mass-related calibration as well as general electricity standards at high precision levels need to be owned by VMI, with necessary calibration equipment to be provided in QUATEST 3.

Recommendation 6-2: Improvement and upgrading of metrology and calibration system

It is necessary to establish a system to officially designate and maintain the primary measurement standards, and insure reliable calibration network, making full use of the available facilities and equipment besides those of VMI and QUATEST.

- a) Organizations responsible for establishing and maintaining national metrology standards and their reference standards, and those providing calibration service for secondary standards by using national and reference standards should be clearly (and exclusively) designated by law, with clear indication of designation criteria (in the public interest, and assurance of fair service)
- b) Organizations that provide calibration service for working standards and testing and measuring instruments at enterprises and laboratories by using secondary standards calibrated as noted above should be accredited by STAMEQ's director general or MOSTE's ministry for the purpose of insuring reliability of their service. Certification standards are to be clearly defined to encourage participation of public enterprises, research institutes, and universities.
- c) Designation and accreditation criteria for the above organizations should be based on the applicable ISO/IEC Guide. Equipment owned by these organizations will be subject to mandatory, periodic calibration based on higher standards, and calibrated equipment should be affixed with certificate.

Basically, VMI and INST are responsible for activities in (a), while those in (b) are made by VMI (QUATEST 3 in the South) and power companies in the area of industrial metrology, and QUATEST and SMQs in provinces and designated cities in the area of

commercial metrology. In practice, however, this division of responsibility is not strictly followed, e.g., in some areas, VMI owns working standards and competes in providing verification service. Although the above institutional setups need to be given a proper legal basis, present duplication and conflict of some functions may be a practical solution, in consideration to the need for operation of the system under resource constraints, to prevent inefficient allocation of equipment and manpower.

Recommendation 6-3: Development of metrology and calibration system from the long-term view

In the long run, rather than having all the advanced standards in Viet Nam alone as well as the calibration system, a realistic approach is either (1) to own and maintain them jointly by ASEAN countries, or (2) to use advanced metrology standards in foreign countries, which are readily available, as the first step, and to gradually build up secondary or reference standards according to the degree of need.

As for joint efforts by ASEAN countries, each country may maintain basic standards which are frequently used, while sharing advanced standards by having several of them in each country without duplication.

Further, VMI's current environment for the maintenance and management national standards has various problems to be improved from the long-term perspective. In particular, national standards must be maintained under strict temperature and humidity control, while avoiding physical disturbance such as vibration from nearby facilities. VMI's location in Nghia Do is optimum for this purpose as MOSTE's research facilities are concentrated in the area. In future, when more advanced scientific and engineering facilities are constructed (e.g., a high-tech park the plan of which is currently under study), a facility must be specially designed to maintain national standards in due consideration to the foundation, building, and temperature and humidity control.

1.5 Requirements for Development of SMTQ

The requirements for development SMTQ may be summarized as follows (Attached Table III-1 shows details of each fields):

(1) Law and regulatory aspects

- 1) To incorporate the basic direction of standardization and quality control activities into the Act of Product Quality so as to shift from the government-led and public administrative perspective to the viewpoint of building the technical foundation for

industrial and economic development, and on that basis take necessary action required for modification of relevant laws and regulations.

- 2) To take necessary action required for modification of relevant laws and regulations, in order to make all the standards as voluntary ones, thereby to be able to reflect the advancement of technology easily.
- 3) To take necessary action required for modification of relevant laws and regulations, by expansion of the mandatory certification scheme, including integration of import inspection into the scheme, use of the factory investigation method in the scheme, expansion of subject products, etc.
- 4) To take necessary action required for modification of relevant laws and regulations, for development of the metrology system (official system for supplying measurement standards, or calibration system).

(2) Systems/procedures and organizational setup

- 1) Establishment of a Standardization Advisory Panel (to be developed to Standardization Council in the future) to reflect the needs of industry in standardization and related activities, while defining the positioning of the panel in the standardization activities.
- 2) Effectuate the mandatory control by the authorities concerned with mandatory laws, in response to change in establishing method of standards to voluntary ones.
- 3) Defining the functions and roles of Training Center in relationship with SMEDEC, VPC.
- 4) Enhancement of Information Center.
- 5) Acquisition of qualification as the auditing/inspection body for foreign standards conformity certification by STAMEQ
- 6) Establishment of the accreditation body or certification body outside of STAMEQ to insure the impartiality of the accreditation body
- 7) Development of a traceability system of measurement standards

(3) Human Resources Development

- 1) For standard development (particularly engineers from industry)
- 2) Testing engineers (particularly for standard testing)
- 3) For auditors, for certification and accreditation
- 4) Leaders, staff for extension service, and lecturers for quality management
- 5) Industrial extension officers for dissemination of standardization (dissemination of contents of standards, consultancy for certification), and promotion of quality management

6) Efforts for joint undertaking of human resource development programs and establishment of an organization for it

(4) Facilities and equipment

Building up of facilities and equipment of testing/inspection and metrology and calibration for the following:

- 1) Implementation of voluntary product certification (particularly, testing equipment of metallurgy and machinery fields at QUATEST)
- 2) Implementation of foreign standards conformity certification (marking; particularly, testing equipment of metallurgy and machinery fields, and electrical and electronics fields at QUATEST)
- 3) Expansion of mandatory product certification (particularly, testing equipment of electrical and electronics fields at QUATEST)
- 4) Support of quality management of enterprises (particularly, testing equipment of metallurgy and machinery fields, and calibration equipment for measuring instruments electrical and electronics fields at QUATEST)
- 5) Meet the immediate needs of calibration of measurement instruments (calibration equipment at VMI, and QUATEST 3)
- 6) Build-up the metrology system at VMI from a long-term view point

2 Recommendations

2.1 Recommendations

It is recommended to take necessary action for implementation of the improvement and development suggestions made in 1.4, and requirements for development of SMTQ summarized in 1.5. The improvement and development suggestions are summarized in Attached Table III-2 under "Immediate actions", "Short/mid term actions", and "Mid/long term actions".

Of the above suggestions, five projects are recommended to be undertaken, with coordination among two or more organizations within a definite period of time, as summarized in Attached Table III-3 (The development of systems and organizational setups expected as the result of implementation of improvement suggestions and project recommendations in the area of standardization and related activities are shown in Attached Figure III-1).

At the same time, immediate implementation is recommended for the following projects among those shown in Attached Table III-3 as the measures for realizing these suggestions:

- 1) Project to develop a promotion system of company standardization and quality control under the new concept (or quality management), and nurturing the leaders for it at various levels (Project #1)
- 2) Project to assist the improvement of quality capability of factories positioned as the central core of subsectors (Project #2)
- 3) Project to upgrade and expand the mandatory certification scheme particularly emphasizing safety of electrical and electronic appliances (Project #3)

Also, it is recommended to launch the following projects together with, or following, the above projects:

- 4) Project to prepare for development of the certification system in conformity with foreign standards under agreements with foreign countries (Project #4)

The immediate implementation of a part of the following project, and further study of a part of it from the long-term standpoint, are recommended.

- 5) Improvement and upgrading metrology and calibration system (Project #5)

2.2 Tentative Schedule and Organizational Setup for Plan Implementation

2.2.1 Tentative Schedule for Implementation Plan

Figure III-3 shows the outline of the proposed implementation schedule of the overall master plan, including that of recommendations (Attached Figure III-2 shows details).

The decisive factor for the above schedule is the timing of the country's participation in AFTA proposed by ASEAN.

Viet Nam is already committed to the enforcement of CEPT (common effective preferential tariff) in 2006, which is a critical element of AFTA.

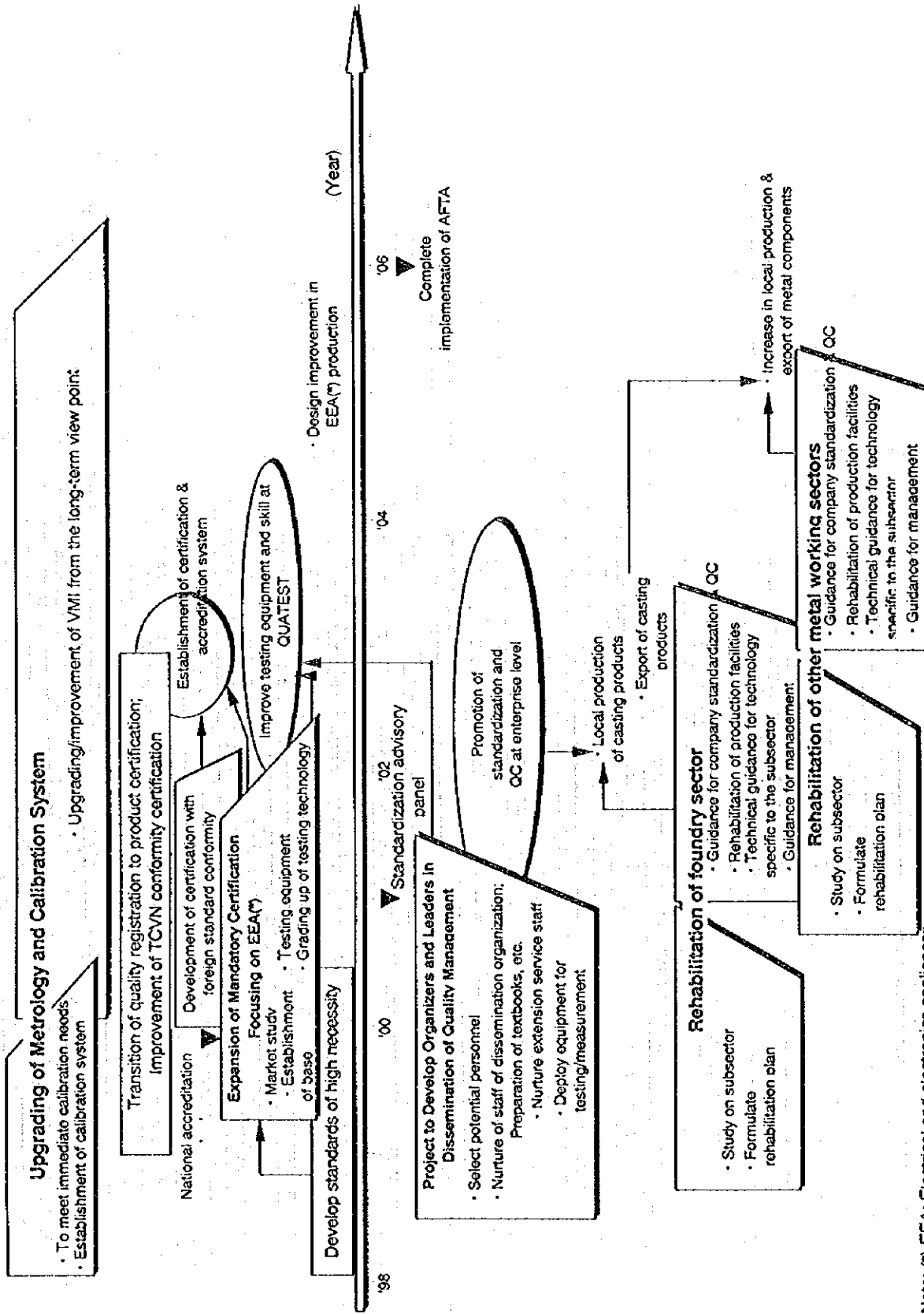
In the recent years, Vietnamese industries have been growing rapidly by making most of foreign direct investment. Nevertheless, the emerging industries have been primarily limited to assembly industries using imported materials and parts. They use few local materials and parts as they do not meet quality requirements. If the country introduces CEPT as scheduled, without any effort to improve competitiveness of its industries, it will be flooded by competitive products from the member countries, which are produced on a much larger scale by using domestic (non-Vietnamese) materials and parts, which would threaten the survival of Vietnamese products, including those assembled at relatively new lines.

Thus, it is important to strengthen the domestic industries producing materials and parts so that they can become competitive prior to CEPT.

Needless to say, participation in AFTA creates a good opportunity for Viet Nam which has been left behind in export activity, by opening up a new, sizable, potential market. This clearly justifies and necessitates the strengthening of industries and enterprises as well as the preparation for export promotion including the development of infrastructure and institutional setup.

The strengthening of local enterprises will focus, first of all, on the foundry industry which will play a critical role in supplying parts to the metal and machinery industries in order to secure significant quality improvement by 2002. As a result, local production of parts and their exports will steadily increase. Then, modernization efforts will be extended to other metalworking subsectors so as to establish sufficient ability to produce metalworking parts domestically by 2004.

Figure III-3 Conceptual Plan for Implementation of the Master Plan



Note: (*) EEA: Electrical and electronics appliances

If this is accomplished, the auto industry and the electronic/electrical equipment industry will become able to redesign and improve their products domestically, in addition to the direct benefit of higher local content. At the same time, modernization of the metalworking industry will enable local production of molds and dies, with effects which will trickle down to the plastics industry which will attain design capabilities and increase local procurement of parts.

In such a way, the competitive foundation for the assembly industries will be developed by 2006 and, as a result, will reinforce competitiveness of their products.

The above modernization process will be driven by powerful tools, quality control and company standardization, which are different from those currently practiced in the country and focus on better quality and higher productivity. In particular, as these concepts are new in the country, efforts in areas including human resources and organizational building will be made to quickly develop infrastructure to enable mass promotion. At the same time, a sufficient system to promote the strengthening of the metalworking industry will be developed by mid-1999, and one to support small- and medium-sized enterprises by the end of 2000, as the latter are expected to become a growth sector in future.

Meanwhile, the certification schemes, particularly for quality systems and foreign standard conformity, will be developed to facilitate exports as well as supply to joint ventures and foreign companies operating in the country. They should be ready to operate by around 2002 when exports of materials and parts are expected to increase.

2.2.2 Organizational Setup for Implementation

Some of them have been or are planned to be started as part of other projects. Thus, coordination and promotion will be critical in the project implementation process with a view to bring them as well as those contained in other projects into an entire system which serves the objective in a consistent manner.

It is essential for STAMEQ's state management departments to understand the overall plan in detail with its objectives, requirements and proposed schedule of implementation, so that they can make necessary arrangements well in advance in undertaking overall planning and coordination for shaping the recommendations and implementing the projects. In particular, projects and other activities with support from abroad will require attention as they require considerable time and effort before implementation.

As a result of implementing these recommendations and projects, most of the relevant resources will be accumulated in various organizations under STAMEQ, including QUATESTs, QUACERT, Training Center, SMEDEC, VSI, MVI, as well as provincial SMQs which receive technical advice from STAMEQ. Thus, well-organized coordination among them will be essential for successful use of these resources.

Attached Table III-4 summarizes the roles of organizations in each recommendation and project.

2.3 Recommendation for Organizational Setup of STAMEQ

All the functions related to the activities of standardization and relevant areas in Viet Nam are concentrated at STAMEQ. However, its traditional role has been limited to the securing of fairness in the production and distribution processes in terms of quality and metrology, and it has only started the function of promoting company standardization and quality management in industry. Therefore, the existing functions of STAMEQ is not fully satisfying these needs, and in fact, some functions are still under consideration.

As a basis of planning STAMEQ's organization and resources to fulfill its vested function in the areas of standardization and related activities⁴, STAMEQ is expected to assume these roles: 1) to conduct, on behalf of industry, standardization activities which should be undertaken by industry, but cannot be covered by them; 2) to promote standardization activity on the industry side; and 3) to represent the country's interest in international standardization. Based on this framework, the following are the recommendations related to STAMEQ's organization and resources.

1) Functions and organizations to be added in promoting standardization and related activities

In fact, there is no function which is to be added to those discussed and contained in the individual areas at the present stage. Nevertheless, in the future STAMEQ is required to launch research activities (standardization research) when the need for developing its own standards arises to meet the needs of industries and/or consumers.

Further, STAMEQ needs to have an advisory panel or council on standardization to reflect opinions and views of industrial communities.

⁴ The present study does not cover other functions, such as legal metrology, quality regulation on the basis of quality registration, and import inspection on quantity and specifications.

- 2) Functions and organizations to be improved, expanded or modified
 - a) STAMEQ needs to strengthen its planning department, both in its scope of work and staffing, in order to grasp the actual needs of industries and translate them into standardization activity.
 - b) To insure impartiality of the certification system, either the certification body or the accreditation body must be made independent from STAMEQ.
 - c) At present, there are three organizations (one of them is in the preparation stage) which assume responsibility for technical guidance related to promotion of standards, and assistance and training in quality management and company standardization; namely, Training Center, SMEDEC, and VPC. However, given the current state of enterprises in the country (dominated by state enterprises, with no significant development of the private sector), it is difficult to justify functional separation of these organizations. It is possible to integrate them into a single organization responsible for promotion and training⁵.
 - d) It is recommended to assign the functions of technical guidance related to dissemination of standards, and quality management and company standardization, to local SMQs which are operated under the technical guidance and advice of STAMEQ, step by step, in accordance with development of local industries. More precisely, in contrast to QUATEST which should be strengthened as a part of the central government, SMQ needs to be reinforced in the context of local government. In other words, its organization and resources should be expanded side by side with the enhancement of local government. Basically, it will proceed by gradually transfer of QUATEST's functions. At the present stage, it will include the function of legal metrology service as well as technical assistance service for local industries.
- 3) Geographical location of STAMEQ's office, laboratories, and other facilities
Organizations under STAMEQ can roughly be classified into the following categories:
 - a) Those closely related to other government organizations, including policy formulation under coordination with other agencies, departments and industries

⁵ Further development of industry particularly with evolution of industrial technologies in the field of product development and improvement is a prerequisite for the leadership by the industry, and such development is assumed to take time.

- b) Those providing service for enterprises and government organizations, including information service, training, and technical guidance service, etc.
- c) Those required to be located in industrial areas, such as testing and inspection functions
- d) Those requiring interaction with other research organizations, such as an organization to maintain national measuring standards or to develop standards

Among them, those under Category (a) would best serve the intended users if they are located in Hanoi where government organizations are concentrated. Those under (c), on the other hand, should preferably be located in the center of an industrial area, and according to the current factory distribution pattern, Nghia Do seems to be the most suitable site. However, as factory distribution changes in the future (for instance, due to industrial development in the north of Hanoi near the airport, and the major development in Ha Tay now being planned), relocation of laboratories are likely to become the subject of discussion.

Those under (b) are strongly related to both government agencies and manufacturers. While they will be convenient if they are located in the same site as (a) for the time being, they may have to be added to other industrial areas, too, in future.

The location of VMI, which maintains national measurement standards, should be studied to be in the environment suitable for its purpose of maintaining national measurement standards in a long-term view, including a purpose-built building.

Further, financial and other constraints necessitate laboratories to be operated by centralizing staff and equipment as far as possible at the present stage. In future, however, they should develop branch laboratories convenient for the manufacturers and following the expansion of industrial zones.

Attached Table III-1: Summary of Requirements for Development of SMTQ

		Requirements by Dimension		
Fields and Recommended Actions	Regulatory systems	Systems/Procedures & Organizational Set-up	Human Resources	Facilities/Equipment
Public administration system related to standardization and quality control, and their organizational setup				
<ul style="list-style-type: none"> Direction of national standardization activities: Reflect needs of industry on standard development and system development 	<ul style="list-style-type: none"> Include as one of the major targets of activity. 	<ul style="list-style-type: none"> Establishment of an advisory panel/ standard council. 		
Development and dissemination of standards				
1) Establishment and updating of standards: Need to develop standards in the areas of strong needs			<ul style="list-style-type: none"> Promotion of involvement of engineers from industry in standard development 	
2) Voluntary or mandatory: Establishment of all the standards as voluntary	<ul style="list-style-type: none"> Establishment of all the standards as voluntary, while make it mandatory by law. 	<ul style="list-style-type: none"> Execution of the law by the competent govt agency as mandatory. 		
3) Dissemination of standards: <ul style="list-style-type: none"> Strengthen dissemination activities to deepen the understanding of contents of standards. Gathering & provision of technological information on foreign standards and quality management. 		<ul style="list-style-type: none"> Define the function of Training Center 	<ul style="list-style-type: none"> Nurture of testing engineers (QUATEST) 	
		<ul style="list-style-type: none"> Reinforcement of Information Center 		

Requirements by Dimension				
Fields and Recommended Actions	Regulatory systems	Systems/Procedures & Organizational Set-up	Human Resources	Facilities/Equipment
Certification and accreditation				
1) Voluntary product certification scheme: <ul style="list-style-type: none"> Meet the needs for certification of enterprises active only in the local market. Meet the needs for certification of enterprises engaged in export and in trade with J/V in Viet Nam. 			<ul style="list-style-type: none"> Nurture of certification auditors 	<ul style="list-style-type: none"> Installation of testing equipment for products covered
2) Mandatory certification scheme: Ensuring reliability of the scheme with complete execution, expansion of coverage and preparation for execution	1) Establishment of all the standards as voluntary, while make it mandatory by law. 2) Unification with import inspection system 3) Adopt production process assessment method 4) Expansion of coverage	<ul style="list-style-type: none"> STAMEQ as qualified certification/inspection body by foreign certification system 	<ul style="list-style-type: none"> Nurture of certification auditors, and testing engineers 	<ul style="list-style-type: none"> Installation of testing equipment for products covered
3) Improvement/development of system for certification & accreditation: <ol style="list-style-type: none"> Nurturing of staff required for certification and accreditation bodies Securing legal entity of national accreditation body according to ISO/IEC Guides 		<ul style="list-style-type: none"> Ensuring impartiality of certification and accreditation bodies 	<ul style="list-style-type: none"> Nurture of certification auditors 	
Quality Management				
1) Quick and mass dissemination of quality management under new concept.			<ul style="list-style-type: none"> Nurture of quality management leaders, organizers at dissemination organizations, and lecturers 	

Requirements by Dimension				
Fields and Recommended Actions	Regulatory systems	Systems/Procedures & Organizational Set-up	Human Resources	Facilities/Equipment
2) Preparation/upgrading of testing equipment and measuring instruments required for undertaking quality management.				<ol style="list-style-type: none"> 1) Installation of testing equipment for QM at QUATEST 2) Establishment of branch laboratories of QUATEST in industrial areas
Testing and Inspection				
1) Improvement of testing system for certification.			<ul style="list-style-type: none"> • Acquisition of testing skill to be conducted based on standards • Nurture of industrial technology extension officers 	<ul style="list-style-type: none"> • Installation of testing equipment for products covered
2) Preparation/upgrading of testing equipment and measuring instruments required for undertaking quality management.			<ol style="list-style-type: none"> 1) Installation of testing equipment for QM at QUATEST 2) Establishment of branch laboratories of QUATEST in industrial areas 	<ol style="list-style-type: none"> 1) Installation of testing equipment for QM at QUATEST 2) Establishment of branch laboratories of QUATEST in industrial areas
Industrial Metrology and Calibration				
1) Meet the urgent and immediate needs.				<ul style="list-style-type: none"> • Meet the urgent and immediate calibration needs.
2) Upgrading of VMI in view of long-term development.	<ul style="list-style-type: none"> • Development of metrology/calibration system 	<ul style="list-style-type: none"> • Development of metrology/calibration system 	<ul style="list-style-type: none"> • Joint establishment of training center of metrology/calibration engineer 	<ol style="list-style-type: none"> 1) Making most of the facilities/equipment available in other organizations through development of metrology/calibration system 2) Joint development of the system with regional cooperation 3) Making most of the advanced measurement standards available internationally 4) Study on optimal location of VMI, with possible transfer plan

Attached Table III-2: Summary of Issues and Recommendations

Areas and Issues	Recommendations		
	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
Public administration system related to standardization and quality control, and their organizational setup			
1) Direction of national standardization activities: strong drive from administration view points, while insufficient reflection of needs of industry on standard development and system development	include the following as one of the major targets of activity: 1) Encouragement of participation of industry and enterprises in national standardization and quality management activities. 2) Promotion of standard activities at industry and enterprises. (The details of recommended activities for functional development are given in the individual items.)	Establishment of an advisory panel on basic plan of STAMEQ.	Establishment of Standardization Council as a national representative body for standardization, while STAMEQ acts as the secretariat of the Council.
2) Functional development: under study or in transition stage in many areas of system and organizational setup and improvement		Promotion of (international) regional cooperation in joint development/undertaking of standardization and quality management promotion (the details of recommended activities are given in the individual items.)	(The details of recommended activities for functional development are given in the individual items.)
Development and dissemination of standards			
1) Establishment and updating of standards: need to develop standards in the following areas of strong needs of industry. • Review of national standards established on the basis of GOST/COMECON standards, to ensure consistency with international standards • Adopt international standards to national standards, while harmonizing them with the local technology level • Standard development/adoption of international standards in the following: 1) to prevent confusion in trade and product design, 2) to expand and reinforcement of mandatory product certification, 3) to be used in quality management.	Development and update of standards in the following fields of strong needs: 1) Metallurgy 2) Machine elements 3) Electrical standards 4) Quality management	Increased involvement and reflection of needs of industries, consumers, and academe in standard development and update.	Research work for establishing standards of industrial technologies, and development of testing methods, and standards.

Areas and Issues	Recommendations		
	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
2) Voluntary or mandatory. Co-existence, while inconsistent implementation.	Establishment of all the standards as voluntary, to change the system for standards to be developed as technological basis.		
3) Dissemination of standards: • Need for dissemination activities to deepen the understanding of contents of standards.	Strengthen the dissemination activities for publicity of : 1) Transition of standards based on GOST/COMECON system to ISO/IEC system 2) Expansion of coverage of products under mandatory certification scheme, and 3) Encouragement of company standards		
• Difficulty in obtaining technological information on foreign standards, international standards and quality management.	Strengthening of information gathering activities with integrated activities in Hanoi and HCMC	Upgrading of information center	

Areas and Issues	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
Certification and accreditation 1) Voluntary product certification scheme: limited number of companies certified, and industries involved. Limitation of quality registration scheme and import/export inspection system in their role in promotion of standardization and quality management. - Need for certification of enterprises active only in the local market. - Need for certification of enterprises engaged in export and in trade with J/V in Viet Nam.	1) Ensure reliability of certification scheme 2) Transfer enterprises under quality registration scheme to product certification scheme with transition of the system 3) Provision of incentives by the Government to the enterprises under product certification scheme	Development of the system of certification with conformity with foreign standards (Project Recommendation # 4)	

Recommendations

Areas and Issues	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
<p>2) Mandatory certification scheme: a) Limited number of products covered, b) not operated effectively due to incomplete execution. The same situation for import/export inspection system.</p>	<p>Ensuring reliability of the scheme with complete execution, through:</p> <ol style="list-style-type: none"> 1) review of necessity of certification for the currently covered products, and 2) integration of similar schemes. <p>Expansion of coverage and preparation for execution in accordance with the expansion:</p> <ol style="list-style-type: none"> 1) Establishment of safety standards to be used for certification 2) Provision of technological assistance to the manufacturers 3) Upgrading/preparation of testing equipment needed 4) Strengthening of public relation function <p>(Project Recommendation # 3)</p>	<p>International joint undertaking for establishment of safety standards and testing method standards.</p>	<p>Transition to the system based on self declaration.</p>
<p>3) Quality system certification & accreditation system: incomplete legal entity of national accreditation body in view of ISO/IEC Guides. Insufficient number of qualified assessors to operate the system.</p>	<ol style="list-style-type: none"> 1) Nurturing of staff required for certification and accreditation bodies 2) Securing legal entity of national accreditation body according to ISO/IEC Guides 	<p>Expand the system to environmental management</p>	

		Recommendations	
Areas and issues	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
Quality Management			
1) Awareness of needs for and practice of quality management: quality inspection is regarded as quality management. High rejection rate in the production process remains unchanged without improvement, deteriorating the international competitiveness. Insufficient quality of raw materials and components results in decrease in industrial linkage in the country.	Quick and mass dissemination of quality management under new concept. 1) Nurture of promotion leaders and organizers (Project Recommendation # 1) 2) Dissemination to the enterprises positioned at the central core of industries (Project Recommendation # 2)	Strengthen the dissemination system to SMEs: Development of promotion guideline of quality system designed particularly for SMEs.	
2) Testing equipment and measuring instruments required for undertaking quality management: Even the factories positioned at the central core of the industry, do not have sufficient equipment and instrument.	Preparation/upgrading of testing equipment and measuring instruments required for undertaking quality management. 1) Deployment to public laboratories (Project Recommendation # 1) 2) Assist installation by the core enterprises (Project Recommendation # 2)	Expansion to other industrial accumulation areas.	Further development to district industrial technology supporting centers.

Recommendations

Areas and Issues	Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
<p>Testing and Inspection</p> <p>1) Inspection system to support operation of certification schemes, etc.: a) Insufficient testing/inspection equipment at public laboratories, b) no accredited laboratory under the new accreditation scheme of laboratory.</p>	<p>Improvement of testing system for certification:</p> <p>1) Revision of requirement of testing for certification scheme</p> <p>2) Upgrading/preparation of testing equipment at public laboratories</p> <p>3) Development of laboratory accreditation scheme from the view point of international mutual recognition</p>	<p>1) Joint activities for mutual recognition of laboratory accreditation.</p> <p>2) Promotion of owning and maintaining of different advanced standards among ASEAN countries each other under international cooperation</p>	
<p>2) Testing equipment and measuring instruments required for undertaking quality management: Even the factories positioned at the central core of the industry, do not have sufficient equipment and instrument.</p>	<p>Preparation/upgrading of testing equipment and measuring instruments required for undertaking quality management:</p> <p>1) Deployment to public laboratories (Project Recommendation # 1)</p> <p>2) Assist installation by the core enterprises (Project Recommendation # 2)</p>	<p>Expansion to other industrial accumulation areas.</p>	<p>Further development to district industrial technology supporting centers</p>

Areas and Issues		Recommendations		
		Immediate actions (1-3 years)	Short/mid term (3-5 years)	Mid/long term (5-8 years)
Industrial Metrology and Calibration				
1) Equip and maintain national measurement standards: Insufficient accuracy of equipment and unsatisfactory condition of facilities result in difficulty in ensuring required accuracy.	To meet the urgent and immediate needs: 1) Provision of scales for mass calibration with higher accuracy level 2) Provision of a set of general electric standards with higher accuracy level 3) Provision of high precision and capacity standards in the area of flow and related secondary standards (Project Recommendation #5)	Development of calibration network through establishment of national metrology system, while making most of the equipment available in industry, institutes, etc. (Project Recommendation #5)	Upgrading of VMI in view of long-term development: 1) through international cooperation 2) upgrading starting from the secondary standards making use of the advanced standards available overseas 3) relocation to the more suitable site (Project Recommendation #5)	
2) Calibration system: inconsistency of national calibration system among North and South. Difficulty to fulfill the calibration needs of petroleum industry, and electrical & electronics industry in terms of accuracy and volumetric capacity.			Promotion of (international) regional cooperation in joint establishment of training center for nurturing metrology engineers.	
3) Metrology and calibration technology: Difficulty in nurturing and ensuring the number of qualified engineers.				

Attached Table III-3: Summary of Project Recommendations

Recommended Projects	Objectives	Outputs	Evaluation Results	Expected Economic Effects, and Difficulty in Implementation	Estimated Costs for Facility/ Equipment
Thrust 1: Qualitative improvement of industries/ enterprises through promotion of company standardization and QM					
(1) Development of promotion system of company standardization & QM, and nurturing of leaders of various levels	Develop an organization and resource of promotion know-how to support quick and large-scale promotion of company standardization and quality management among enterprises.	Establishment of promotion system of QM 1) Nurturing of pioneer leaders and lecturers 2) Development of programs, curriculums, and textbooks for dissemination 3) Nurturing of extension staff 4) Installation of testing equipment for QM at laboratories in industrial areas, with nurturing testing engineers	Immediate implementation is recommended	Economic effect (Direct effect) • Decrease in rejection rate through standardization • (Ripple effect) • Economic effect due to improved competitiveness Financial position of investment • Improvement of balance deficit with increased testing demand in the future	1) For machinery/metal working fields: US\$ 2.58 mil. 2) NDT equipment: US\$ 0.11 mil. 3) Measuring instrument in electrical field: US\$ 0.03 mil.
(2) Assist improvement of quality capability of core factories	Develop improvement plans for the selected factories to upgrade their quality capabilities and provide support for their implementation. Technology transfer on QM.	Phase I 1) Subsector development plan (including reorganization) 2) Factory improvement plans for key factories in the selected subsectors 3) Introductory training at key factories about actual practice of company standardization and QM Phase II • Assistance for the key factories in their plan implementation.	Immediate implementation is recommended	(Economic effects) • Reduction of rejection rate, improvement of sales price, quality improvement through market development, through (US\$ 3.7 mil./year of direct economic effect assuming that the foundry subsector is selected)	Phase I: • Testing equipment for QM evaluation: US\$ 0.18 mil. Phase II: • Depending on the study result of Phase I

Recommended Projects	Objectives	Outputs	Evaluation Results	Expected Economic Effects, and Difficulty in Implementation	Estimated Costs for Facility/ Equipment
Thrust 2: Development of Standardization Promotion System meeting the Needs of Open Economy					
(3) Expansion of mandatory certification scheme particularly focused on safety of electrical and electronics appliances	Expansion and complete execution of the mandatory certification to secure operational safety of electrical and electronics appliances (EEA) produced or distributed in the country.	<ol style="list-style-type: none"> 1) Reduction of electrical leakage, exposure, fire and other accidents caused by use of EEA. 2) Development of relevant standards 3) Upgrading of equipment and devices to test and inspect EEA 4) Acquisition of relevant testing and inspection techniques and skills 5) Exclusion of imported substandard products from the market 	Immediate implementation is recommended	<p>(Economic effects)</p> <ul style="list-style-type: none"> • Reduction of loss and damages caused by use of EEA. • (Ripple effects) • Improvement of technologies of manufacturers particularly of product improvement and development • Development of R&D function of QUATEST 	Testing equipment of electrical/electronics appliances (Unit: USS mil.) <ul style="list-style-type: none"> • Phase 1: 5.10 • Phase 2: 5.10 • Phase 3: 4.17 • Phase 4: 5.00 • Phase 5: 4.17
(4) Development of certification system with conformity with foreign standards under mutual agreement	Create an authorized system to certify conformity of a locally manufactured product with foreign standards in Viet Nam under an arrangement with foreign certificate system	<ul style="list-style-type: none"> • Qualification of STAMEQ as the assessing/ inspection body for the foreign standard-based certification under the formal arrangement. 	Recommend implementation together with, or following the Projects #1, and #3.	<p>(Direct effects)</p> <ul style="list-style-type: none"> • Inspection fees to STAMEQ (indirect/ ripple effect) 1) Expansion of export with improved reputation in export. 2) Dissemination of QM concept. 3) Improvement of assessment and inspection technology. 	Not applicable (Assuming implementation of the Projects #1, and #3 in advance, and target being the certification in the fields of machinery/metal working and EEA)

Recommended Projects	Objectives	Outputs	Evaluation Results	Expected Economic Effects, and Difficulty in Implementation	Estimated Costs for Facility/ Equipment
(5) Upgrading/improvement of metrology and calibration system	1) Meet the immediate calibration needs 2) Improvement of metrology system 3) Development of total system of metrology and calibration. Establishment (or transfer) of building for maintaining national measurement standards.	1) Upgrading/improvement of mass standards and relevant equipment 2) Installation of electrical standards and calibration equipment 3) Installation of flow standards for oil 1) Unification of domestic metrology system 2) Improvement of calibration system	Recommend implementation Recommend implementation Recommend further study from the long-term stand point of view	1) Improvement of accuracy of legal metrology in the field of mass 2) Calibration locally of measuring instrument which is calibrated abroad. 3) Reduction of financial loss caused by measurement error of oil • Making the possible use of local calibration equipment	(Unit: US\$ mil.) VMI: 1) Mass standards: 0.14 2) Electrical standards: 0.13 3) Calibration of electromagnetism: 0.08 QUATEST 3: • Flow standards: 0.30 Necessary to define the project taking into account the probability of joint undertaking among ASEAN, and possibility to utilize higher measurement standards available internationally.



Attached Table III-4: Responsibility of Relevant Organizations in Implementing the Recommendations

	STAMEQ (*)	VSI	Training Center	Information Center	SMEDEC /PVC	QUATEST	SMQ	VMI	QUACERT /BOA	G.C. (*)
Standardization										
Public administration system related to standardization and quality control Involvement of industry in defining basic direction of standardization/ standard development	1) Planning 2) Coordination for committee/ council	- Coordination for TC								
Standard development and updating Develop standards of strong needs, and in accordance with industrial development	- Basic direction with involving industry	1) Define required standards 2) TC Coordination								
Dissemination of standard 1) Strengthen the dissemination activities	- Overall planning		- Organize seminars/ workshops		1) Dispatch lecturers 2) Consultancy service	1) Dispatch lecturers 2) Consultancy service	- Consultancy service			
2) Strengthen information gathering				- Information gathering & provision						
Certification and accreditation										
Product certification										
1) Improve TCVN conformity certification, and transition of quality registration to product certification	1) Define products 2) Prepare regulatory requirement 3) Coordination of Gov't agencies									
2) Development of certification with conformity with foreign standards under mutual agreement (Project #4)	1) Define products/ procedures 2) Prepare regulatory requirement 3) Agreement with foreign operation body		- Organize seminars/ workshops			1) Preparation of testing equipment 2) Acquisition of testing technology			- Acquisition of assessment technology	
3) Expansion of mandatory certification in the field of electrical and electronics appliances (Project #3)	1) Define products 2) Prepare regulatory requirement 3) Coordination among Gov't		- Organize seminars/ workshops			1) Preparation of testing equipment 2) Acquisition of testing technology			- Ensuring assessors	
System certification and accreditation - Nurturing of assessors									- Ensuring assessors	
Quality management										
1) Dissemination of company standardization and QM with nurturing of promotion leaders (Project #1)	- Overall coordination		1) In advance training of staff 2) Prepare curriculum/ textbooks 3) Organize training courses 4) Keeping lecturers		1) Training of staff & potential outside resources 2) Dispatch lecturers as needed 3) Technical guidance	- Preparation of testing equipment	1) Training of staff for extension officer 2) Provision of technical guidance to local SMEs			
2) Promotion of QM among the core factories (Project #2)	- Overall coordination				- Training of staff & potential outside resources					- Coordination & assistance for implementation of study results
Testing and Inspection										
1) Upgrading and preparation of testing equipment for certification at QUATEST (Project #3 as one of the measures)						1) Preparation of testing equipment 2) Acquisition of testing technology				
2) Testing equipment for quality management (Project #1 as one of the measures)						- Preparation of testing equipment				
Metrology and calibration										
1) Improvement of measurement standards & calibration equipment to meet the immediate needs (Project #5)								- Preparation of equipment & training of staff		
2) Establishment of national metrology and calibration system (Project #5)	1) Define the system 2) Prepare regulatory requirement 3) Coordination of Gov't agencies							Define technological requirements		
3) Upgrading/improvement of metrology and calibration system from the long term view point (Project #5)								1) Preparation of equipment 2) Improve room condition (or planning of new building) 3) Training of staff		

Notes: (*) State management departments. (*) General Corporations.

Attached Figure III-1 Development of MSTQ System through Implementation of the Proposed Projects (1/2)

Action/Projects Field of activities	Project #1	Project #2	Project #3	Project #4	Project #5
Development of Regulatory System	Set promotion of participation of industry and standardization activities of industry as one of major target	Establishment of an advisory panel		Establishment of standardization council	
a. Reflect needs of industry on basic direction of standardization	All the standards as voluntary standards				
b. Securing business of standard development by separating technical specifications from technical regulations for policy implementation	Securing mandatory implementation with laws/regulations				
Development and Dissemination of Standards	Standards relating to metallurgy				Standard development according to industry needs
a. Transition of standards to ISO/IEC system	Standards relating to QM				
b. Adjustment of standards with local technology level	Standards relating to electrical/electronics				
c. New development or adoption of intl standards of strong needs					
System/Organizational Setup & Procedures	Through an advisory panel				Through Standardization Council
1. Reflect needs of industry on basic direction of standardization					
2. Certification & Accreditation	Transition from Quality Registration to product certification				
a. For those related to local markets					
b. For those related to export market & foreign companies in VN				Foreign standard conformity certificate	
c. For securing safety				Expansion/effectuate mandatory certificate	Toward the self certificate

ANNEXURE Figure III - Development of ISO 9001 System through Implementation of the Proposed Projects (2/2)

Action/Projects Field of activities	Project #1	Project #2	Project #3	Project #4	Project #5
Human Resource Development					
1. Standard development		Increasing involvement of engineers with development of industrial technologies	Promotion of participation from industry	Standardization with leadership by industry	
2. Resource for certification accreditation operation			Expansion/ effectuate mandatory certificate	Foreign standard conformity certificate	
3. Testing/ inspection engineer	For machinery & metallurgy fields through promotion of QM		For electrical/electronics fields through expansion of mandatory	Other fields through development of system for foreign standard conformity certificate	
1. Quality Management & Company Standardization					
a. Extension staff					
b. Lecturers					
c. Staff at promotional organization					
Facility & Equipment					
1. For machinery & metallurgy	Trough assistance for QM				
2. For electrical & electronics			Electrical / electronic testing facilities		
3. For petroleum products					Metrology / calibration equipment
4. For basics of metrology					

Attached Figure III-2 Implementation Plan

Project	Immediate actions			Short/mid term				Mid/long term				
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industrial development scenario	1	2	3	4	5	6	7	8	9	10	11	12
<ul style="list-style-type: none"> • Assembly industry of electrical/electronic/informatic appliances • Computer software development industry 				<ul style="list-style-type: none"> • Local production of casting products • Export of casting products 	<ul style="list-style-type: none"> • Local production & expansion of export of metal components • Design improvement in electronics appliances production • Assembly industry of mechatronics 							
Standardization				<ul style="list-style-type: none"> ▼ Establishment of an advisory panel 								
<ul style="list-style-type: none"> • Public administration system related to standardization and quality control • Standard development and updating • Develop standards of strong needs • Meet the needs of standard development in accordance with industrial development • Research for development of standards 												
<ul style="list-style-type: none"> • Dissemination of standard • Strengthen the dissemination activities for publicity of: <ul style="list-style-type: none"> Transition to ISO/IEC system Expansion of mandatory certification • Strengthen information gathering 												
<ul style="list-style-type: none"> • Certification and accreditation • Product certification • Transition of quality registration to product certification • Improvement of TCVN conformity certification 												
<ul style="list-style-type: none"> • Development of certification with conformity with foreign standards under mutual agreement 												
<ul style="list-style-type: none"> • Expansion of coverage and preparation for execution of mandatory certification in the field of electrical and electronics appliances 												
<ul style="list-style-type: none"> • Expansion of coverage and preparation for execution of mandatory certification in the field of electrical and electronics appliances 												
<ul style="list-style-type: none"> • System certification and accreditation • Nurturing of assessors • Development of system & organizational set-up 												
<ul style="list-style-type: none"> • Quality management • Dissemination of company standardization and quality management with nurturing of promotion leaders • Installation of testing equipment and measuring instruments for quality management at QUATEST/SMO 												
<ul style="list-style-type: none"> • Promotion of quality management among the factories positioned as the central core of industries • Installation of testing equipment and measuring instrument at the core factories 												
<ul style="list-style-type: none"> • Testing and inspection • Upgrading and preparation of testing equipment for certification at QUATESTs • Installation of testing equipment and measuring instruments for quality management at QUATEST/SMO • Installation of testing equipment and measuring instrument at the core factories 												
<ul style="list-style-type: none"> • Metrology and calibration • Improvement of metrology/calibration equipment to meet the immediate needs • Improvement of metrology system • Upgrading/improvement of metrology and calibration system from the long term view point 												

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