

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
DIRECTORATE FOR STANDARDS AND QUALITY (STAMEQ),
MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
THE SOCIALIST REPUBLIC OF VIET NAM

**STUDY
ON
DEVELOPMENT OF
INDUSTRIAL STANDARDIZATION, METROLOGY,
TESTING AND QUALITY MANAGEMENT
IN
THE SOCIALIST REPUBLIC OF VIET NAM**

(Summary)

JANUARY 1998

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Abbreviation

AASHTO	American Association of State Highway and Transportation
ABB	Asea Brown Boveri
ACCSQ	ASEAN Consultative Committee for Standards and Quality
AFTA	ASEAN Free Trade Area
AIB	Approved Inspection Body
API	American Petroleum Institute
APIAC	Asia Pacific Laboratory Accreditation Cooperation
APLMF	Asia Pacific Legal Metrology Forum
APMP	Asia Pacific Metrology Program
APQ	Act on Product Quality
APQO	Asia Pacific Quality Organization
AS	Australian Standards
ASEAN	Association of South-east Asian Nations
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BOA	Bureau of Accreditation
BS	British Standards
CAC	Codex Alimentarius Commission
CBU	Complete Built Up
CE	Communittè Eurpèèn
CE meter	Carbon Equivalent meter
CEPT	Common Effective Preferential Tariff
CKD	Complete Knock Down
CNC	Computerized Numeric Control
COMECON	Council of Mutual Economic Assistance
CPV	National Congress of Communist Party of Viet Nam
DIN	Deutches Institut Fur Normung
DOSTE	Department of Science, Technology and Environnient
DY	Deflection Yoke
EAN - International	European Article Numbering - International
EN	European Norms

EU	European Union
EVN	Electricity of Vietnam
FBT	Fly Back Transformer
FDI	Foreign Direct Investment
FY	Fiscal Year
GDP	Gross Domestic Product
GE	General Electric Co.
GOST	Standards of Former Soviet Union
IAEA	International Atomic Energy Agency
IAF	International Accreditation Forum
IATCA	International Auditor, Training & Certification Association
IC	Information Center
ICS	International Classification for Standards
IEC	International Electrotechnical Commission
IKD	Incomplete Knockdown
ILAC	International Laboratory Accreditation Cooperation
INST	Institute of Nuclear Science and Technique
IP	Institute of Petroleum
IQA	Institute of Quality Assurance
IRCA	International Register of Certified Auditor
ISO	International Organization for Standardization
ISO/IEC Guide	Guides developed and published by ISO and IEC
J/V	Joint Venture
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
JSA	Japanese Standards Association
KRISS	Korea Research Institute of Standards and Science
MIE	Vietnam Machine & Industrial Equipment Corporation
MOSTE	Ministry of Science, Technology and Environment
MPI	Ministry of Planning and Investment
MRA	Mutual Recognition Agreement
MSTQ	Metrology, Standardization, Testing and Quality Control
MT	Magnetic Particle Testing (Examination)

NAFTA	North American Free Trade Agreement
NDT	Non-destructive Testing
NEC	Not elsewhere classified
NIEs	Newly Industrial Economics
OIML	International Organization of Legal Metrology
OMIC	Overseas Merchandise Inspection Co., Ltd
PAC	Pacific Accreditation Cooperation
PASC	Pacific Asia Standards Congress
PM	Project Manager
POMIMECO	Power and Mining Mechanical Corporation
PSB	Singapore Productivity and Standards Board
PVPDC	Petrovietnam Processing and Distribution Company
QA	Quality Assurance
QC	Quality Control
QM	Quality Management
QPVN	Vietnam Code of Practice
QUALIMENT	Quality Management Training Network
QUASEI	Quality Service International
QUATEST	Technical Centers for Quality Assurance-Testing-Measurement
RT	Radiographic Testing (Examination)
S/W	Scope of Work
SAE	Society of Automobile Engineers
SC	Sub-technical Committee
SFIB	Specified Foreign Inspection Body
SIRIM	Standards and Industrial Research Institute of Malaysia
SKD	Semi-knock Down
SME	Small and Medium Scaled Enterprise
SMEDEC	SME's Development Support Center
SMQ	Office(department) for Standardization, Metrology and Quality Control
SMTQ	Industrial Standardization, Metrology, Testing and Quality Control
SO	Staff Officer
SQC	Statistical Quality Control
SSC	Southern Steel Corporation

STAMEQ	Directorate for Standards and Quality
ST-SEV	Standards Developed and Published by COMECON (former)
TA	Technical Assessor
TC	Standards (Company Standard)
TC	Technical Committee
TC	Training Center
TCN	Branch Standards
TCVN	Vietnam Standards
TQM	Total Quality Management
TRI	Textile Garment Research Institute
UL	Underwriters' Laboratories
USA	United States of America
USSR	Union of Soviet Socialist Republic
UT	Ultrasonic Testing (Examination)
VAT	Value Added Tax
VCCI	Chamber of Commerce and Industry of Vietnam
VEAM	Vietnam Engine & Agricultural Machinery Corporation
VEC	Vietnam Electro-Technical Equipment Corporation
VEIC	Vietnam Electronics and Informatics Corporation
VILAS	Vietnam National Accreditation Scheme
VINACEGLASS	Industrial Ceramic and Glass Corporation
VINATEST	Association of Testing Laboratories
VINATEX	Vietnam National Textile and Garment Corporation
VMI	Vietnam Metrology Institute
VPC	Vietnam Productivity Center
VQA	Vietnam Quality Award
VSC	Vietnam Steel Corporation
VSI	Vietnam Standards Institute

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● Part I Introduction

1 Background, Objective, and Scope of the Study

1.1 Background and Objective of the Study

The present study is primarily designed to develop a master plan in the areas of industrial standardization, metrology, testing and quality control (referred to as SMTQ, or "industrial standardization and related activities"), including improvement proposals for "regulatory systems", "human resource development", "organization and system", and "facilities and equipment".

Since its adoption of the Doi Moi (policy renewal process) in 1986, Viet Nam has successfully transformed from the former centrally planning economy, which has been adopted for many years, to the economy introducing a market mechanism, and the economy has been undergoing steady growth. Continuation of the Doi Moi policy has been confirmed in the recent economic development policy and plan, which was adopted at the VIIIth National Congress of Communist Party of Viet Nam (CPV) in June 1996. The plan then declares the full-fledged embarkment of industrialization and modernization and sets forth long-term economic development targets toward 2020, to basically become "an industrialized nation" and to boost GDP by 8 - 10 times of that in 1990.

To achieve these targets, the Vietnamese government has adopted a strategy to make most of the foreign enterprises and investors for fund, technology, management skills, and market development by actively encouraging foreign direct investment. As a result, the Vietnamese economy and industry have shown a conspicuous growth since 1989. The inducement of foreign direct investment and the promotion of the open economy, however, have created a variety of problems which have increasingly become apparent.

Namely, the economy based on the open market is naturally the prerequisite to promotion of foreign direct investment, and Viet Nam has chosen this policy direction. With this, firstly, there is a clear deterioration of intra- and inter-industrial linkages due to the industrialization process which is nurtured by relying on imported materials and parts. In fact, many joint ventures seen in the manufacturing sector are remaining at the assembly stage and import almost all of parts and components required. State enterprises also depend heavily on imported materials.

Another challenge is the increasing influence of industrialization in the original ASEAN member countries, which has reached a significant level and is affecting the industrialization process in Viet Nam which has opened the market. In particular, market opening has spurred the mass inflow of imports from neighboring countries, while local

enterprises, largely consisting of state enterprises, have not made much progress in improvement of management and lose competitiveness as indicated in slowdown of growth rate.

Thus, local industries are facing the need for structural changes, from assembly-only to multi-tier structure providing vertical linkage, and from manufacturing on consignment to direct exporting (Figure 1-1).

It is important to realize that these challenges should not be viewed as mere problems to cope with, which are created by the opening of the economy. Rather they are the challenges which can turn into opportunities for the country to leverage its open economy for economic development under the increasingly globalized economic environment as seen in the case of AFTA.

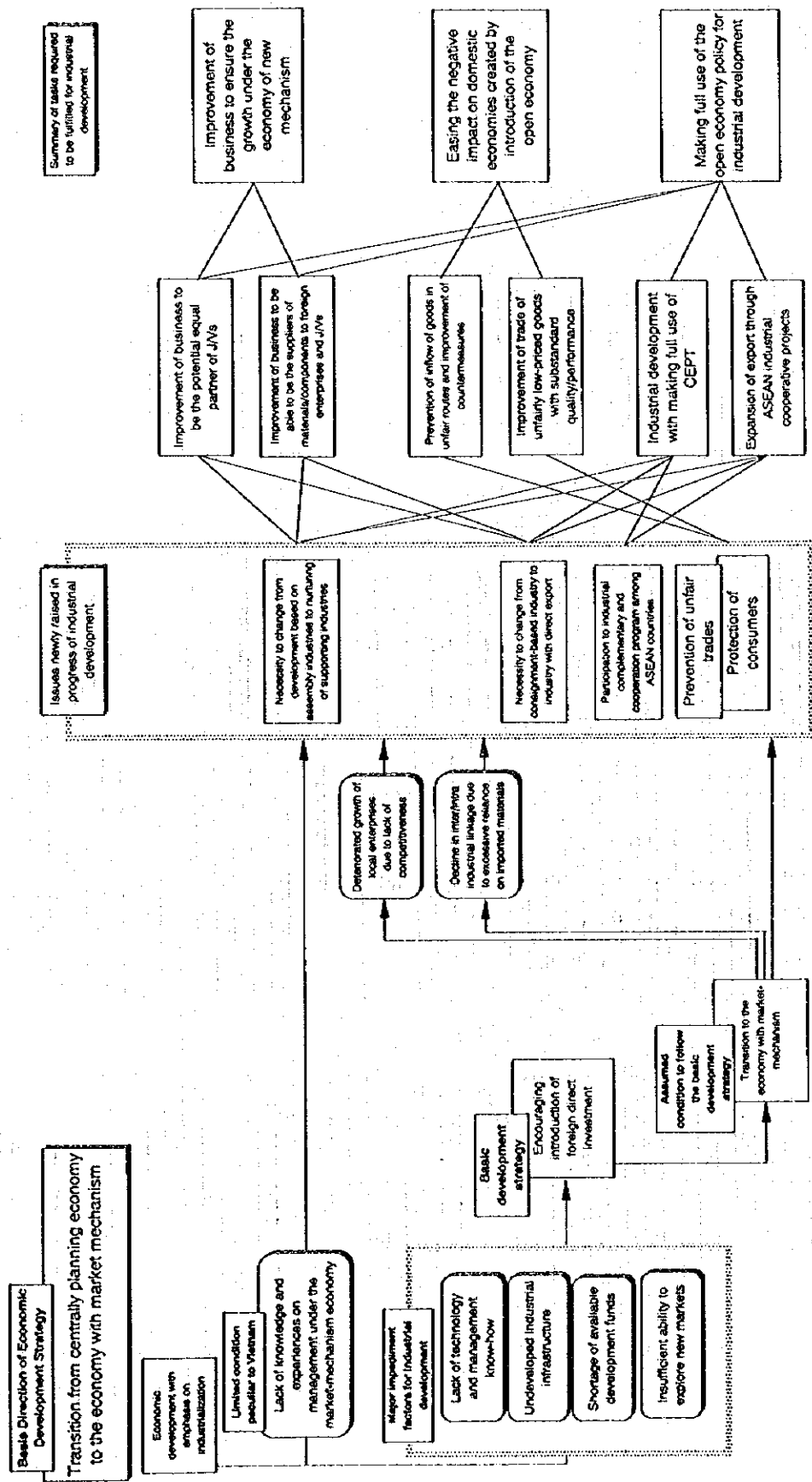
Here, industrial standardization and related activities are the effective means to strengthen competitiveness of the Vietnamese industries by improving product quality and production efficiency, serving as a part of technological infrastructure to help meet the challenges. Nevertheless, most of enterprises in Viet Nam have a long way to undertaking company standardization and quality management; their quality management practice is still limited to product inspection. It will take some time before STAMEQ's efforts to promote standardization and related activities produce fruitful results.

Further, most of local enterprises, excepting for a handful of large enterprises, have few testing equipment required in carrying out the adequate quality management. There is also the shortage of metrology and calibration resources for use in the industrial sector, forcing foreign-affiliated enterprises to rely calibration service on foreign sources.

To overcome these difficulties, the Vietnamese government decided to promote systematic development of standardization and related activities, thereby to disseminate standardization and quality management to the industries, while making the country's standardization and related systems internationally recognized. Then, it requested the Japanese government for technical assistance in development a master plan for such efforts.

In response, Japan International Cooperation Agency (JICA) sent a preparatory study team to Viet Nam in August 1996, which agreed and signed with the Vietnamese government the Scope of Work which sets forth the scope and contents of the proposed study. Based on the Scope of Work, JICA organized a study team consisting of UNICO International Corp., Japanese Standards Association, and Overseas Merchandise Inspection Co., Ltd., which conducted the survey and analysis. This report compiles the result of the study.

Figure I-1 Tasks for industrial development



1.2 Scope of the Study

The study covered the following activities which were defined in the Scope of Work agreed on by the preparatory study team and the Vietnamese government, dated August 2, 1996:

1. To evaluate the present condition and needs of the activities on standardization, metrology, testing and quality management in Viet Nam
2. To review the policies, strategies and social-economic development plans essential for the promotion of standardization, metrology, testing and quality management in Viet Nam
3. To evaluate and identify the problems in the standardization, metrology, testing and quality management in Viet Nam
4. To prepare a master plan in detail for the development of industrial standardization, metrology, testing and quality management in Viet Nam, which will include, among others, the following subjects:
 - 4.1 Recommendation on organization structure of STAMEQ to meet its required functions and tasks
 - 4.2 Recommendation for the development of a technical infrastructure for metrology and testing services
 - 4.3 Recommendation on specific priority projects (standard development, testing, metrology, training and quality management)
 - 4.4 Priority and procedure for the implementation of the projects
 - 4.5 Project justification and viability
5. Recommended implementation plan
 - 5.1 Implementation plan and time schedule
 - 5.2 Appropriate organizational and administrative arrangements
6. Conclusion and recommendations

Major subjects of the study are as follows.

(1) Study areas

Industrial standardization, metrology, testing, and quality control.

"Metrology" is limited to the area which is closely associated with industrial standardization, with focus on maintenance of accuracy levels of measurement, calibration, and testing equipment, which is related to metrology, testing and inspection; and legal metrology is not included.

(2) Sectors for study

1) Major industrial subsectors for study

- Machinery subsector (with special emphasis on industrial processing machines)
- Electrical equipment and components subsector, and electronic equipment and components subsector
- Metalworking industry

2) Secondary industrial subsectors for study

- Textile industry
- Construction materials
- Petroleum industry products

(3) Geographical areas for study

Hanoi, Ho Chi Minh City, and peripheral areas of these cities

2 Outline of the Study and Organization of the Report

2.1 Organization of the Study

The study consists of the following five economic and technical study components. The master plan was formulated on the basis of analysis of data and information collected in these fields of study components.

- 1) Macroeconomic and sectoral study of the subsectors selected for the study
- 2) Study on manufacturers of the subsectors selected for the study
- 3) Study on the existing systems and organizations related to industrial standardization
- 4) Study on systems, resources, and organizations of metrology and calibration, testing and inspection related to industrial standardization
- 5) Study on quality management promotion system

2.2 Field Survey

In the course of the study, field surveys were conducted three times, besides the presentation and discussion of draft final report in Viet Nam.

2.3 Organization of the Final Report

The final report will compile all the results of the study, including those discussed in the Interim Reports I and II. The current draft final report is organized as follows.

The report consists of "Summary" and "Main Report." The Main Report consists of four parts, "Introduction," "Analysis of Current State," "Master Plan," and "Analysis of Subsectors," followed by "Annexes." Part I will briefly describe and discuss the objective and background of the study, and the process of the study. Part II will analyze the current state of: 1) economic and industrial development, and industrial sector; and 2) the institutional setup and system in the areas of industrial standardization and related activities. Part III will establish planning targets, discuss major issues in each area of standardization and related activities, and recommend improvement and development measures. It also recommends projects which should be implemented by joint efforts of related organizations, with specific due dates. Part IV will analyze the current state of standardization and quality control in the subsectors selected for the study, and recommend promotional measures for each subsector. Finally, the annexes will contain materials related to the analysis in Parts I through III.

● Part II

**Present Status of Standardization,
Metrology, Testing and Quality Control**

1 General

The system for standardization and related activities (or SMTQ) in Viet Nam is in a transition stage. The current organizational setup is defined by "Act on Product Quality", the basic law on standardization and related activities, as follows:

- 1) State Administration Agencies
 - a) MOSTE (Ministry of Science, Technology and Environment) with STAMEQ as the responsible agency
 - b) Regional Center for Standardization, Metrology and Quality Control (or QUATEST as the existing institute)
 - c) Provincial Departments for Standardization, Metrology and Quality Control (or SMQ in 61 province and special cities)
- 2) Organizations in charge of quality control in the ministries and other agencies (or DOSTE in each ministry)

The current organizational setup according to the above is shown in Figure II-1. The major function of STAMEQ, the center agency of SMTQ, is composed of (1) standardization, certification and accreditation, (2) metrology, (3) testing and inspection, (4) quality management, and (5) registration, inspection and control of product quality (quality control), while it undertakes dissemination and training activities as its supporting functions.

2 Standard Development

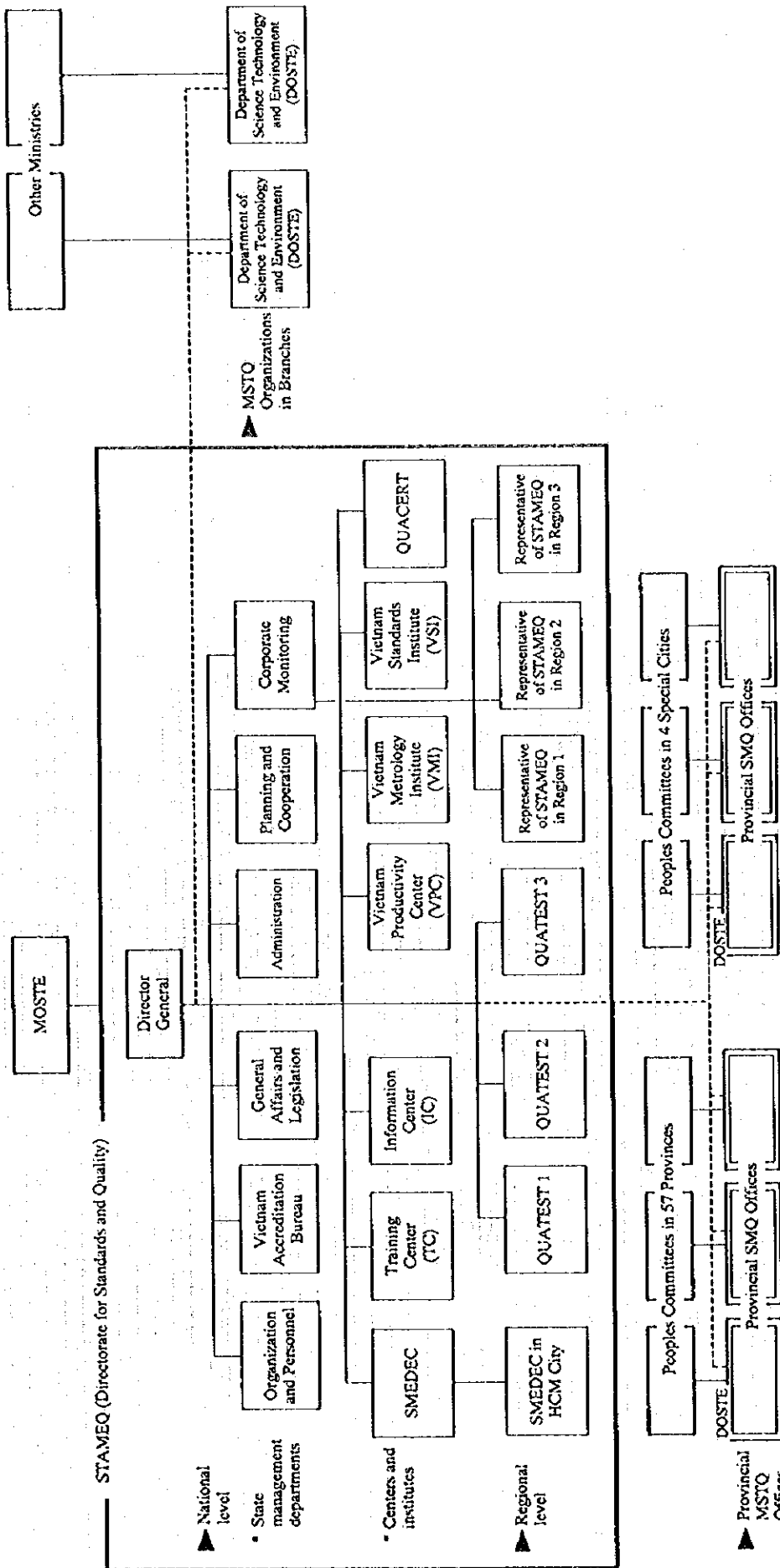
2.1 System of Standards

1) Level of standards

The standards in Viet Nam consists of three levels; mainly National standards (TCVN), Branch standards (TCN) and Provincial standards. Company standards (TC) are also developed by companies mainly for use in quality registration.

National standards (TCVN) are approved, signed and promulgated by Minister of MOSTE, on the basis of draft standards submitted by Director General of STAMEQ. Other ministries and provinces may establish and issue their own standards (Branch standards and Provincial standards) to meet its public administrative needs.

Figure II-1 Organization Structure of STAMEQ



Notes: (MOSTE): Ministry of Science Technology and Environment, (SMEDEC): Small and Medium Enterprises Development Support Center, (QUACERT): Vietnam Quality Certification Body, (QUATEST): Technical Centers for Quality Assurance Testing Measurement, (MSTO): Metrology Standards Testing and Quality, (SMO): Standards Metrology and Quality

———— Direct administration, - - - - - Technical guidance / assistance

There are approximately 5,000 national standards, most of which are voluntary. Each ministry is authorized by MOSTE to establish branch standards. In practice, however, most standards proposed are submitted to MOSTE (STAMEQ), and after review by Technical Committees, are issued as TCVN. Branch standards are rarely issued today, and only when appropriate TCVN is not available.

Not even 50 provincial standards exist at present.

2) Mandatory and voluntary standards

TCVN standards are categorized into mandatory and voluntary standards. The mandatory standards must be observed by all organizations and individuals.

2.2 Establishment and Revision of Standards

1) Organization for establishment and revision of standards

"TCVN Technical Committees" prepare draft standards. The Committees include Technical Committees (TCs) and Subcommittees (SCs) representing specific areas of technology. There are 60 TCs and 8 SCs at present.

Technical sections of VSI serve as secretariats of these TCs and SCs. Members of TCs and SCs are composed of representatives of government agencies, industries, universities, consumer groups, and other organizations. In principal, the members are appointed from among the candidates who expressed their interests in response to a notification in the gazette. Actually, however, VSI nominates them from among those with appropriate expertise, because of the insufficient number of candidates.

STAMEQ represents the national standards body, participating in the activities of international standardization organizations (such as ISO, IEC, CAC, EAN International, etc.) in which Viet Nam is a member.

2) Process of establishing standards

a) Acceptance of proposal for new standards

Each year, STAMEQ receives proposals for new standards from ministries, branches, private enterprises, trade association, and individuals. When requesting formulation of a standard is made from an industrial enterprise, this enterprise must submit a draft proposal and pay expenses. This has kept the number of requests from industries down.

b) Preparation of a standards development plan

STAMEQ rates the above proposal for new standards in consideration of MOSTE's request based on public administrative considerations, sets its priority, and prepares a standard development plan.

c) Preparation and examination of draft standards

For each standard, VSI causes a competent technical committee or subcommittee to prepare a draft standard, sends it to related ministries, organizations and groups for comment and necessary modification, and completes and submits a final draft standard to STAMEQ.

d) MOSTE's approval of the draft standard

STAMEQ examines the final draft standard, sends it to MOSTE for comment, makes any modification required, and receives final approval of MOSTE upon the minister's signing.

e) Printing and publication

VSI prints and publishes approved standards, which are added to the TCVN list and published in the official gazette.

The establishment process is identical for mandatory and voluntary standards, except for discussion by TC which takes longer for mandatory standards.

3) Revision of standards

Established standards are reviewed every 5 years. If a complaint is submitted, the review period is shortened, normally to 2 years depending on the situation. Such complaints, however, are rare for mandatory standards. In such a case, the period prior to review exceeds 5 years.

4) Plan for establishment of standards

STAMEQ (VSI) prepares a general plan for standards establishment every five years. The current plan covers the period between 1996 and 2000.

5) Number of standards established

From 1963 until 1996, 7,614 standards were established and 1,486 were abolished. However, the data do not tell us the number of standards currently used in the country, since the figure includes the number of newly established standards as well as the

number of those revised, while no breakdown is given.

The proportion of standards adopted from overseas standards is relatively low in the fields of mechanical engineering, architecture and civil engineering, which together hold a majority share. On the other hand, the proportion is higher for standards in the fields of electricity, food, metallurgy, textile, and electronics. Particularly in the field of electricity and electronics, a relatively large number of standards have been adopted from ST-SEV.

2.3 Dissemination of Standards

When a standard is newly established, it is announced to the public through the gazette. The details of the standard are informed to three QUATESTs at the same time, while the list of standards, together with their contents if necessary, is sent to 61 provincial SMQ offices. Also, a press release is sent to magazines and industrial organs.

Workshops are held to give guidance in implementing new standards which are important/compulsory for industries. In particular, mandatory standards are occasionally announced at press conferences for quick and wide dissemination.

As for promotion of development of company standards, STAMEQ holds seminars for small and medium enterprises. VSI also offers similar courses.

3 Certification System

3.1 System for Certification

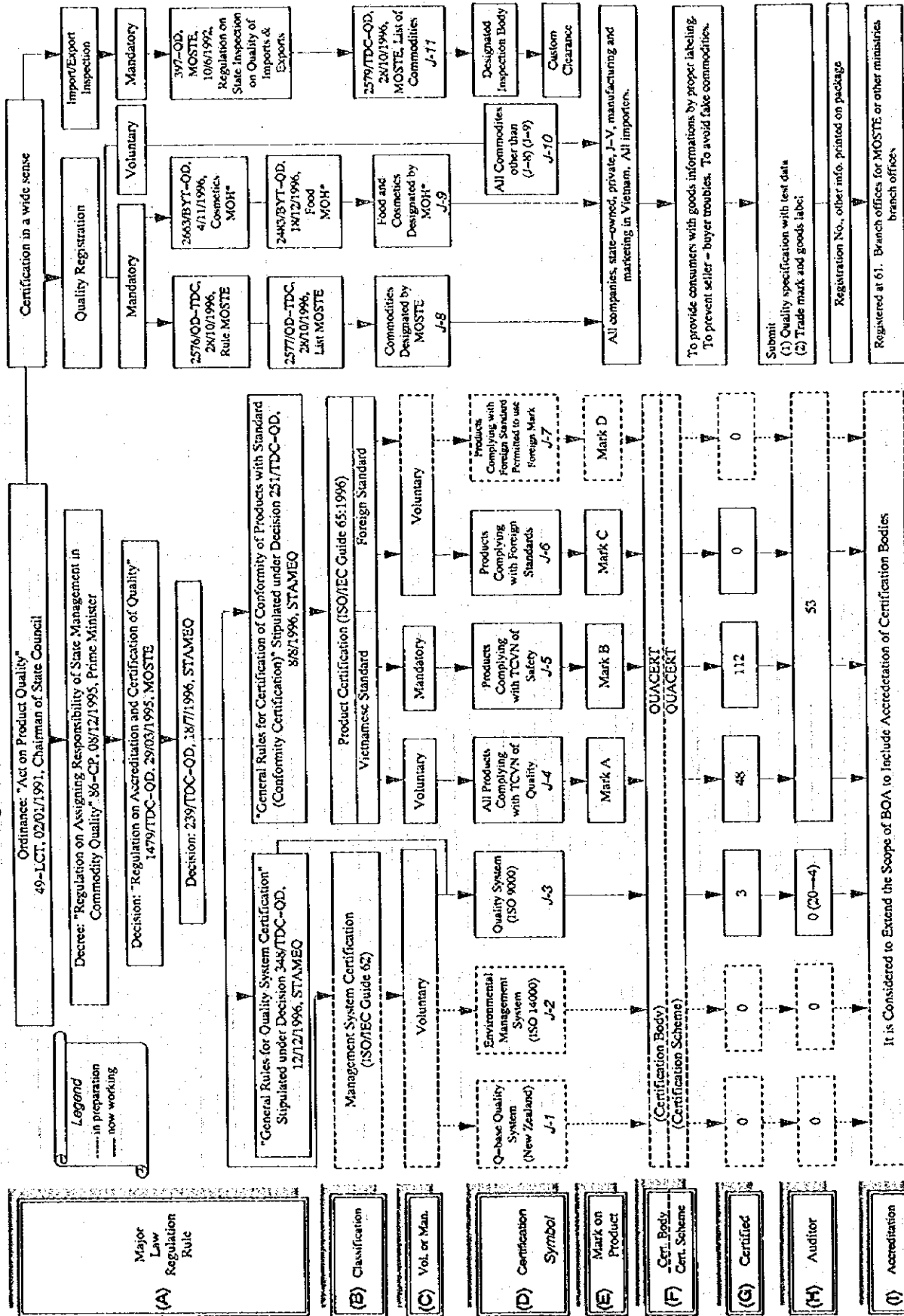
The certification system in Vietnam is roughly classified into two programs, namely system certification, and product certification (marking system).

The certification system as a whole is centrally managed by STAMEQ. The entire certification system is illustrated in Figure II-2.

There are seven certification schemes consisting of one mandatory and six voluntary schemes, including those which are under preparation.

- | | |
|---|----------------------------------|
| 1) System certification | |
| a) Q-BASE quality system certification | Voluntary
(under preparation) |
| b) Environmental management system certification (ISO14000) | Voluntary
(under preparation) |
| c) Quality system certification (ISO 9000) | Voluntary |

Figure II-2 Certification System in Viet Nam



Note: * MOH, Ministry of Health

2) Product certification (marking system)

- | | |
|--|----------------------------------|
| d) Product certification: compliance with TCVN quality standards | Voluntary |
| e) Ditto: compliance with TCVN safety standards | Mandatory |
| f) Ditto: compliance with foreign standards | Voluntary |
| g) Ditto: compliance with foreign standards/foreign mark affixed | Voluntary
(under preparation) |

QUACERT is the sole certification body in Viet Nam. It consists of a Certification Council, an Executive Committee, and Operating Units.

Certification Council is composed of representatives of STAMEQ, industry circles, enterprises who are or may be certified in the future, and research institutes, setting direction of certification activity according to national economic policy and international cooperation. The Executive Committee is appointed by STAMEQ's director general and is responsible for day-to-day operation and management of QUACERT. Operating Units are organized by STAMEQ and are responsible for actual certification service. Offices of Operating Units are in QUATEST 1, 2 and 3.

3.2 Product Certificate

The product certification system consists of four types under a scheme, one mandatory and three voluntary. The certification body is QUACERT.

The certification process consists of the following two:

- "Type testing" in order to assess the conformity of the product sample with requirements of the applied standard;
- Assessment of the company's quality assurance system;

Surveillance is carried out twice a year through reviewing the quality assurance system and testing the product sample taken from workplace and market.

The number of products certified as of the end of December, 1996 is as follows:

Product	Product certification (Voluntary)	Product certification (Mandatory)	Product certification (Voluntary)	Product certification (Voluntary)
	A	B	C	D
Wire, electric cables	0	*69	0	0
Electric fans	0	*43	0	0
Cement	23	0	0	0
Electric poles	5	0	0	0
Asbestos panel	7	0	0	0
Acid	1	0	0	0
Towels	3	0	0	0
Bicycles	5	0	0	0
Steel	1	0	0	0
Shrimp cake	1	0	0	0
Cladding material for cable	2	0	0	0
Total	48	112	0	0

Number of companies certified in total: 160

* Mandatory certification based on safety standards accounts for 70% of total.

3.3 Other Registration, or Inspection System¹

1) Quality Registration

Commodities to be registered are categorized into two groups; mandatory and voluntary. The commodities necessary to be registered on a mandatory basis are those designated by MOSTE, Ministry of Health and other ministries for consumers safety, health and environment protection. All other commodities are voluntary-registered. The objectives of this system are to provide consumers with correct product information to avoid trouble between manufacturers and consumers, and to prevent fake commodities from appearing in the market. It is operated as a product inspection type certification.

2) Mandatory Import/Export Inspection

The inspection is carried out as a part of national inspection program for product quality. The commodities for which mandatory inspection is required cannot be imported or exported without the inspection having been performed. Commodities to be inspected are announced by MOSTE every year.

The inspections are carried out at QUATEST-1, 2, 3 and other government-designated inspection bodies. The inspection report is submitted for custom clearance.

¹ Outlined in the following as one of certification schemes in a broad term.

The inspection is exempted for certified products.

At present, no current commodities for the inspection does not include any industrial products must undergo mandatory inspection prior to export, whereas such industrial products as fertilizer, agricultural chemicals, explosives, cement, gasoline, lubricant, steel bars, electrical wire and cable, fans, air conditioner, etc. are designated for import inspection.

3.4 Auditor Registration

- 1) Q-BASE quality system certification: under preparation
- 2) Environmental management system certification: under preparation
- 3) Quality system certification: None ... Foreign auditors will be invited for a while.
- 4) Product certification: 53 auditors (28 in the northern region and 25 in the southern region) have been registered so far.

They are registered with QUACERT, including QUACERT staffs as well as engineers and other experts at universities and research institutes. Candidates are rated on the basis of knowledge and experience according to a "scoring table" and those who have reached a certain level are registered.

4 Accreditation System

Vietnam's accreditation system consists of five voluntary schemes (including three under preparation) as shown below.

- Accreditation of testing calibration laboratory
- Accreditation of inspection body (under preparation)
- Accreditation of certification body (under preparation)
- Auditor registration and accreditation of registration body (under preparation)

BOA (Bureau of Accreditation) is established as the accreditation body within STAMEQ, conducting accreditation activity under VNAS (Vietnam National Accreditation Scheme).

As for accreditation of testing laboratories, VILAS (Vietnam Laboratory Accreditation Scheme) is currently handling both testing and calibration laboratories.

At present, an inspection body can be established without accreditation although it needs to have a business license. In fact, there are 10 inspection bodies which are not officially accredited. At present, legislation, the scheme, and assessment organization,

method and criteria are under review.

Preparations are now being made for accreditation of a certification body for product and system certification to be included within the scope of BOA.

The scheme and procedure of auditor registration is being considered, covering BOA's own or affiliated auditors.

Mutual recognition with foreign accreditation bodies

STAMEQ participates in APLAC which has arranged a mutual recognition agreement (MRA) currently signed by NATA (Australia), SINGLAS (Singapore), TERLAS (New Zealand), HOKLAS (Hong Kong), and A2LA (U.S.). Vietnam is now preparing for signing the MRA in 1998.

5 Quality Management

5.1 Programs and Organizational setup for Promotion of Quality Management

In Viet Nam, "quality control" is recognized and promoted in two approaches: to encourage and promote enterprises to implement activity to insure product or service quality; and to keep enterprises from supplying substandard products to the marketplace.

Quality control currently practiced in Viet Nam is basically a ramification of the latter approach. The quality registration system and inspection of export and import products are maintained and operated to achieve the purpose of maintaining desirable quality standards.

On the other hand, quality control in the former approach (encouraging corporate initiatives) is perceived in the country as the TQM concept. In fact, TQM-based quality control activity was formally launched by STAMEQ in 1996.

At present, various events and incentive programs are being conducted to promote quality control at a national level, while activities to disseminate and teach quality control techniques are on the rise, all of which are planned and implemented under the leadership of STAMEQ.

5.2 Quality Management at Enterprise Level

- 1) Manufacturers are strongly conscious about quality of their products, but their quality management is limited to quality inspection. No remedial measures are evident for the high rejection rate of finished products and high rate of products returned to the production floor to be re-worked, despite the deterioration of

production efficiency and reduction of competitiveness these conditions cause.

- 2) Almost no resource is available in industry at present for implementing quality management with a precise understanding the concept of quality management.
- 3) Technicians in industry have high potential for skill development, and dissemination of quality management is very promising, so long as the concept of quality management is disseminated successfully, and the top and middle management of manufacturers are well trained about the organizing method of quality management.

6 Testing and Inspection

6.1 General

At present, the following legal systems require testing and inspection of products, and have close association with industrial standardization and quality control:

- 1) Quality registration system
- 2) Mandatory product certification system
- 3) Voluntary product certification system
- 4) Export/import product inspection system

Each system, by law, designates an inspection body(ies) including QUATEST.

Major testing and inspection bodies are as follows:

- 1) QUATEST1, 2 and 3 under STAMEQ
- 2) SMQ (Department for Standardization, Metrology & Quality Control) belong to and are located in 61 provinces and designated cities
- 3) 58 laboratories accredited under the old scheme (including state enterprises, laboratories under jurisdiction of ministries other than MOSTE, and universities)²

In addition, there are laboratories owned by enterprises. In the south, these laboratories operated by the enterprises have organized an association, called VINATEST.

In the area of testing and inspection, QUATEST is primarily responsible for: (1) inspection of export and import products; (2) verification/certification (mandatory and voluntary certification of quality and safety based on TCVN and other standards); (3) contract testing and (4) quality monitoring of domestic products.

SMQ is responsible for standardization, calibration, and quality control of products in

² The qualification was already expired.

each province and serves as an organization to handle product quality registration. In fact, it is responsible for inspection related to quality registration, which has previously been conducted by QUATEST. While some SMQ can perform various tests including cement or electrical safety, most of them provide inspection service by assigning actual tests to QUATEST and other testing laboratories, and obtaining test results. Their daily activity is centered around legal metrology.

Research institutes under jurisdiction of various ministries and laboratories of state enterprises constitute the second tier of the testing bodies. Most of them have obsolete and deteriorated equipment. Recently, new testing equipment has been installed at some laboratories by UNIDO or under bilateral assistance programs, but these projects were not necessarily carried out in consideration of the balance and linkage within the entire system, so that some testing items are poorly covered, while there is duplication in other areas. SMQ's facilities and equipment are not sufficient even in larger laboratories of Hanoi, Ho Chi Minh City, and Hai Phong.

According to the manufacturer questionnaire survey conducted under the current study, QUATEST is most frequently used among testing laboratories.

6.2 Use of Laboratory Service by Category

1) Testing and inspection for mandatory product certification

At present, electric fans, cable and wire are subject to mandatory product certification. Safety tests on sample products are conducted by QUATEST or the laboratories accredited under the old scheme.

2) Testing and inspection in mechanical field

In this field, tests on mechanical strength, such as tensile, bending and hardness tests, are most widely conducted. For instance, strength tests on steel reinforcement bars for concrete work and weld specimen tests (to check welder skills and welding methods) are conducted by various facilities including QUATEST, SMQ, and technical colleges. On the other hand, chemical analysis of metallic materials is not widely carried out as analytical instruments are not available or inoperable due to the lack of consumable materials. Also, instruments for measuring dimension and shape are not sufficient in variety and quantity, although the industries using them have still to develop.

Non-destructive testing is extensively used for material inspection of castings and forgings, product inspection of pressure vessels, cylinders and pipes, and field inspection of welds during construction of plants, port and harbor facilities, buildings

and pipelines. Many of them are required by regulatory agencies such as the police and the labor department. Most of non-destructive testing laboratories which belong to factories meet in-house demand only. At present, QUATEST 3 is virtually the only one testing laboratory capable of meeting diverse non-destructive testing demand from a variety of industries.

3) Testing and inspection in the electrical and electronic field

In this field, testing service is not very active and is mainly related to safety. In addition to inspection for mandatory certification, most tests are concerned with insulation of electric of lamps and prevention of electric leakage. They are conducted by QUATEST, which has low voltage dielectric testing equipment only and does not have medium- and high-voltage equipment.

4) Testing and inspection covering construction materials

At present, tests on cement, concrete, and reinforcement bars are mainly carried out by QUATEST, some SMQ, and technical colleges. There is no testing equipment applicable for steel shapes.

5) Testing and inspection covering petroleum products

Chemical and physical property tests are mainly carried out at QUATEST 3 for gasoline, lubricant, hydraulic oil and fuel oil. However, QUATEST 3 is not capable of performing a full range of tests based on API standards or for jet fuel.

6.3 Testing Capability

Eleven laboratories have been accredited as of December 6, 1997 under the new scheme which has started in January, 1997. In June 1997, two laboratories under QUATEST 3, namely the construction material laboratory (T1) and petroleum product laboratory (T6) were evaluated by certified auditors from the UK and VILAS, and T6 was accredited after corrective action of minor non-conformities. On the other hand, T1 will have a re-assessment shortly.

In addition, 10 laboratories of private and state bodies also have been accredited.

In 1998, 4 laboratories of VMI, 3 of QUATEST 1, 2 of QUATEST 2, and 4 of QUATEST 3 plan to make application.

Of the 58 laboratories accredited under the old scheme, around 30 are expected to make application, while the remaining are not likely to apply due to anticipated difficulty in meeting the requirements.

7 Metrology and Calibration

7.1 Establishment and Maintenance of Official Measurement Standards

(1) Maintenance of primary standards

Official measurement standards in the country are maintained by VMI (Viet Nam Metrology Institute) under STAMEQ, who serves as the first tier organization to maintain the highest standards in a variety of fields including length, mass (weight), volume, voltage, etc. and to take responsibility for traceability. Nevertheless, the national standards for measurement of radiation (α , β , γ , and χ rays) are maintained by the Center for Radiation Protection of INST (Institute of Nuclear Science and Technique) under the Viet Nam Atomic Energy Committee. All of the national standards are located in Hanoi, while QUATEST 3 in Ho Chi Minh City holds reference standards to supplement VMI's role in the south.

(2) Technical requirements for metrology

Metrological requirements are contained in TCVN, and have their origin in the former USSR's system. At present, they are being revised according to OIML's international recommendations to develop international harmonization. The work is slated for completion in 1999.

(3) International comparison of national measurement standards

Some of VMI's national standards are calibrated with reference to international standards in Australia, the UK, India, China, or Korea, while many are not calibrated.

(4) Maintenance system of measurement standards

Under national standards (or primary standards), secondary standards are maintained by VMI and QUATEST 1 and 3, while working standards by VMI, QUATEST 1, 2 and 3, and some specified enterprises.

7.2 Calibration System

(1) Calibration system

Basically, VMI provides secondary and lower standards for QUATEST 1-3 and 61 SMQ throughout the country. Then QUATEST provides calibration services in the field related to industry, and SMQ legal metrology services.

(2) Calibration service related to industrial metrology

Calibration service in the field of industrial metrology is provided by VMI directly in the north, and QUATEST 3 in the south. However, actual demand is still very small in number. It is attributable to the fact that the industries in Viet Nam do not have much concern about such service, since they are not required to meet a high level of accuracy.