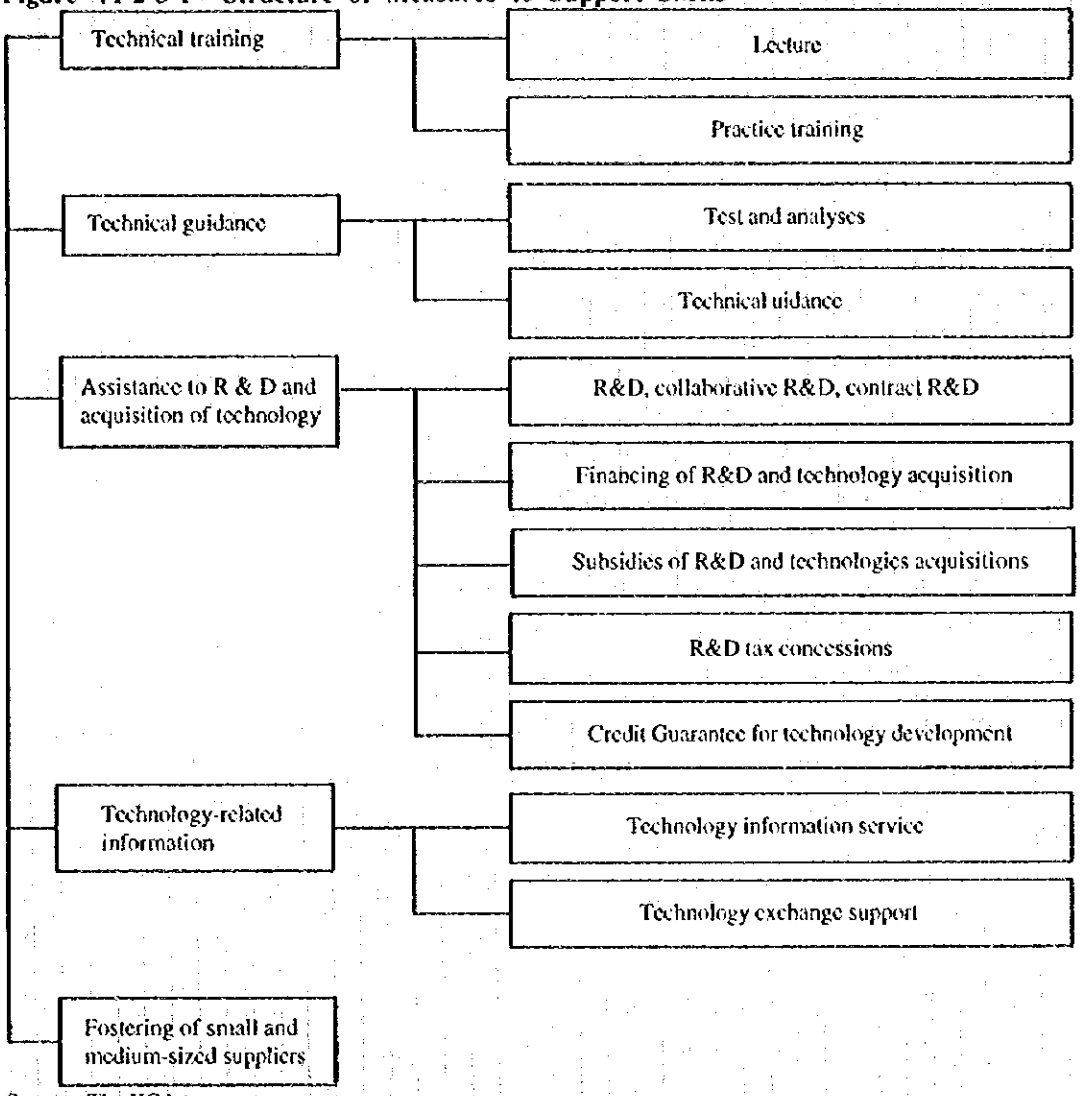
Figure VI-2-3-1 Structure of Measures to Support SMEs



Source: The JICA team

Cases to be reviewed are selected from among all projects (by category) according to simple but practical criteria; (a) whether or not the program has already made substantial achievements, or (b) a large number of SMEs is supported by the programs, or (c) some unique methods are employed in the program.

2.3.2 Technical Training

Training of personnel provided under a institutional framework is to improve technology-related capacities of managers and engineers of SMEs. Measures employed are basically divided into two categories; the lecture and the practice.

Through the lectures the trainees study a basic theory and applied knowledge of technologies with textbooks. The practice makes the trainees acquire knowledge and skill through actual operation of facilities and equipment in the public research laboratories, etc..

< reference case >

"Kanagawa Technical Training Center" of Japan is a private corporation being established 30 years ago to give mainly lecture training to managers and engineers of SMEs. Main task of the corporation is the training commissioned by the Kanagawa prefectural government. Any SMEs' manager or employee, who has the knowledge of about two years of business experience, can apply for the training courses as a trainee.

Grants by the central and the prefectural governments are provided subsidizing two-thirds of the training fees for each trainee.

Table VI-2-3-1 The Training of the Kanagawa Technological Training Center (FY 1995)

(commissioned by the prefectural government)

A:	Category of training
B:	Target of training
C:	Enrollment of trainees
D:	Length of training period
A:	Long-term training
B:	Training gives trainees basic ability necessary for technological development
C:	20 persons
D:	For lecture 250 hours or more, for practice 110 hours or more
A:	Medium-term training
B:	Training gives trainees practical ability to be applied to their jobs immediately
C:	20 persons
D:	For lecture 40 hours or more, for practice 20 hours or more
A:	Short-term training
B:	Training gives trainees a special technology-related knowledge
C:	20 persons
D:	For 36 hours or more of lecture and practice
A:	Advanced engineer training
B:	Training gives trainees a higher technological development ability
C:	20 persons
D:	For lecture and practice 65 hours or more, for seminars and report making 15 hours or more
A:	New technology training
B:	Training gives trainees a basic knowledge of new technologies
C:	20 persons
D:	For 9 hours or more inclusive of lecture, practice and report making
A:	Training of application of private enterprises' technology
B:	The ability to apply advanced technologies of private enterprises is improved through lectures and practices
C:	20 persons
D:	For 20 hours or more

Source: Kanagawa Technical Training Center

Besides the training mentioned, the Training Center carries out eight activities independently. Following two are to be noted among them.

(a) Visits to excellent private and public facilities

About 40 persons of SMEs' managers and employees are given important opportunities to visit excellent facilities of large enterprises and public institutions. The tour is held once or twice a year, to visit facilities in the region or in the nation.

(b) Short-term overseas training program for long-term trainees

Program has been supported by a foundation which The Bank of Yokohama, Ltd. (private local bank) founded in 1965. Several trainees of the long-term training courses have been sent out to European countries and elsewhere, for about two weeks, every year.

2.3.3 Technical Guidance

Technical guidance is given to assist each SME for solving individual and specific technical problems. The guidance is basically classified into two categories; the tests & analysis and the technical advisors' guidance.

(a) Tests and analysis service

Because the frequency of the use of tests & analysis equipment is limited, it is not so economical for SMEs to own them on their own account. Then, the public research laboratories give tests & analysis services to SMEs.

Because public research laboratories give consultation through their report on the results of the tests & analysis to enterprises, this tests and analysis services is a technical guidance as well.

Furthermore, as fees of the public services are set at considerably lower levels than those of the private ones, these services can be regarded as subsidies for the private sector.

(b) Dispatch of technical advisors

Public organizations dispatch advisors, who give technical guidance on the site to SMEs.

If it is difficult to respond to the needs of SMEs by the staff of a public laboratory alone, it could utilize outside experts and dispatch them to the SMEs.

< reference case >

The Public Corporation of SMEs Promotion of Korea is facing the situation in which many SMEs ask the corporations to give highly developed and specialized guidance to them.

Therefore, to cope with the situation, the corporation has now adopted a unique strategy in which it makes short-term subcontracts with a number of technical consultants from industrialized countries. At every request for technical guidance made by a company, the corporation makes contract with a foreign consultant through its overseas office. Based on the contract, the foreign consultant visits Korea, for about one week, and helps the company to solve its specific problem on the site.

Last year, while the corporation gave about two thousands of technical guidance, the number of those dealt with by foreign consultants was reached about 300.

Because the corporation bears the extra cost for the foreign consultants' services, the beneficiary SME pays no more than the regular guidance fee. Moreover, because the guidance fee of the corporation equals to from 20 to 30% of the actual charges by private consultants, it can be said that the SMEs are highly subsidized.

2.3.4 Assistance to R&D and Acquisition of New Technologies

The institutional measure which assists R&D and acquisition of new technologies of SMEs can be largely classified into two categories; direct support and indirect one.

Technological activities of SMEs are directly assisted by the R&D activities of public research laboratories. And SMEs' innovative activities are also supported indirectly by various incentives.

Moreover, there are many cases in which those two support are given to an R & D project at the same time.

2.3.4.1 Independent R&D, collaborative R&D and contract R&D by public research laboratories

< reference case >

The Institute of Technology and Industrial Research of Korea carries out technological development and technical guidance to SMEs.

Those tasks are implemented in a planned manner. First of all, the annual plan for the operations is made open to public through newspapers and official gazettes. Next, competent SMEs are selected from among a large number of applicants. Then, the institute provides assistance through R&D and technical guidance to the selected enterprises. The institute is, presently, carrying out approximately 100 R&D projects, of which contract R&D represents 60%, independent R&D 30%, and collaborative R&D 10%.

Because the institute bears a majority of the costs of the collaborative R&D and contract R&D, SMEs receive technological and financial support at the same time.

The Korea Academy of Industrial Technology (KAITEC) is a comprehensive research laboratory of the Government, established in 1989 aiming to assist the reinforcement of industrial technology which would improve international competitiveness of the industries.

The laboratory undertakes R&D as part of the SMEs support activities as follows:

* Prototype development of article of cast metal industry
* Technological development support for the high-tech SMEs whose R&D expense represents more than 2% their total sales amount
* Comprehensive support from prototype to mass production technology development aiming to support technology intensive start-ups
* Design and development of equipment and parts for the assistance to the acquisitions of automation technologies.
* Technological development by the institute and application of the existing KAITEK technologies for the SMEs which are planning to introduce a flexible production line.
* Development of appropriate pollution-control machines and equipment, energy saving machines and equipment.

2.3.4.2 Financing of R&D activities

< reference case >

The Science and Industrial Development Fund of Chile (FONTEC) was established, with a fund of 30 million dollars from the Government, to promote technological innovations of SMEs, in September, 1991.

Schemes and performance of the FONTEC are as follows.

- Beneficiaries are SMEs which are planning to carry out the R&D with the latest technology according to the local standard judged by the FONTEC.
- The FONTEC finances 50% of the total R&D expenses of eligible R&D projects.
- The maximum amount to be financed is US$1.5 million. The collateral is required.

This program achieved a remarkable result with financing of about US$45 million dollars in total for about 350 projects, during the period from September, 1991 to July, 1995.

Moreover, the FONTEC has only 12 experts, but there are efficient enough to undertake the appraisal of 12 to 16 projects per month.

2.3.4.3 Subsidies of R&D financing

Without exception, the proportion of subsidy exceeds 50% or higher of the total R&D expenditure in the countries surveyed. Because beneficiaries can receive a large amount of financing for R&D as a grant, it can be said that this measure gives a maximum merit to SMEs among other support measures. By applying to applicants severe criteria for selection of eligibility, the number of beneficiaries might be kept low.

< reference case >

The Ministry of International Trade and Industry of Malaysia commenced "the Industrial Technical Assistance Fund (ITAF)" program in 1990. Assistance is given to SMEs in the form of a matching grant. In this assistance, 50 % of the eligible expense is born by the Government and the remainder born by the applicant, subject to a maximum of MR 250,000 (US$97,740).

ITAF provides subsidies of the technological activities expenditure of SMEs by the following four schemes; the Consultancy Services, the Product Development & Design, the Quality & Productivity Improvement and the Market Development.

Table VI-2-3-2 The Outline of the Industrial Technological Assistance Fund

Name of the Scheme	Maximum Amount of Grant		Executing Agency
Consultancy Services	RM 40,000	(US$1,560)	The National Development BANK
Product Development & Design	RM 250,000	(US$97,740)	SIRIM
Quality & Productivity Improvement	RM 250,000	(US$97,740)	SIRIM
Market Development	RM 40,000	(US$1,560)	MATRADE

Source: The MITI of Malaysia

The Standard and Industrial Research Institute of Malaysia(SIRIM), an agency under the Ministry of Science, Technology and Environments is responsible for the Product Development & Design Scheme of the program. The SIRIM identifies projects being supported by applying the following criteria:

* To predicate a significant achievement or improvement to existing products/production process
* Implementation of the project must conform to healthy development and design practice

The mode of disbursement is as follows:

* UP to 70 % of the total grant approved may be claimed in the project implementation stages; and
* The balance of 30 % will be paid after the project is completed.

Since the start of the program, about 150 projects have been approved for 260 applicants to the program with RM 8,040 thousands (US$3,143 thousands) of grant, by the end of 1994.

The Government is now considering the transfer of the SIRIM from government administration to public corporation or to private sector in the near future. The objective of the reform is the improvement of the service efficiency which might be made possible through the independent management method and free competition with similar entities in the private sector.

2.3.4.4 R&D tax concessions

The R&D tax concessions are largely divided into two types.

One is a tax system in which any R&D investment is given the incentive. Another type is a tax system in which selected R&D investment with some conditions is eligible for the incentive.

< reference case >

In Australia, the 150 % tax concession' is applied to the R&D project which consists of local contents and exceeds the amount of A$20,000 (US$15,000) a year. When the concession is applied, a project saves its R&D expense on the after tax base by as much as 46%.

The R&D tax concession regime is also established in other countries. However, the Australian system is noteworthy because enterprises could obtain large tax exemption by combining the system with other preferential tax treatment

2.3.4.5 Credit guarantee system for technology development

Though a mortgage is requested for a bank loan to finance R&D financing, SMEs' assets are not generally available for the purpose. Therefore, a public guarantee system has come to be installed in some countries so that their R&D activities can be promoted. Similar systems has been introduced in some countries quite recently.

Furthermore, because of the nature of the business; high business risk with low return, the implementation of the scheme should be supported by the government finance or by the contribution from other sectors like the financial institutions.

< reference case >

The Korea Technology Credit Guarantee Fund(KOTEC) is a special organization established, as the successor of the public guarantee system, by the government in April 1991. The function of KOTEC to give credit guarantee to SMEs who lack collateral for the commercial loans to finance acquisition of technologies.

Major part of the capital fund of KOTEC is raised by the contributions from financial institutions and the central government.

Beneficiaries increases rapidly in recent years. This shows a good performance of this guarantee system.

However, as its ordinary expense is large and it increases, KOTEC puts out losses of a considerable amount of money every year.

Table VI-2-3-3 Outline of KOTEC's Credit Guarantee Scheme

Eligibility:	SMEs which develop technology or improve technology		
Ceiling amount of guarantee:	Ordinary ceiling Special ceiling Maximum ceiling	Won 1.5 billion Won 1.5 billion Won 3.0 billion	(US$1.9 million) (US$1.9 million) (US$3.9 million)
Guarantee fee:	1.0% p.a.		

Source: KOTEC

Table VI-2-3-4 Performance of Technology Credit Guarantees of KOTEC

Year	1989	1990	1991	1992	1993	1994
Number of companies	1,063	2,897	5,154	5,295	10,105	15,332

Source: KOTEC

Table VI-2-3-5 Condensed Income Statement of KOTEC

(Unit: million Won; ( ) million US$)

Year	F/Y 1992		1993		1994	
Operating Revenue	26,409	(34)	36,031	(46)	54,839	(71)
Operating Expenses	189,910	(245)	128,089	(165)	215,335	(278)
Operating Loss	163,051	(210)	92,058	(119)	160,496	(207)
Net Loss	163,064	(210)	76,340	(98)	156,519	(202)

Source: KOTEC

2.3.5 Technology-related Information

The technology-related information service to SMEs is classified into two types; the technology information service and the exchange support.

(a) Information service

The public organizations which provide technical support to SMEs usually have libraries with information in various forms such as books, magazines, newspapers, research reports, patents information and computerized database. These materials including the database are available to every citizen.

Among the information service the computer-based service becomes very important in every country. New information technologies as "INTERNET" are going to be introduced in several countries for the information service to SMEs.

(b) Exchange support

Another type of the technology-related information service to SMEs is the institutional arrangement for creating an "arena" where managers, researchers and engineers from various fields such as industry, public and academy exchange their knowledge and information. SMEs which participate in this arena are often going to establish a small group of enterprises and other entities aiming at development of new

technologies or products through partnership. A system of this kind has been developed markedly in Japan and Korea.

< reference case >

The Ministry of Commerce and Industry, the CANACINDORA (the National Federation of Industry of Mexico) and the IBM (American computer industry) are managing the database "UNIDAD DE TECHNOLOGIA TRANCIERO" for technology-related information service and technology transfer to SMEs in Mexico.

The Ministry provides data and the salaries of the system operators transferred from a government research laboratory, the IBM grants the computer hardware and software for the information system and the CANACINDORA operates ordinary information services for SMEs. This combination brings the quality of service with a minimized cost.

2.3.6 Fostering of Small and Medium-Sized Suppliers -Vender Development Program (VDP)-

VDP is a measure by which the cooperation between the large enterprises and the subcontracted SMEs is promoted under the government guidance. Private resources of the large enterprises; technologies, know-how, experts, etc. are made availed to SMEs through the public-supported program.

Large enterprises which provide quality improvement and technical guidance to the SMEs through their long term relations, play the key role in this program for the technology transfer to the SMEs.

< reference case >

By the Government nomination of the national automotive company as the anchor company of the scheme, the "PROTON Component Scheme", the first challenge of VDP program, commenced in Malaysia in 1988.

This Scheme obtained the honor of success because the vender enterprises which manufacture and process the automotive components and parts for the anchor company, have been promoted remarkably through the implementation of the program.

Afterwards, the government widened the scope of anchor company to cover the industries other than the automotive industry and promoted the stage of this program to the "Vender Development Program". Enterprises participating in the program are 42 of

anchor companies, including a lot of Japanese enterprises and 71 of local vender enterprises by the end of July, 1995.

Anchor companies must newly foster venders and assume the responsibility for not only the purchase of products of the venders but also the provision technical and managerial guidance to them.

So far, the "Three-party-agreement method" involving the Government, anchor enterprises and financial institutions, installed from April, 1993, is the first in the world, replacing the conventional "Two-party-agreement method" of the Government and the anchor enterprises. The point is having added financial institutions to the element of the program to support the financial procurement for the vender companies.

2.4 Experience of Pubic and Private Support to the SMEs in Japan, Malaysia and Brazil

2.4.1 Japan

2.4.1.1 An overview

Japan has a long history of the public support for SMEs' technological innovation activities with various and substantial measures and programs since the SMEs Fundamental Law was enacted in 1963. In this law, the Government declared to support development effort of SMEs and concurrently requested the local administrations to pursue this policy duly at the local level.

The local administrations and national research laboratories execute various assistance measures. Especially, the public research laboratories, located in 185 places in the nation, play important roles in the fields of technical training, R&D assistance, technical guidance and technology-related information service, etc. to SMEs. The 47 prefecture administrations coordinate various assistance organizations in the central government agencies, the local administrations of cities, towns, and villages and private economic groups. In addition, the prefectures also take charge of financing and subsidizing R&D activities of SMEs.

The private support are executed to reinforce the public assistance works particularly in the fields of training and technology diffusion.

However, the SMEs which apply for the supporting measures are estimated at about 20 percent, at most, of all manufacturing SMEs. The remaining 80 % perform technology development activities with their self-efforts or in cooperation with other private enterprises.

A lot of SMEs are affiliated to large enterprises particularly in the processing and assembly industry in Japan, and two-thirds of them are provided with some technical guidance from large enterprises. Technical guidance of this type is not given by institutional arrangement like the Suppliers Development Plan of Argentina. It is a voluntary activity in the private sector.

Moreover, the "technology-marketing exchange group" becomes prevailing and cross-sectoral cooperation among enterprises has become popular in all types of SMEs recently. There are two categories of the exchange; voluntary activities of private sectors and guided activities supported by public programs.

2.4.1.2 Policy framework for the 1990's

The council for SMEs policy of the central government has determined a framework for technical support to SMEs in the 1990's. It is summarized as follows;

A. Promotion of the integration of technology and marketing

(1) To promote technological development activities.

(2) To expand the geographical boundary and relax he company- size qualification standard for the "Technology and Marketing Exchange Plaza", to promote the network of the corporate exchange and the technology transfer from large enterprises to SMEs.

(3) To use the public research laboratories as the core for collaborative R&D and marketing network.

B. Technology development through local research laboratories

(1) To foster creative SMEs by the promotion of R&D collaboration among SMEs and by the utilization of local incubators.

(2) To promote linkage among local research laboratories, universities and private research institutes in order attain the scale of economy in technology development of the local level.

C. Human resources development

Training of engineers of SMEs should be promoted. In addition, training capacity should be expanded in the SMEs universities to strengthen the R&D capacities of SMEs.

D. Promotion of international cooperation by SMEs

Measures will be established to encourage SMEs to participate in international cooperation especially to foster supporting industries in the developing countries.

2.4.1.3 Structure of support measures

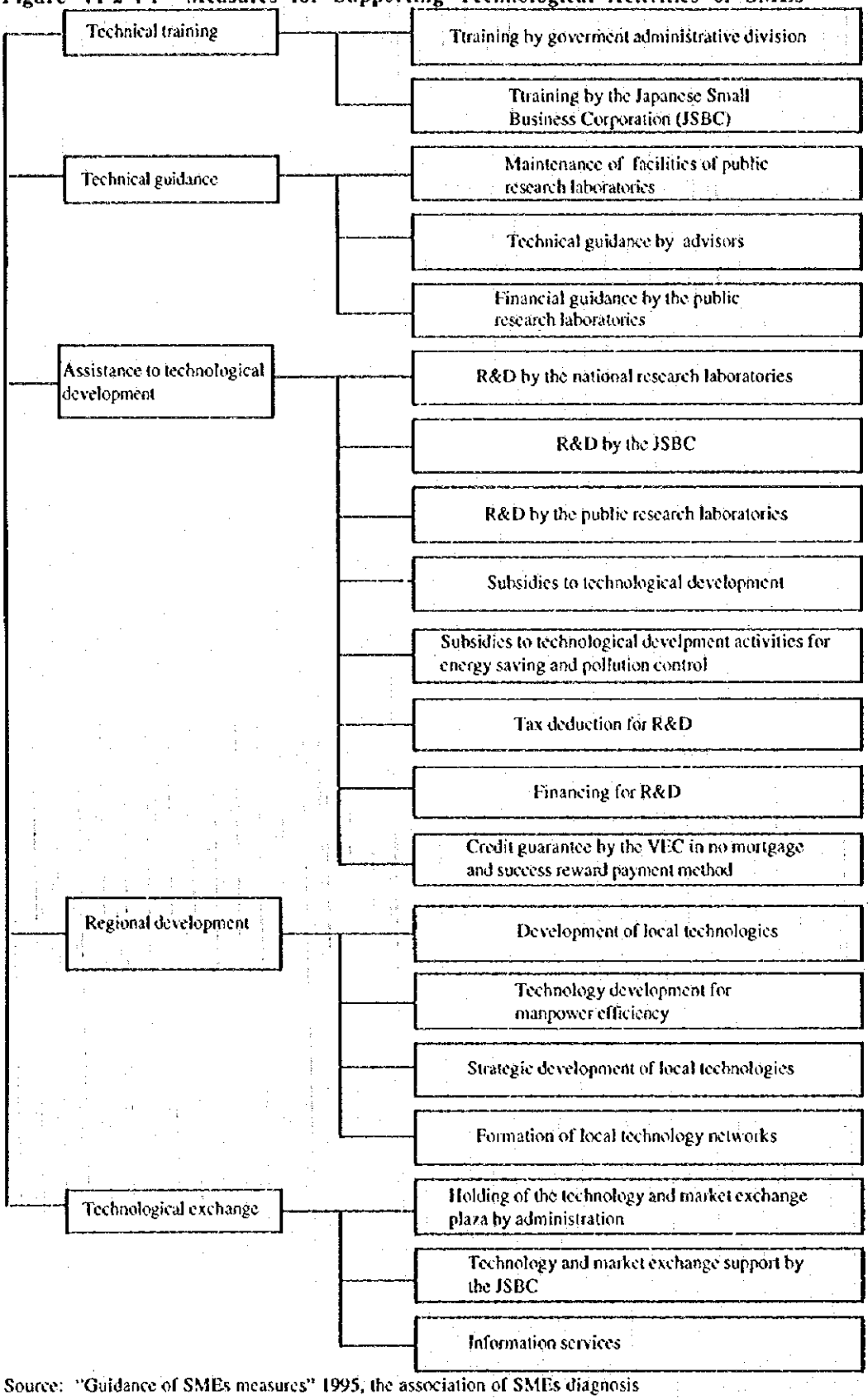
Current measures for supporting technological activities of SMEs are (1) technical training, (2) technical guidance, (3) technology development assistance, (4) regional technology development and (5) technological information and technological exchanges.

The Government worries about Japanese industrial technological activities are becoming weak due to the decrease in the competitiveness of technology of manufacturing SMEs. To cope with this situation, the Government promulgated the

temporary special law in 1995 which aims to promote new establishment and R&D of SMEs. A scheme under this law will be explained in the next section of this report.

Major implementing agencies of technological support are the local administration and the research laboratories. Budget for their technological support partly subsidized by the central government is as shown in Table VI-2-4-1.

Figure VI-2-4-1 Measures for Supporting Technological Activities of SMEs



Source: "Guidance of SMEs measures" 1995, the association of SMEs diagnosis

Table VI-2-4-1 Budget of the Central Government for Technical Support to SMEs

(unit: million Yen, ( ) million US$)

	FY1995	
< Financing supply >		
(1) Subsidies to technological development	3,363	(33.6)
(2) Expansion of the free guarantee scheme of the credit guarantee system	400	(4.0)
(3) Subsidy to the VEC fund	350	(3.5)
< Training and technology-related information >		
(4) Cultivation of entrepreneurship	30	(0.3)
(5) Training for start-ups support	30	(0.3)
(6) Technical guidance	340	(3.4)
(7) Maintenance of information system of the regional information centers and public laboratories	173	(1.7)
(8) Regional collaborative R&D of industry, academy and administration	309	(3.1)
(9) Special diagnosis work to start-ups	76	(0.8)
(10) Improvement of access to patent information	1,707	(17.1)
< Service of market information >		
(11) Foundation of techno-fair	56	(0.6)
< Facility improvement >		
(12) Promotion of incubation facilities of the third sector	400	(4.0)

Source: Small and Medium Enterprise Agency, "SMEs white paper" 1995 version

2.4.1.4 Subsidies for technological development

Local administrations provide two schemes; (1) subsidy to technological development and (2) subsidy to high-technology development.

A meeting is held for public announcement of the schemes in every March, end of the fiscal year of Japan and the application is executed from the beginning to 20th of April. The responsible entity appraises candidate projects by examining the proposed R&D plan and management performance of the applicant. For example, a responsible agency in Kanagawa prefecture approved 30 projects in 1995. About 300 projects are assisted by the scheme in Japan in 1995.

(1) Subsidy to technological development

Eligibility: SME which locates its facility in the prefecture and runs business for one year or more and has intention to execute technological development project inside the prefecture.

Eligible projects: (a) R&D of the new technology and new product
(b) R&D of high technology areas
Either projects of both categories must be completed within the fiscal year

Eligible expenditure: Raw material, machine and equipment and outsourcing subcontract processing expense, etc.

Rate of subsidy: Two-thirds of the R&D project expenditure

Amount of subsidy:

A; From ¥1 million (US$10 thousands) to ¥2 million (US$20 thousands) (for start-up SMEs)
B; From ¥2 million (US$20 thousands) to ¥5 million (US$50 thousands) (for general SMEs)
C; From ¥1 million (US$10 thousands) to ¥7 million (US$70 thousands) (for R&D type SMEs)

(2) Subsidy to high-technology development

Eligibility: (a) SME which locates its facility in the prefecture and runs business for one year or more and has intention to execute the technological development alone inside the prefecture
(b) A group of SMEs exchanging their technology or a SME that executes collaborative development with universities.

Eligible projects: (a) R&D in high technology fields such as electronics, new material and biotechnology
(b) technology development relating to welfare equipment with application of high technology.
Either projects of both categories must be completed within the fiscal year

Eligible expenditure: Raw material, machine and equipment and outsourcing subcontract processing expense, etc.

Rate of subsidy: 50% of the R&D project expenditure

Amount of subsidy:
A; From ¥1 million (US$10 thousands) to ¥7 million (US$70 thousands) (for development by alone).
B; From ¥2 million (US$20 thousands) to ¥10 million (US$100 thousands) (for collaborative development).

2.4.1.5 Support to new establishment and R&D support to SMEs

Those eligible are SMEs or individuals which will establish a new venture. When projects get the approval of a prefectural governor, various supporting schemes are offered to them such as the loans, credit guarantee and concessional taxation. This is a privileged support, more advantageous than other existing measures for assistance so that a lot of SMEs applied for this assistance in 1995.

Table VI-2-4-2. Assistance Schemes for the New Establishment and R&D

Equity Capital Issue:	(scheme) Even if the capital amount exceeds ¥1 million (U$10 thousands), the Investment and Development of SMEs Co. Ltd. will underwrite the stock of the approved companies. (executing entity) The Investment and Development of SMEs Co. Ltd.
Reinforcement of SME's mortgage:	(scheme) Ceiling amount of the insurance payment is expanded up to ¥200 million (US$2 million) by the exceptional measure of the SMEs insurance law. Ceiling amount is ¥70 million (US$0.7 million) in no mortgage frame and ¥20 million (US$0.2 million) in no mortgage without warrant frame. (executing entity)The Credit Guarantee Corporation
Financing for modernization of machines and equipment:	(scheme) The repayment period is expanded up to seven years (executing entity) Financial section of the prefecture administration, the Kanagawa assistance foundation of SMEs
Preferential treatment of tax:	(scheme) Deduction of payable corporation tax by the amount equivalent to 7% of fixed asset investment or the acceleration depreciation of the asset at the rate of 30 %, extension of the period of deficit carry over to 7 years, etc. (execution entity) Taxation office
Subsidies to R&D:	(scheme) Ceiling amount is ¥30 million (US$0.3 million) and rate of subsidy is two-thirds of R&D expenditure. Period of subsidy is not limited and personnel expense can be included in eligible expenses. (executing entity) Section of industry and trade of the prefecture
Concession loan with low interest:	(scheme) Expansion of ceiling amount of institutional loans: up to ¥600 million (US$6 million) for the Regional SMEs activation loan, up to ¥60 million (US$0.6 million) for the Employee's independence loan and up to ¥350 million (US$3.5 million) for the Special loan for promotion of technological exchange of different type industry. (executing entity) The Small Business Finance Corporation, The People's Finance Corporation, The Central Bank for Commerce and Industry Cooperatives
Financing of corporate union promotion:	(scheme) Works such as grouping of SMEs, or SME' facilities and cooperative works in the field of knowledge intensive activities are financed 80% of the project cost without charge of interest. (executing entity) Section of industry and trade of the prefecture administration
Advice on the planning and execution of the project	(scheme) Consulting for the planning and execution of the eligible project (executing entity) The Japanese Small Business Corporation

Source: Kanagawa Prefecture

2.4.1.6 Activities of public research laboratories

Public research laboratories are taking charge of a crucial part of the technical support to SMEs in such activities as R&D, technical guidance, training, and technology-related information and exchange

R&D:

Public research laboratories carry out various R&D such as ordinary R&D, collaborative R&D and contract R&D.

The results of R&D are fed effectively into technical support activities. Laboratories also provide them to the private sector through public announcement, research report and the journals.

Technical guidance:

The laboratories carry out test and analysis upon request by the private sector at certain charges and give consultation and guidance free of charge.

As the amount of charge is limited to ¥13,000 (US$130)/case by the ordinance, there is a considerable economic benefit for the SMEs, when the test and analysis require highly advanced equipment.

Technical training:

Research laboratories support the R&D personnel of SMEs by provideng the opportunities of training and handling the modern facilities. These trainings are considered, today, as the best strategy to keep the strong competitiveness of Japanese industrial technology.

The research laboratories also facilitate the international research exchange program to accomodate researchers from various developing countries.

Technology-related information and exchange:

The research laboratories collect a lot of journals and books related to the science and technology. In addition, these laboratories developed the original databases which consist of technology information file; enterprises' technology information, science and technology experts information, research facilities information, R&D information and library information. They offer free referral service of the database at the request of enterprises and citizens.

Major commercial databases and patent information database are also available by the referral service though the cost of service is charged to the users.

Moreover, the laboratories carry out the forum activities such as lecture seminars, course seminars and a symposium aiming at development of new technology and new

product. By these activities, public and private personnel are given opportunities to exchange technological information.

2.4.2 Australia

2.4.2.1 Outline of governmental support to SMEs

Policy objective of the institutionalized support programs to SMEs is set to promote the globalization of productive activities and to improve the competitiveness of productive sectors.

The programs address two themes;

* Building competitive firms: through business assistance programs aimed at encouraging innovation and improving the take-up of technology, improving management skills, ensuring access to both debt and equity capital, and exports.
* Building a competitive environment: ensuring that Australian firms have every opportunity to compete in the global market by continuing the process of micro-economic and tariff reform, ensuring a strong science base, improving market access and promoting investment and business linkages.

In response to a call from industry to make the government's programs more meaningful and accessible, the Government has created AusIndustry as a new office within the Industry, Science and Technology portfolio.

Under the guidance of a private sector Board, AusIndustry focuses on improving business access to effective and efficient programs.

Among the objectives, AusIndustry will strengthen the cooperative partnership among the key enterprise improvement activities within the industrial portfolio and relevant programs in other portfolios, ensuring that firms have access to programs most relevant to them, no matter the source of the program.

The technical support program for "Building Competitive Firms" is called innovation program and its major schemes are:

* Tax Concession for Research and Development
* Concession Loans for the Commercialization of Technological Innovation
* Competitive Grants for Industry Research and Development
* Australian Technology Group
* Technology Access Program, etc.

Programs shown below are carried out for "Building a Competitive Environment" purpose.

* International Science & Technology Program
* International Industry Collaboration Program
* Science and Technology Awareness Program
* French-Australian Industrial Research Program
* Cooperative Research Centers

2.4.2.2 Innovation program

The institutionalized technical support measures in Australia are very concise. Content of each scheme of R&D tax concessions, R&D financing, R&D subsidies, technology-related venture capital and technology-related information services is quite simple and easy to understand.

A. Tax concession for research and development

The eligible R&D activities must have adequate Australian content and the results must be exploited on normal commercial terms and to the benefit of Australian economy.

Expenditure eligible under the concession at 150 % includes; salaries, wages and overhead costs which are directly related to the company's R&D activities, contract expenditure; and capital expenditure on R&D plant and equipment including pilot plant.

Annual eligible expenditure must exceed A$20,000 (US$15,000). The minimum for participating in R&D syndicate is A$500,000 (US$370,000).

B. Competitive grants for industry research and development

A competitive grant for R&D is available to firms undertaking market driven R&D programs either alone, or in collaboration with research organizations, government partners or end users.

The program provides grants of up to 50 % of the cost of undertaking R&D for a period of up to three years. The grants are available on a competitive basis for:

* market driven R&D in dynamic firms needing assistance but unable to receive 150 % tax concession
* collaborative R&D activities, which are high risk but could provide extensive benefit to Australia

* trial and demonstration activities between technology developers and potential customers
* collaborative R&D activity between firms and research institutions

Eligibility of applicants is assessed on relative merit by the Industry Research and Development Board.

C. Concession loans for the commercialization of technological innovation

The Government has allocated A$48.2 million (US$35.8 million) over a four year period to encourage and further the commercialization of technology.

Loans are made available at concession rates to firms through a competitive selection process, based on merit. Firms with fewer than 100 employees which have the capacity to successfully manage a commercialization process are eligible to apply for support.

Commercialization activities supported by the loan are limited to the following areas, which may include related market research;

* product/process design
* trial production runs
* regulations and standards compliance
* protection of core intellectual property
* trial and demonstration activities
* product documentation

D. Australian Technology Group

The Australian Technology Group Ltd.(ATG) is a technology commercialization company established to contribute to the profitable commercialization of Australian technologies developed by the public and private sectors.

The ATG seeks to bring early stage product development activities to a point where viable intellectual property and commercial rights, products, process or companies can be developed to exploit prior investment in technologies. It is able to:

* identify and evaluate technologies with commercial potential
* provide effective protection and control of intellectual property
* provide seed capital to bring projects to the stage where they would be attractive to private sector partners
* provide management expertise and international experience in product marketing to match high potential markets with quality sources of high technology

* commission research and product development from public sector institutions for SMEs

ATG has been established with an initial Government equity of A$30 million (US$22 million). In the long term, ATG will be seeking additional equity from the private sector to contribute to profitability investment in an expanding group of technologies.

E. Technology Access Program

The Technology Access Program aims to enhance the competitiveness of Australian firms, particularly SMEs, by improving their ability to understand, evaluate and adopt appropriate technology to lift their capacity and performance. The program also aims to improve companies' access to the technical knowledge and expertise found in a range of institutions across the country, generally located in the university and TAFE systems.

Australian Technology Network

The proposed Australian Technology Network will help consolidate existing academic institutional infrastructure into a coordinated national network of centers. Existing centers will be encouraged to join together to respond to specific industry needs and operate in a way that makes them readily accessible to firms, particularly smaller companies.

Competitive grants will be made available for groups of academic institutions or centers to assist in the areas of applied research and development, transfer of technology, provision of technological information, advice and related training.

Technology Counselors

Technology Counselors will be available through AusIndustry's enterprise improvement services to:

* help firms make the right connections with institutions and the deliverers of government assistance programs.
* provide technological information and advice to firms, and
* performance advisory and referral service.

Technology Counselors will also play an important role in linking the various centers participating in the national network to ensure that firms across the country can have access to the most appropriate technical advice wherever they may be available.

Technology awareness and demonstration (Company level support)

Competitive grants will be available for a range of projects aimed at raising awareness, encouraging uptake and /or demonstrating the participation of new and appropriate technologies at SME level and industry in general.

Subsidies for projects such as technology audits and feasibility studies aimed at improving the firm's ability to identify, evaluate and introduce new technologies will also be available through AusIndustry.

Review of international best practice in the adoption and management

The Government is undertaking a comprehensive study on international best practice in the adoption and management of technology.

The outcome will be disseminated through:

* the publication of a literature review, the case study material, and a policy document, and
* the production of a "how-to" manuals (aimed at managers) and Video (aimed at staff).

The lesson learned will also feed into the development of industry assistance programs and relevant higher education courses and workshops.

2.4.2.3 Innovation program of State government (Business Victoria)

To make the Government more responsive and approachable to business and to further assist and support Victorian companies to become internationally competitive, Business Victoria has been established with responsibility for a new package of programs.

Business Victoria acts as a single point of contact for business. Telephone Helpline has been established to provide quick access to information and assistance. Business Victoria concentrates on two new areas:

* Extending and improving a range of consulting services designed to improve the strategic management and competitive position of modern companies; and
* Encouraging innovation within SMEs and prompting Victoria's research capabilities

The initiatives of Business Victoria consist of three categories: enterprise improvement, innovation and export.

In enterprise improvement, as the principal delivery vehicle for AusIndustry in Victoria, Business Victoria will offer easier access to a range of State and Commonwealth

business services. Business Victoria will add to AusIndustry/NIES with extended programs.

In innovation, Business Victoria intends to promote innovation in Victoria through a series of programs. Innovation programs are shown below.

A. Promotional and technology awareness program

The purpose of the program is to develop a strong innovation culture within the Victorian community through an information dissemination program aimed at raising firm's awareness of technology and Victoria's research and innovation facilities.

The following directories/databases will be published in 1995-96:

* A directory/database of the major public sector research facilities, with an outline of key research and development activities.
* A directory of the fourteen Victorian-based Cooperative Research Centers with a reset node in Victoria, listing their research and development capabilities.

The budget of the program was A$435,000 (US$360,000) for 1994-95.

B. Technology diffusion

The purpose of the program is to enhance the international competitiveness of Victorian industry by promoting and developing strategies for the diffusion of technology.

There are various approaches in the program such as consulting study on the SMEs technology needs, a marketing exercise on rapid prototyping facility, tooling industry seminars and provision of technology networking.

The budget of the program was A$1.33 million (US$1.14 million) for 1994-95.

C. Marketing Victorian technologies (a pilot program)

The purpose of the program is to assist in the marketing of Victorian technologies overseas.

Assistance will be provided to selected SMEs and to research and development organizations, to enable them to package technology projects for joint marketing. Up to seven technologies will be selected for this pilot program. Selected technologies will be packaged by expert consultants for direct marketing in the pilot market.

The budget of the program is A$100,000 (US$75,000) for 1995-96.

D. Best practice 2000: A strategic study

The purpose of the program is to provide a model of best practice for the manufacturing and service industries that will enhance their international competitiveness for the year 2000 and beyond.

The study will:

* Develop a model of Best Practice 2000 characteristics based on the best performing companies.
* Assess the present position of Victorian and Australian firms relative to that model.
* Help understand the change process, resources and needs of organizations, depending upon their size and context, necessary to achieve best practice by 2000.
* Translate the knowledge into a range of industry improvement sub-programs.

The budget of the program is A$150,000 (US$110,000) for 1995-96.

E. Maximizing benefits from Cooperative Research Centers

Commercialization of R&D is key objective of the Victorian Government's innovation policy. The purpose of the project is to assist Victorian-based Cooperative Research Centers(CRCs) to commercialize and export their R&D, and to assist SMEs to access to CRCs facilities and services.

Assistance, of up to A$25,000 (US$18,600) per project, is designed to increase the probability of success of proposed R&D. Preference will be given to projects which involve SMEs.

Priority will be given to those projects that:

* Would not be possibly undertaken without Government assistance.
* Provide maximum net benefit to Victoria.

The budget of the program is A$200,000 (US$150,000) for 1995-96.

2.4.2.4 Computer-based business information system

Emphasis is put on the development of computer-based information system that will support SMEs to access the assistant programs without trouble.

AusIndustry will also be a source of critical business information. The Commonwealth, through the BizLink initiative, is working cooperatively with State Governments to develop computer-based information sources for business. These sources include a comprehensive guide to government programs and services of interest to business, information on business licensing requirement, and training sources.

BizHelp

BizHelp is the first in AusIndustry's suite of business information products, collectively known as BizLink. BizLink underpins AusIndustry's role as an entry point for all government business assistance programs, by providing quality information and referral sources.

BizHelp is a powerful information tool that puts the details on over 500 business assistance programs for SMEs.

BizHelp:

* is used by AusIndustry and other government agencies to direct businesses to appropriate assistance
* is widely available and indispensable to accountants, industry associations, banks and consultants
* includes a software package, quarterly updates, a basic training package and access to help desk service
* lists over 500 programs and services providing industry assistance
* runs on any PC with Windows or Apple Macintosh and is simple and user-friendly
* costs A$200 (US$150) per annum, with a multi-user license available for A$2,000 (US$1,500) for ten or more work stations.

BizHelp was launched on November 1994. Related BizLink products will be phased in during 1995-96. Future products will be introduced as a result of market demand and will use delivery mechanisms which are appropriate to the needs of users.

The next BizLink product was scheduled for delivery in 1995. The Australian Chamber of Commerce and Industry and AusIndustry were working on the development of a module that would focus on business assistance services offered by industry associations and chambers of commerce.

2.4.3 Brazil

2.4.3.1 Private sector institutions

The institutional framework for technical support for SMEs in Brazil is quite different from similar framework in other countries.

The National Confederation of Industries(CNI) and the Brazilian Micro and Small Companies Support Service (SEBURAE) are private executing entities that assist micro, small and medium companies in various areas including technical support.

Though the Financing Agency for Projects and Studies (FINEP) is the principal public agency supporting for projects and programs regarding technological development and R&D, it sets up a new program for micro and small enterprises' technology development activities in cooperation with the SEBRAE since January 1995.

The CNI assists SMEs of the confederation and SEBRAE assists micro and small enterprises including those of the so-called informal productive sector.

The CNI, as an entity with the greatest entrepreneurial union representation is involved in designing industrial projects and policies. For supporting SMEs with technology-related issues, CNI has a Department for Small and Medium Industries Assistance(DAMPI).

The DAMPI was created in 1972, absorbing and expanding the late National Center of Industrial Productivity. Its major objective is the introduction of a nationwide support system for the SMEs. It designs basic national programs and cooperates with regional programs. It promotes exchange of experiences, conducts studies and researches on SME problems. Its activities are based on three basic areas: training, support of technology-related information and development of industrial technologies.

The SEBRAE offers similar services to that of the DAMPI to micro and small companies in various productive sectors. The SEBRAE System is unique and has important aspects with dynamic and intensive supporting activities:

* local needs-oriented services through decentralization
* development of many kinds of supporting tools
* excellent access to the facility
* good coordination and linkage with other supporting entities

Details of the SEBRAE System are described in the next section.

2.4.3.2 Organization and activities of the SEBRAE

The SEBRAE is defined as an autonomous and private social service function, established in January 1991, which has succeeded the previous state CEBRAE (Brazilian SMEs Support Center).Together with the change of the name, there was a change in its legal status since it became a private entity.

Nevertheless, SEBRAE is still in line with the government policies aimed at enhancing the quality and productivity of companies in general.

SEBRAE differs in some aspects from the models of similar entities in other countries.

The uniqueness comes from the fact that its highest ruling body, the National Deliberative Council, consists of representatives from several institutions and segments. In other countries, similar institutions with similar goals are usually under the guidance of government agencies.

The National Deliberative Council is composed of representative from the industrial, commercial, agricultural and service sectors; the areas of research and technological development; and financial and credit institutions that provide adequate lines of credit for meeting the needs.

The financial resources are collected through the contribution of firms through a retention of 0.3 % of the salaries of commercial and industrials salaries throughout the country. This amount is transferred to the national SEBRAE which then transfers it to the state SEBRAEs according to the population of each state.

The operational units in the state and Federal District have their own separate legal structure, though they offer the same type of service as indicated by the guidelines of the National Deliberative Council. Nevertheless, this standardization is pursued only in terms of philosophy, and emphasis is put on the character of each region.

Fields of activities of SEBRAE are shown below:

* Specific training through courses and lectures;
* Supply of information via database;
* Specialized consultation by technical teams;
* Preparation of technological publications;

* Dissemination of information through newspapers, magazines, radio and television;
* Organization of trade missions;
* Participation in fairs and exhibitions;
* Contacts with public and private entities;
* Encouragement for creation of business centers and mini-industrial districts;
* Dissemination of information on potential markets and opportunities for new businesses;
* Contacts with credit institutions;
* Agreement with other supporting entities for micro and small companies;
* Preparation of formal projects;
* Promotion of purchase, sale and service centers;
* Promotion of joint ventures;
* Approach to universities, technological centers and research and development entities.

To maintain continuity to its activities and the quality of the service to companies nation-wide, the SEBRAE system regularly updates its information related to the reality of the business society.

SEBRAE's technical team regularly attend programs designed to keep them abreast of the latest development and trends. This training enable them to appraise the impacts that any changes in government policies, market situations, legislation, etc. can have on small businesses.

SEBRAE's business philosophy has permitted it to become the most outstanding Brazilian entity supporting this segment of companies of vital economic and social importance.

Computer-based information system (The SEBRAE Counter)

Since information is a common factor in all of the activities performed by the system, an information center has been set up to provide access to a wide range of data. Located in every state and soon to be established in City and Town Halls, Board of Trade and business associations-the SEBRAE Counter is the door to the System for micro and small businesses. The layout of the SEBRAE Counter is standardized throughout the nation.

Staffed by the trained personnel, the database is linked to other information networks and is thus capable of meeting the on-going needs of the users from start-up through consolidation and growth.

2.4.3.3 Technical support by SEBRAE

The SEBRAE carries out its technical support programs according to the objective; technology development, problem solving of technical activities, energy saving technology and awareness of technology, etc.

The SEBRAE assists technological innovation of micro and small companies through provision of subsidy to consulting fees.

(Example 1) PATIME

PATIME is the typical technological assistance program of SEBRAE to support quality improvement, new technology development, business feasibility study and introduction of technologies, etc.

In 1994 this program provided support to about 2000 companies in 24 states among 27 states of the whole country with a participation of 320 consultants who offered 80,000 hours' consulting services.

The cost of the consultancy amounted to US$700 per company and was shared by the SEBRAE (35% of the total cost), FINEP (35%) and beneficiaries (30%).

The numbers of both participants and consultants doubled and program execution was extended to 27 states in 1995.

(Example 2) SEBRAE Tec

This program was newly developed and commenced in September 1995 to solve the technological problems of micro and small enterprises.

Companies could receive consultation on a specific and sophisticated technical problem up to 20 hours at the cost of 27 REAL (US$28) per hour. Registration of consultants from universities and research laboratories was completed in 15 states by the end of June 1995.

2.4.3.4 Financial assistance program for technological activities

FINEP

FINEP, a public financial institution related to the Secretariat of Science and Technology of the Presidency, finances eligible projects in the field of R&D, technology transfer and quality control.

The US$500 million of fund of FINEP comes from various sources; the National Treasury, special development fund, local financial institutions, the IBRD (World Bank) and the Inter-American Development Bank and foreign technical cooperation entities. FINEP extended loans of about US$350 million to private enterprises and about US$150 million to fund universities and research laboratories in 1994. Terms of the loan applied to private sector are up to 10 years of repayment including 3 years of grace with an annual interest rate of 16 % plus adjustment index.

There are two priority fields of financing:

* high technology industry such as factory automation, electronics and biotechnology.
* regional industries of priority in terms of on employment and tax revenue effects, such as leather industry and footwear industry.

FINAP-SEBRAE joint financing program for SMEs

This financing scheme was launched to improve competitiveness of micro enterprises with less than 100 employees in January 1995.

Eligible projects are technology-related and quality-related ones. The scheme is shown below.

While total budget for the scheme was set at 75 million REAL (US$77 million) for 1995, SEBRAE allocated 8 million REAL for its contribution to it.

Amount of financing per project:	up to 120,000 REAL (US$123,500)
Interest rate:	27.75 % p.a.
Grace period:	24 months
Repayment period:	36 months after the grace period
Guarantee:	90 % of debt will be guaranteed by SEBRAE

2.4.3.5 Regional experience (the State of Sao Paulo)

FIESP-Sao Paulo State Industry Federation

The FIESP represents the industrial entrepreneurs of the State.

It has created the DEMPI with the objective of supporting the development of SMEs in the State.

The DEMPI provides:

* training supplying courses and seminars;
* consulting services and entrepreneurial diagnosis for addressing operational and technological problems;
* diffusion of information on business development through databases, such as a list of consultants for project analysis, sectoral development, etc. and a list of potential partners, etc.

SEBRAE-SP

The SEBRAE-SP has a network of 17 regional offices through which it meets the information and services demands of SMEs.

Its major action lines are:

(a) Training activities both on entrepreneurial management and on subjects related to new technologies.
(b) Entrepreneurial business subcontracting and business exchanges, etc.
(c) Dissemination of useful information to SMEs.

For technological consulting services directed towards the diffusion of new technologies and innovation, the SEBRAE Tec Program has been established.

In addition, based on the policy of some large enterprises, the SEBRAE has developed a training program organized among a group of 15 large enterprises.

Chapter 3
Supporting System for SMEs' Quality Improvement

3.1 Argentine SMEs' Quality Improvement Activities and Remaining Hurdles

3.1.1 The Current Quality Improvement Activities

a. Introduction

It is widely recognized that quality improvement activities are essential part for manufacturers in order to secure their competitive edges in the market and achieve exports. And an endowment of competitive suppliers in many industry types is considered one of the necessary business climates to attract foreign direct investments.

Three kinds of surveys were conducted on SMEs' current quality improvement activities in Argentina. They are a survey on autopart and capital goods manufacturers by the study team itself, CEPAL's survey on leather products, chemical/plastic products, metallic products, scientific machinery and equipment, and KPMG's survey on autopart manufacturers.

As the results of those surveys, a number of the SMEs have been undertaking quality-improvement programs since 1990: for instance, by contracting with private consultants and recruiting quality-control experts. Quality improvement primarily involve the introduction of 5-S programs (the five S's: seiri, seiton, seiso, seiketsu, shuukan; Japanese terms synonymous with workplace order, cleanliness, and routine), problem-analysis tools, Cell's system, quality self-control systems, and Poka-yoke (foolproof") systems in plants.

According to JICA's survey on quality control in Argentina completed in November 1990, IACC (Instituto Argentina de la Calidad), ASADECC (Association Argentina de Calidad y Confiabilidad), and other organizations[1] and universities are providing seminars and/or training courses. IACC gives priority to the training of technicians who graduated a technical high school. ASADECC regards the seminar for executive and on QC circle as important.

The existence of professional quality-control organizations such as ISACC and ASADECC is an advantage of Argentina. But it is a problem that many of the SMEs do not include those courses in their staff training programs because those courses are not capable of fully satisfying their practical needs.

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1 Other organizations include CGI (Confederacion General de la Industria de la Republica Argentina), UIA (Union Industrial Argentina), INTI, IRAM. All of them except INIT are organizations of private sector.

b. Human resources

According to the survey conducted by CEPAL, out of 39 sample SMEs half of them have only one employee in charge of quality improvement activities, 13% have no one responsible for quality improvement activities and the rest have more than one person in charge.

Sixty seven percent of the sample SMEs have to train their personnel committed to quality improvement tasks. Nevertheless, at present only 46% of them are involved in training programs.

c. Quality improvement activities

In general, the use of organizational techniques by the sample SMEs is scare and the proportion of enterprises using relatively complex techniques is small. Besides, the implementation of such techniques is, in some cases, partial and limited only to some phases of productive process. It should be noted that in most cases, the SMEs started using these techniques after 1990, these being their first advance in the quality improvement field, with an aim at maintaining themselves in the market through new operation procedures.

A strong heterogeneity exists among these SMEs as shown by the fact that almost a third of them use less than 20% of the studied eight indicators[2] and ten techniques[3], and a quarter of the enterprises use more than 40% of such indicators and techniques. The most used techniques are: "Problem- analysis tools", "Preventive maintenance", "Quality circles". On the other hand, techniques such as JIT, TQM and KAN-BAN are used by less than 5% of the SMEs.

According to the survey effected by KPMG, product and/or service quality control activities[4] carried out by 66 autoparts manufacturers that answered the questionnaire survey do not substantially differ, since the percentage of manufacturers

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2 The indicators are the following: "Average delivery terms", "Productivity evolution", "Waste percentage", "Proportion of discarded final products", "Stock rotation", "Percentage of rework time", "Evolution of processing products", "Other indicators".

3 The techniques and quality norms of interest are the following: "Problem-analysis tools", "Preventive maintenance", "Quality circles", "Processes statistical control", "Mode analysis and failure effect", "Cells production", "Just in time", "ISO 9000", "TQM" and "Kan ban".

4 The quality control activities: "Document which defines quality policy", "Document which defines the responsibility, authority", "Executive review of the quality system at the specified intervals", "Preparation of the quality manual", "Preparation of the documented procedures", "Preparation of the quality plan", "Documentation of the procedures for controlling and verify design", "Design verification to conform to user needs and requirements", "Inspection and testing of incoming goods", "In-process inspection and testing", "Final inspection and testing", "Maintenance of inspection, measuring and testing equipment", "Control of nonconforming products", "Documentation of the procedures for implanting corrective action", "In-house quality auditor".

that implement each activity range between a maximum 8.3% and a minimum 4.4%. However, the higher percentage relate to the inspection and testing of finished products and products in process. On the other hand, design verification is the control activity with the lowest percentage. This is not surprising, since when the companies identified their weakness, a considerable number of them pointed out design as a weakness.

There is a clear trend towards carrying out a detective quality control aimed directly at the products. In most of the companies no preventive controls are performed and the activities carried out are not aimed at establishing a standard quality system, but rather at a specific control of the products.

d. Quality improvement assistance from clients

Sixty five percent of the autoparts manufacturers surveyed have recently been assisted by clients in matters concerning the quality improvement of their products. The assistance comprises the following five large groups: (i) assistance in continuous improvement programs; (ii) support for obtaining of the ISO 9000 certificate; (iii) quality audit; (iv) courses and training and (v) suggestions for quality improvements.

e. Hiring external institutes to improve product quality

Fifty five percent of the sample autoparts manufacturers hired external institutes during the last fiscal year. They hired mainly consultants working exclusively in the area of quality improvement. many of the small autoparts manufacturers surveyed also sought external support from independent professionals, particularly engineers.

Fifty three percent of the respondent autoparts manufacturers admit that their companies need external organization to support quality improvements.

f. Obtaining the ISO 9000 certificate

Only one of the 39 sample SMEs has obtained the ISO 9002 certificate.

Only one of the 66 sample autoparts manufacturers has obtained the ISO 9002 certificate, it is no coincidence that both of them run their business with foreign investors. Most respondent autoparts manufacturers (82%) answer categorically that they intend to obtain such certificate. The rest said that they did not have the certificate and did not plan to obtain one for the near future.

g. Obstacles and required assistance

Fifty nine percent of those which have some obstacle to conducting quality improvement activities among the sample 39 SMEs mention that the shortage of financial resources is the major obstacle. Other obstacles are the difficulties in changing SMEs culture (30%) and the lack of adequate institutional support (30%).

Twenty eight percent of the sample autoparts manufacturers mention that there is a need of training services in order for them to obtain the ISO 9000 certificate. Twenty percent of the samples want the subsidies for consultant fees and 17% want the subsidies for training fees, in connection with the training services. In addition, 18% of them require the assistance in information services and 17% of them require the assistance through an in-house quality auditor.

3.1.2 Accomplishments and Remaining Hurdles

a. Accomplishments

A number of the surveyed SMEs have been undertaking intensive quality-improvement programs since 1990: for instance, by contracting with private consultants and recruiting quality-control experts. Quality improvement primarily involve the introduction of 5-S programs (the five S's: seiri, seiton, seiso, seiketsu, shitsuke; Japanese terms synonymous with workplace order, cleanliness, and good habit), quality self-control systems, and Poka-yoke ("foolproof") systems in plants.

A majority of the respondents that involve the introduction of 5-S programs, quality self-control systems, and Poka-yoke ("foolproof") systems in plants have demonstrated impressive gains in terms of lowered rates of defective products and heightened productivity. In fact, over the past five years, some have even succeeded in decreasing their defect rates to one-tenth of the past rates.

A substantial part of the sample SMEs still subject their final products to little more than visual checks or inspections that rely only on venire micrometers and other unsophisticated instrumentation. Clearly, top management executives at such enterprises have plenty of room to show a stronger commitment toward supporting their quality improvement activities with appropriate assistance from quality control organizations or consultants.

b. Remaining hurdles

A substantial part of the sample SMEs noted that seminars and training courses conducted by Argentine quality control organizations are not capable of fully satisfying their practical needs. On the other hand, many of the quality control personnel responded that they would participate in the seminars and training courses led by foreign institutions or instructors even if they had to dmanage to find time. These responses suggest that Argentine quality control organizations need to improve the content and quality of their services.

Argentina is a large country with SMEs scattered nationwide. Different regions have different types of SMEs depending on their resources which SMEs use for material. Sometimes, these SMEs form an essential part of the claims from raw materials to the market, be of foreign or domestic. Under the circumstances, limited quality of materials/parts in regions tends to result in limited quality of the final products after being processed/assembled in SMEs. Thus, establishing a national network capable of assisting SME quality improvement activities in an efficient manner remains an important issue.

Despite the expressed desire for quality improvements, a substantial number of SMEs do not have the financial resources to hire outside consultants, which effectively implement training programs and other quality improvement activities. Providing financial assistance to such enterprises thus counts as yet another challenge.

The SMEs which have already cut their defect rates by impressive margins will nevertheless still find themselves pressed to push those rates further to the right and trim their product costs if they intend to stay on top of the global competition. To that end, they must move to enlarge and reinforce their existing quality-control systems and pursue all-out modernization drives aimed at replacing outdated plant facilities. Obtaining long-term, low-interest financing for such undertakings, however, will constitute a formidable hurdle for many.

3.2 Activities of Leading Quality Improvement Organizations

3.2.1 Servicio Brasileiro de Apoio as Micro e Pequenas Empresas

The Servicio Brasileiro de Apoio as Micro e Pequenas Empresas (SEBRAE) was founded in 1972. In 1990, it was given autonomy from federal government control and privatized. SEBRAE has developed a nationwide network led by its head office and comprising 27 state branches, 100 municipal offices, and 360 service centers. It currently provides assistance to some 3.5 million small enterprises.

(1) Total quality program

Managerial capacitation is one of SEBRAE's five service themes, and the "Total Quality in Micro and Small Companies" program is one SEBRAE undertaking with that focus. Given that most U.S.-developed TQM programs tend to be too difficult and generally ill-suited for small enterprises, SEBRAE decided to develop a total quality program of its own that would be both dynamic and easy to understand. The SEBRAE program involves four stages:

(i) Seminars to build awareness of total quality
(ii) Basics and tools for total quality
(iii) Specific training
(iv) Follow-up activities

The second stage alone consists of 14 different modules, with a training period spanning 14 weeks (for a total of 60 hours). Participants are eligible for SEBRAE assistance and may attend the organization's regular meetings for a period of up to 12 months after the completion of their training courses.

The fee for participation in the quality program is $1500. Micro and small companies, however, are eligible for discounts. About 6000 executives and quality-control specialists from not only micro and small companies, but also midsize and large companies, have received training under the program since it was initiated in 1993.

SEBRAE activities range from program development to education and promotional campaigns. Independent consultants are responsible for the practical affairs of supervision at the work sites of corporate clientele.

(2) Subsidies for consulting expenses

Working together with Finnaciadora de Estudos e Projetos (FINEP), SEBRAE furnishes micro and small enterprises subsidies of up to 3000 Reals to cover consulting and training expenses.

It has also been known to extend subsidies to small-scale suppliers who have participated in the P1 program run by Autolatina. In that particular program, five of the small suppliers set up a consortium and contributed the necessary resources. In return, they were offered special discounts by consulting firms. SEBRAE provided each supplier in the group an average $5000 a month in subsidies, and Autolatina coordinated the overall program. Each of the suppliers has registered quality improvements and productivity gains, now bears the full cost of its own consulting expenses, and is engaged in efforts to obtain ISO 9000 certification.

(3) TQC video kit development and sales

SEBRAE has developed a TQC video kit (a 12-week training program) that companies can use to train their employees in TQC skills. It currently markets the kit to micro and small enterprises at a price of $150 per kit. SEBRAE has produced 10,000 kits and still has 5000 in inventory.

(4) ISO-9000 support software development and sales

SEBRAE's San Paulo branch has developed a software package aimed at helping companies satisfy ISO 9000 standards. The package was developed in cooperation with the Brazilian Technical Standards Association (ABNT) at a cost of around $100,000. Each set (consisting of three floppy diskettes) is priced at $190 for micro and small enterprises (roughly half its market price). So far, 400 sets have been sold.

3.2.2 Brazilian Institute of Quality and Productivity (Brazil)

While moving forward with deregulation and the privatization of its state-run enterprises, the Brazilian government in 1990 also launched a "Quality and Productivity Program" aimed at boosting product quality and industrial productivity. The principal goal behind that undertaking is to help Brazilian goods and services meet international standards in terms of price and quality. Over 300 organizations have taken part in the

program, the activities of which are now under way in 16 states. The government also unveiled plans to set up the Brazilian Institute of Quality and Productivity (the IBQP, a five-state organization for improvements in quality and productivity) and to that end, sought technical assistance from the Japanese government.

The Japanese government responded by having the Japan International Cooperation Agency (JICA) send specialists in these fields to Brazil. In September 1993, the Brazilian government formally decided to establish its first IBQP facility in the city of Curitiba, in the province of Parana. The Japanese government followed up by sending a preliminary study team in March 1994, as well as personnel for long-term studies the following October. In January 1995, the first IBQP was set up in Parana, and in April, the Japanese and Brazilian governments formally signed an agreement for project-type technical assistance under the "Brazilian Productivity and Quality Improvement Project."

(1) Project-related organizations

a. Supervisory organization

Ministerio da Industria, do Comercio e do Turismo is the institution representing the Brazilian government in the Brazilian Productivity and Quality Improvement Project.

b. Executive organization

SEBRAE will bear the operating expenses as the institution responsible for project implementation, and strive to ensure that the project's benefits extend nationwide.

(2) IBQP overview

IBPQ National (Brazil) will have its powers focused primarily in the area of coordination. Plans call for setting up quality and productivity centers in the five states covered under the IBPQ program. IBQP Parana was the first of the series, established in January 1995. The network that will link IBQP National with the five state IBQP coordinating centers and other related institutions has been dubbed "the IBQP system." IBQP National will work to extend the benefits of technology transfers in Parana State nationwide. With IBQP National's coordination and assistance, IBQP Parana will train selected staffers from within the IBQP system to serve as personnel for technology-transfer activities.

IBQP Parana will establish a secretariat under its board of directors; the secretariat will comprise separate departments for training, research, public relations, and other functions.

(3) Project duration

The Brazilian Productivity and Quality Improvement Project will have a duration of five years extending from June 1, 1995. Japan and Brazil will jointly evaluate the project's effectiveness in attaining its objectives six months prior to its scheduled end.

(4) Specific areas for technology transfers

a. Personnel management and labor-management relations

Wage management; skills development; labor-management relations; worker participation; productivity concepts; campaigns to foster productivity movements (construction of the IBQP system); organizational development (morale surveys)

b. Workplace-enhancing technologies

5-S programs and small-group activities; proposal systems; basic improvement methodologies; standardization in the workplace; occupational safety and health (risk prediction)

c. Production management

Production planning; production process control; production facility maintenance (including total preventive management, or TPM); industrial engineering (IE) basics; cost accounting and cost control

d. Quality control

Total quality control (TQC); standardization; policy management

e. Productivity surveys and studies

Surveys of corporate management trends; methods of productivity analysis

(5) Japanese implementation framework

a. Long-term dispatch of specialists

-- chief-advisor
-- coordinator
-- personnel management and labor-management relations
-- production site improvement technologies
-- production management
-- quality control
-- productivity analysis and surveys

b. Programs for trainees

Japan will conduct training programs of roughly two months' duration for groups of three to four Brazilian trainees (counterparts) each year.

c. Provision of support equipment

Japan will supply Brazil with the audiovisual and data-processing equipment as well as instructional materials and vehicles required for the pursuit of specialist-led technology-transfer activities.

(6) Brazilian implementation framework

Brazilian personnel will be assigned as counterparts for the technology-transfer activities led by Japanese specialists. Under current plans, 10 permanent counterparts are to be assigned over the project's five-year duration. In addition, plans call for assigning 15 IBQP personnel from other states as temporary counterparts for 2.5-year spans, for a total of 30 temporary counterparts over the full five-year project duration.

Construction work on the IBQP Parana facility is slated for completion in November 1995.

3.2.3 CNPC (Chile)

The government of Chile, the Workers Union Federation (CUT), and the industry and Commerce Federation (CPC) agreed on the creation of a National Center for Productivity and Quality (CNPC). The CNPC will be a tripartite institution (government, businesses and workers), with the participation of the academic sector. Its mission will be to stimulate and mobilize the national effort aimed at raising productivity and quality, which requires a real cultural transformation of the participating bodies involved and of society as a whole.

To begin the functioning of the CNPC the government of Chile has resolved on the creation of a committee in the Agency for Industrial Development (CORFO), which will have a tripartite council: three secretaries of state (Economics, Labor and CORFO; two trade union leaders (president and first vice-president of CUT), and two business leaders (president and director of CPC). As a fund for initial activity the government has agreed to assign 120 million pesos (approximately US$300,000) for 1995; together with various other support to be given by the Institute for Technology Research (INTEC). Additionally, the CNPC is applying for finance from the Fund for Supporting Scientific and Technological Development (FONDEF) for several activities and it will have

contributions from the private sector. Moreover, the government of Chile has presented a request for technical cooperation to the government of Japan, for training of Chilean personnel in Japan, experts specialized on total quality process and technical equipment for the establishment of a national information network on productivity and quality in Chile (approximately US$10,000,000).

The CNPC began to operate with four staffs in April 1995 and the number of staffs will be increased to ten people at the end of the year.

(1) Principal features

The CNPC will be created definitively by a law. The text of the relevant bill is being prepared. The central idea is to constitute a common law trust, which is therefore autonomous from the central apparatus of the state, with a tripartite council of directors. In this manner, the law will make possible the active participation of the ministries and other institutions of the government in the center, being able to effect all kinds of contributions without limitation. But, at same time, the center will have autonomy in relation to the central apparatus of the state.

The goal is not to set up a center which has a large number of personnel and carries out many activities by itself, rather it is to have a substantial capacity to encourage and bring together initiatives in the field which it works in, putting people in contact with each other, and establishing networks of mutual collaboration.

On account of the fact that there is already network of public and private institutions acting in the field of stimulating industrial production and developing technology, the programs to be performed by the CNPC will not duplicate activities. The center will carry out some of its task by itself, while others will be fulfilled by encouraging and supporting other public and private institutions. This function, activating and linking the networks, will be essential in the working of the center. In particular, the CNPC will have relations for working as a complement to the Center for Industrial Productivity, which is organized by the Association of Exporters of Manufactured Goods.

The finance for the CNPC will come from the funds of the government of Chile, from contributions of the private sector, from earnings for services provided and from resources obtained from international cooperation.

(2) Principal activities

a. Program to raise awareness of the CNPC

The central activity during 1995 will be an intensive national campaign for making the initiative for constituting the CNPC and its basic profile known to all the players involved (clients and collaborators of the CNPC at the same time), owner and executive of businesses, workers and union organizations, business associations, regional associations, government agencies, academic centers, private consultants, etc.

This line of work should use all possible means for this; media for communication with the masses (newspapers, magazines, radio, T.V., etc.), forums, seminars, courses, workshops, conferences, etc.

In this activity of teaching and general contacts the CNPC will coordinate with various existing institutions: the business and union groupings, academic centers (universities, institutes, others), governmental agencies and institutions, private consultants. The CNPC will encourage, coordinate, support and, when necessary, finance these activities. Only when there is no institution which cannot be made responsible for it will the CNPC carry activities out directly. But the central guidelines of the activities will always come from the managing leadership of the CNPC.

b. National quality award

It has been decided that the CNPC create the National Quality Award. The terms, the conditions and the rule for the Award are already drafted by a team of outstanding specialists, and it only needs a final revision and approval by the council of the CNPC. The Award will be made in six categories: small, medium and large businesses; producers of goods or of services.

To proceed with this initiative the CNPC will require the support of groups of specialists, academics, businessmen and union leaders.

c. National information network

There will be the establishment of a national network for information and exchange to link about 1,000 government agencies, trade union organization, training centers and academic institutions in the capital and the rest of the country. Through this network, information will be exchanged, and the coordination of activities among all these parties will be generated. Integrating with this network will be the "Red Chile", which already exists, linking about 1,500 people in governmental agencies, businesses, universities, also outstanding Chileans resident abroad.

d. Audio visual education

Studios will be set up and operated to create and edit videos for supporting the performance of courses and seminars about productivity and modernization of the work processes of companies and of labor relations, aimed at business managers, trade union leaders and workers.

e. Studies of productivity by sector

Studies of productivity by sector will be performed, taking international comparison into account. This constitutes an essential basis for well-founded evaluations by trade unions, labor associations, and the public sector of productivity performance in any particular sector, detecting weaknesses and strengths, pointing out the challenges, formulating recommendations, and agreeing on concrete programs.

f. Comparative studies of salaries linked to productivity

There will be encouragement for a cooperation for productivity and quality based on comparative studies of national and international experience of salary systems that give incentives for increases in productivity, and, at the same time, reward workers adequately for their contribution.

g. Tripartite technological missions

A nation movement will be started and encouraged for tripartite technological missions for each field of activity. Their objective will be for business leaders, workers and government officials, with the support of professionals and academics, to know about the experiences of the companies, technological institutes and training centers that are the most advanced in matters of management and technology.

h. Specific proposal

Studies will be carried out with technical and viable recommendations about themes related to productivity and quality; responding their studies to the shared interest of business associations and worker organizations and being used for the design of government initiatives and the drafting of laws.

j. Dissemination of pilot trials

Pilot experiments and trials will be developed and spread with the objective of identifying, studying, following-up and distributing innovative projects and trials involving cooperation between businessmen and workers.

k. Conceptualization of trials and experiments

Regarding total quality, a discipline constantly being created and evolving, the CNPC will encourage the conceptual and methodological systematization and ordering

that synthesized Chilean and international experiments in total quality, with the purpose of formulating useful proposals to academic, professional, business, trade union and governmental bodies.

3.2.4 Fundacion Mexicana para la Calida Total (Mexico)

(1) Overview

The past seven years has seen Mexico enter into a number of free-trade accords that have further opened its economy and markets to foreign trade. As to be expected, competition has intensified, thus underlining the critical importance of total quality as a factor in organizational strategies.

Fundacion Mexicana para la Calidad Total was set up in 1987 as the outgrowth of a proposal put forward in the periodical "Organizational Reform" for an independent nonprofit private sector organization capable of making contributions to corporate enterprises and organizations in all fields of endeavor. As such, its mission lies in "creating a total-quality culture suited to the Mexican business climate, and capable of contributing to Mexico's economic development."

Currently, there are over 1000 members, and the organization is financed by 30 companies, including IBM Mexico and Hewlett Packard Mexico. To date, its staff of 10 officials have sought to foster nationwide acceptance of total-quality principles through efforts aimed at influencing some 2000 opinion-makers in the business, government, academic, labor, and mass-media fields.

(2) Principal activities

a. Surveys and studies

The organization has been engaged in an array of qualitative and quantitative surveys and studies of quality, productivity, and labor and production conditions, and all on a continuing, systematic basis. As one element of that undertaking, it has compiled case studies on total-quality practices in Mexico's corporate sector.

b. Consulting and education

The organization provides corporations with diagnostic systems for their own self-evaluation, and offered member-corporations consulting services aimed at assisting them in the formulation of total-quality systems. In addition, it is engaged in a range of educational programs for the promotion of improvements in quality, productivity, and labor and production conditions.

c. Publications

(Case studies)

Case studies of total-quality practices are performed at a rate of about one company per every half-year. To date, 15 case studies have been completed. The case studies are used by business schools and various industrial organizations.

(Monographs)

The Fund also issues monographs on technologies, concepts, and methods relevant to the quest for total quality. Such monographs are designed to familiarize Mexican corporate and institutional quality-control specialists with theoretically and pragmatically useful information published by counterparts in Mexico and abroad.

(Magazine "Perspective")

Inaugurated in 1993, the magazine Perspective carries case studies and monographs in addition to articles on a variety of total quality related themes. The magazine now has a circulation of 2000-3000.

d. Mexican quality network

Fundacion Mexicana para la Calidad Total has taken the initiative in establishing a Mexican network of organizations devoted to the quest for improved quality. Currently the network consists of 19 pre-existing nonprofit organizations based in various cities nationwide. Each is engaged in total quality surveys, studies, and promotional campaigns.

e. International Network of Quality and Productivity Centers

Since 1988, Fundacion Mexicana para la Calidad Total has been a member of the International Network of Quality and Productivity Centers (NQPC). Established in 1978, NQPC is a network of over 50 nonprofit organizations located across the North and South American continents. Each is engaged in promotional activities and surveys and research on quality, productivity, and labor and production conditions.

NQPC members hold general conferences twice annually to exchange information, experiences, and knowledge and share the benefits of their work.

3.2.5 Union of Japanese Scientists and Engineers

(1) Overview

The Union of Japanese Scientists and Engineers was founded in May 1946. Later, in 1962, it was placed under the jurisdiction of the Science and Technology Agency as a foundation in step with the rapid progress of modern society.

The Union's mission lies in contributing to advances in the cultural and industrial arenas through general backing for activities considered essential to the promotion of science and technology. On that basis, it has been pursuing studies and educational programs concerned with themes in management technology and quality control.

The Union operates on an annual budget of around ¥4.1 billion derived from the revenues it receives in membership fees (¥50,000 per member per annum), seminar participation fees, and through sales of various publications. It enjoys absolutely no subsidies from the government. It currently has a staff of 100, about half of whom are involved in quality control affairs in the broadly defined sense. For that reason, quality control-related projects have become the Union's principal focus of activity.

The organization has its offices in Osaka and Tokyo, but holds seminars in those and other cities as well, including Nagoya and Fukuoka.

(2) Principal activities related to quality control

a. Education and training

(Concerning quality control)

The Union offers courses on varying topics and for all levels of company management, from top executives to employees engaged in actual production routines. As listed below, course topics include the adoption of total quality control (TQC) principles to actual implementation, TQC management, TQC improvements, and methods of statistical analysis.

-- Quality Control (QC) Seminar: Course for directors (4 nights, 5 days)
-- QC Seminar: Special course for company executives (4 nights, 5 days)
-- QC Seminar: Introductory course for company executives and managers (3 days)
-- QC Seminar: Course for managers (12 days: 3 days/month over 4-month span)
-- QC Seminar: Course for section chiefs (6 days)
-- QC Seminar: Basic course (30 days: 5 days/month over 6-month span)
-- QC Seminar: Introductory course (8 days)
-- Quality andFunction Deployment Seminar: Introductory course (4 days)
-- TQC Policy Management Seminar (3 days)
-- QC Seminar: Course for coordinators of TQC promotion activities (6 days)

-- Seminar on Tools for Product Planning (4 days)
-- Seminar on New QC Tools: Course for mid level managers (4 days)
-- Seminar on New QC Tools: Introductory course (3 days)
-- Seminar on New QC Tools for Sales Personnel: Introductory course (4 days)
-- QC Seminar for Procurement and Materials Personnel (10 days: 3 days/month for 2 months and 2 days/month for 2 months)
-- QC Seminar for Procurement and Materials Personnel: Introductory course (4 days)
-- QC Seminar for Sales Personnel (10 days: 3 days/month for 2 months and 2 days/month for 2 months)
-- QC Seminar for Sales Personnel: Introductory course (4 days)
-- QC Seminar for Good Manufacturing Practices (GMP): Introductory course (2 days)
-- QC Seminar for Good Manufacturing Practices (GMP): Applied course (3 days)
-- Software QC Seminar: Course for managers (6 days)
-- Software QC Seminar: Course for engineers (8 days)
-- Software QC Seminar: Course for design and review (3 days)
-- QC Seminar: Course for plant foremen (6 days)
-- QC Seminar: Elementary course for mid-level workers (4 days)
-- International TQC Seminar (5 days)
-- Correspondence Course: "Elementary Course in Quality Control" (6 months)

(Concerning QC circles)

The Union also offers a number of courses on fundamental concepts and implementation strategies for QC circles, for top executives and QC-circle members.

-- QC Circle Course for Executives (1 day)
-- QC Circle Course for Managers (2 days)
-- QC Circle Course for Promoters (6 days)
-- Course for QC Circle Leaders (3 days)
-- Course for QC Circle Leaders in Services and Sales (3 days)
-- Training Course on Initiation and Promotion of QC Circle Activities (1 day)
-- QC Circle Shipboard College Course (13 days)

Altogether, the QC circle courses listed above were held 94 times in 1994, for a total of 7310 participants. To date, the Union has held such courses 1229 times, reaching a total of 147,109 participants.

(Concerning the ISO 9000 series)

In addition, the Union runs several training courses for ISO 9000 series assessors and auditors.

-- ISO 9000 Assessors' Course (5 days)

-- ISO 9000 Auditors' Course (4 days)
-- ISO 9000 Promoters' Course (2 days)
-- ISO 9000 Introductory Course (1 day)

b. Research conferences

(Conferences)

To foster widespread adoption of quality-control practices as well as advances in the field, every year the Union sponsors a number of conferences (listed below), all generally focused on academic and corporate research themes and the benefits of quality control and quality improvement activities including lectures by leading authorities. Many of the conferences on quality control convene in November every year. The QC circle-related conference sponsored by the Union's QC circle headquarters, however, is held six times annually, in venues nationwide.

-- Top Management Conference on Quality Control (1 day)
-- Conference on Quality Control (for managers and staff) (3 days)
-- Spring Conference on Quality Control (for managers and staff) (2 days)
-- Conference on Quality Control (for managers and supervisors) (3 days)
-- Conference on Quality Control in the Service Industry (1 day)
-- QC Circle Conference (2 days)
-- National Conference of QC Circle All-Stars (1 day)

QC circle conferences serve as forums for mutual enlightenment and exchange where speakers have the opportunity to relate their quality-circle experiences before a larger audience of their peers. As such, the conferences have proven immensely beneficial to quality-circle activities in general. In addition to those sponsored by the QC circle headquarters, the Union also holds conferences at QC circle branches, at each corporation, and at each corporation's business offices in Japan. In 1994, it held a total of 177 such conferences, at which a total of 3400 presentations were given, and which drew around 100,000 participants in all. Roughly 390,000 QC circles, altogether representing around 3 million members, are registered with the QC circle headquarters.

Other than conferences per se, the Union also hold gatherings aimed at providing different QC circles opportunities to visit each other's workplace and share views, insights, and experiences.

(Symposia)

The Union also holds the following symposia on a number of regular basis every year. The objective is to have authorities from many fields gather and discuss ways of applying viable new industrial technologies and solving issues of weighty importance.

-- QC Symposium
-- Symposium on Quality and Function Deployment (2 days)
-- TQC Research Group Symposium (1 day)
-- Symposium on New QC Tools for Managers and Staff (1 day)
-- Symposium on Software Production Quality Control (2 days)
-- Symposium on Quality Information Systems (1 day)
-- Presentation of Research Case Studies on New QC Tools (monthly)

c. International cooperation

The Union welcomes numerous guests from abroad who are involved in QC-related affairs, and sends study missions abroad several times each year. In addition, it cooperates with various overseas organizations in jointly sponsoring the annual international QC seminar and annual international QC circle conference.

(The dispatch and reception of study teams)

The Union regularly organizes study teams and sends them abroad each year to investigate international QC trends, and provides study teams from abroad with a general introduction to current Japanese QC practices. Additionally, it helps to arrange plant tours and panel discussions, and handles applications for participation in general conferences on quality control and other events. It has planned the following study teams and training programs for fiscal 1995.

-- QC Circle Shipboard University (13 days)
Destinations: Hong Kong, Taiwan
-- QC Overseas Study Team (15 days)
Destination: Europe
-- QC Circle Overseas Training Team (15 days)
Destination: Undecided
-- Southeast Asia QC Overseas Study Team (12 days)
Destination: Southeast Asia
-- Software Product QC Survey Team (13 days)
Destination: U.S.

(International TQC seminars)

To accommodate growing foreign interest in Japanese TQC concepts and practices, the Union has since 1988 been holding an International TQC Seminar in Tokyo, with English as the official language. In 1992, it expanded on this activity by inaugurating a similar seminar for Spanish-speaking participants. It also occasionally holds TQC seminars in response to requests from China, Brazil, and other countries. In fiscal 1995, it plans to hold its (5-day) International TQC Seminar five times.

d. QC Technical consulting services

On request, the Union conducts in-company seminars and presentations on such topics as quality control, QC systems based on ISO 9000-series standards, and the establishment of QC circles. It also supplies lecturers for such purposes, and offers professional consulting services on technical issues.

(QC diagnostics)

On request, the Union will send teams of QC specialists (Deming Award Committee members) to analyze the effectiveness of corporate QC implementations and offer recommendations on areas for improvement.

(On-site guidance)

On request, the Union will also furnish specialists for site-specific guidance: e.g., at head offices, plant facilities, and other corporate work sites.

e. Publications

The Union publishes two monthly journals: Quality Control (inaugurated in 1950) and QC Circles (inaugurated in 1962).

f. Extension services

(Deming award)

In 1951, the Union set up several Deming Awards to commemorate the distinguished contributions made by Dr. W.E. Deming. The Union's Deming Award Committee is responsible for screening candidates and conferring the awards, which include the following:

-- The Deming Award main prize, for individuals or groups who contribute to the dissemination and development of quality control
-- The Deming Award implementation prize, for companies that have registered improved business performance attributable to the implementation of quality control practices

As of 1994, the committee had conferred the main prize to a total of 57 individuals, and the implementation prize to a total of 141 companies. In 1984, foreign companies were made eligible for the implementation prize, and three have since received it.

(QC Circle Headquarters)

The Union's QC Circle Headquarters has nine branch offices active in 38 districts around Japan. Together, they cooperate in holding conferences for the promotion of QC circles nationwide, symposia, workshops on methods of instituting and promoting QC

circle activities, registering QC circles with headquarters, and providing support services in the arena of QC circle supervision and promotion.

3.3 Forms of Government-based Support for SME Efforts in Quality Improvement

3.3.1 Financing by Financiadora de Estudos e Projectos (Brazil)

Financiadora de Estudos e Projetos (FINEP) is the research and financial arm of Brazil's Ministerio da Ciencia e Tecnologia. Working together with SEBRAE, since January 1995 it has been furnishing credit to micro and small companies for activities in the area of quality control. In particular, it finances expenses for third-party services deriving from the implementation of total quality systems: e.g., consulting services, personnel training, software acquisition, and the development of data necessary for the control of work processes.

FINEP's financing budget for 1995/1996 is 75 million Reals. Companies unable to provide ample credit guarantees can nevertheless take advantage of a credit guarantee fund framework that SEBRAE has established for such cases. Credit terms and conditions are as follows:

- Credit ceiling: 120,000 Reals
- Annual interest rate: 27.75% (the lowest loan rate currently available in Brazil)
- Grace period: 24 months, maximum
- Repayment schedule: 36 months, maximum (following the grace period)
- SEBRAE credit guarantees: up to 90% of the loan sum

3.3.2 Technical Assistance Funds-Quality (Chile)

It is considered that the quality and productivity issue is of key importance for competitiveness in the next decade and that the enterprises show a clear interest in addressing it. For this purpose, CORFO has given an identity of its own to one of its Small and Medium Enterprises technical assistance funds (TAF-Quality) and has promoted together with the private sector and trade union entities, initiatives aimed at fostering the introduction of updated managerial and organizational forms (National Center for Quality and Productivity and Industrial Productivity Center).

This TAF-Quality subsidizes small and medium enterprises from any sector to hire technical assistance for strengthening quality system implementation processes. This fund has been operating for two years and it is granted through bids.

The program has six modules: diagnosis, training in the concept of quality, quality system planning, management process in quality systems, production processes in quality systems and quality project design. The TAF is usually managed by second level agencies, specialized in the area in which they operate. These specialized agencies are called Technical Information Agency (TIA). The TIA of this TAF is CORFO itself, but CORFO is performing its function cooperating with approved industrial associations such as Instituto Textile de Chile. The entrepreneur's contribution to financing increases along the project, in the sense that the first module receives a 75% subsidy with a maximum of up to UF75 (UF1 = US$30 -- as of August 1995), which is gradually reduced in the following modules.

As of today, two bids have been summoned, 200 enterprises applied, and 50 qualified. The eligible enterprises have to meet certain requirements related to legal and financial aspects, and to their managerial development level. Thus, they are eligible through a grand system with different variables set by CORFO. In some cases, the corporation visits the enterprise to evaluate its actual possibilities of implementing a quality system and to suggest alternatives of technical assistance. The most advanced firms benefited by this program are presently in the third module.

3.3.3 The Total Quality Management for Small Business Program (Australia)

The National Industry Extension Service (NIES) is an arm of the Department of Industry, Science, and Technology's AusIndustry division. NIES is engaged in efforts to develop and foster the spread of total quality management (TQM) programs.

NIES has developed the TQM 'How To' Program which is a critical initiative in business improvement. The program presents an Australian interpretation of the worldwide TQM approach and is tailored to meet the needs of individual enterprises regardless of size, industry sector, state of development or current culture.

TQM focuses on problem prevention and favors the gradual approach to change. Management and staff are equally involved in managing and improving the processes that serve customers.

Adoption of the quality process within any given enterprise requires each stage of the continuous improvement process to be addressed in the context of strategic planning, application of technology and human resources. Quality principles form the basis for a powerful set of governing values that influence the decision-making process within a firm.

The TQM program provides a clearly defined operational framework and a step-by-step guide for implementation that enables firms to strategically chart their own course towards cultural changes and sustained quality improvement.

Total Quality Management for Small Business (TQMSB) is another enterprise improvement program which has been adapted to meet the needs of small businesses. It recognizes that satisfying customers through high-quality products and services is critical to small business success in both domestic and international markets. The program has been developed to ensure that it is:

- Flexible
- Low in cost
- Easy to understand and implement
- Practical
- Small business friendly
- Attuned to the way small business operate.

TQMSB provides a clear and logical path for implementing quality programs, with proven success in both service and manufacturing sectors. TQMSB endeavors to assist firms to not only build on their strength and improve the effective use of resources but also to assist them in understanding and managing all facets of their business.

NIES has been helping businesses through the TQM 'How-to' and TQMSB programs. It provides eligible companies subsidy assistance of up to 50% of their expenses for consulting. Although the federal and state governments both provide subsidy shares of 50%, subsidy ceilings differ by the state. (Incidentally, the ceiling is A$50,000 in New South Wales.) NIES has offices in each state, and offers companies advice on selecting consultants suited to their needs.

While the Australian Chamber of Manufacturers gave the TQMSB program high marks, officials of the Victoria state government were not as sanguine in their follow-up assessment. In their words, "Individualism runs strong in Australia. It is often difficult for corporate managers to establish close working ties, and that is a major obstacle." Even if something were done to make the TQMSB program easier for Australian small companies to adopt, those that have yet to establish any system-wide program of quality control would likely find fast-track undertakings in TQM far beyond their capability. In fact few if any Japanese SMEs have apparently adopted TQM principles, either.

3.3.4 Quality and Productivity Improvement Schemes (Malaysia)

The Ministry of International Trade and Industry (MITI) established the Industrial Technical Fund (ITAF) in 1990. Two of the four themes under the fund are being managed by a seven-member team from the Standards and Industrial Research Institute of Malaysia (SIRIM), a MITI arm. (SIRIM is slated for "corporatization" on Jan. 1, 1996, a move intended to help it shake off its bureaucratic colors and revitalize its organizational structure.) One of those themes is the Quality and Productivity Improvement Scheme. It aims to assist small and medium-scale industries (SMIs) in upgrading their product quality, quality systems, and productivity, and in improving their production systems.

a. Eligibility for application

SMIs eligible to apply for assistance under this scheme include those in operation or those not yet in commercial production but possessing production facilities or with access to facilities approved by the government. (Such approved facilities include the Incubator Scheme and the Technology Park). They must also fulfill the following conditions:

- Be involved in manufacturing or service projects directly related to the manufacturing sector;
- Be sole proprietorships or partnerships registered with the Registrar of Business or be incorporated as Sendirian Berhad or Berhad under the Companies Act 1965;
- Have a shareholders fund not exceeding MR2.5 million;
- Have at least 70% of their equity held by Malaysian citizens; and
- Have at least 51% of their equity owned by SMIs or individuals.

b. Form of assistance

Assistance is given in the form of a matching grant where 50% of the project costs is borne by the Government, the remainder being borne by the applicant. The maximum grant under this scheme is MR250,000.

A company that has successfully implemented a quality or productivity improvement scheme may submit a second application to implement another quality and productivity improvement project. The grant allowed for the second application may not exceed the balance of the grant approved for the first application.

c. Eligible expenses

Expenses eligible to be claimed are:

- Involvement costs of the manager or management representatives and assistants during the project implementation period. The maximum costs should not exceed 30% of the total grant approved;
- Consultancy costs;
- Costs of acquiring technology and skills through training, and acquiring information including documents such as standards, technical regulations, directives etc;
- Service costs for related scheme, testing and calibration at SIRIM or other laboratories accredited by SIRIM or recognized by the government;
- Costs of acquiring equipment and software for product design, testing, development, safety, and/or pollution prevention not exceeding 30% of the total grant. This is based on the cost apportioned for the project implementation period;
- Costs of materials used in designing and building prototypes; and
- Incidental costs amounting to 10% of the total grant approved.

The expenses eligible to be claimed do not include materials and equipment for production.

d. Mode of disbursement

The grant may be disbursed directly to the consultant or appropriate party after the company has submitted claims duly verified from the consultant or appropriate party concerned.

Alternatively, reimbursements may be made based on written statements concerning payments made in advance by the company.

- Up to 70% of the total grant approved may be claimed in stages; and
- The balance of 30% will be paid on completion of the project.

All documents concerning payments must be verified by the company's external auditor.

e. Criteria for approval

All applications for grants will be considered based on the following criteria:

- The objective of the project should be to make significant improvements to existing quality systems or production systems.
- Implementation of the project must conform to good development and design practices namely:
  - Effective and well scheduled implementation methods.
  - Technical and physical requirements, cost and time period for the project must be reasonable.

- The development team must possess knowledge of the technical aspects of the product and/or process concerned.

Foreign experts or consultants may be engaged if qualified local consultants are not available. The development work (product quality) must be carried out in Malaysia.

- The potential company should:
  - Show commitment towards quality;
  - Possess production facilities or have access to facilities approved by the government (such as, SIRIM's Incubator Scheme, the Technology Park, or the Innovation Center)
  - Be capable of supporting at least 50% of the development costs;
  - Have a good business record with financial institutions and government agencies.
  - Aim to produce a product which has market potential.

f. Achievements

Total funding for the Quality and Productivity Improvement Scheme stands at MR20 million. Between 1990 and 1995, 272 firms applied for funding under the scheme, and 107 were approved. To date, the approval rate has not climbed beyond 39%, a factor suggesting that the preliminary screening process is rigorous. To date, a total of MR6 million in grants has been extended, so the scheme still has plenty of room for the provision of additional financial assistance.

Perhaps owing in part to the severity of the preliminary screening process, neither MITI nor SIRIM as yet perform any follow-up assessments to gauge project-derived gains in product quality or plant productivity. Though MITI officials demonstrated no interest in performing such follow-up assessments, SIRIM officials concede they are necessary.

So far, reports are that only five or six of the SMIs that received subsidy assistance under the Quality and Productivity Improvement Scheme have since earned ISO 9000 certification.

3.3.5 Technical Adviser-based Assistance in Quality Improvement (Japan)

(1) Gratis assistance

On request from small and medium sized enterprises, local governments will send highly knowledgeable and experienced, prefecturally certified technical personnel to

provide instruction in the development of new products and technologies. Such on-site assignments may last for up to seven days. Qualified advisers will include individuals with at least 20 years of experience in their technical field, or those with professor or assistant-professor status at universities or technical schools.

The national and prefectural governments bear an equivalent 50% share of the expenses from services rendered by these technical advisers. Accordingly, the corporate customer has to pay nothing.

In fiscal 1994, advisers were sent to a total of 181 companies in the Tokyo area alone for assignments of a combined 1129 man-days (an average 6.2 man-days per adviser). The technical assistance services they provided ranged from such areas as design, development, production management, quality control, and equipment troubleshooting. Tokyo's fiscal 1995 budget for this service is ¥27 million (including subsidies from the national government).

(2) Gratis on-site inspections and assistance

In response to requests from small and midsize businesses for technical assistance, small, two- or three-man teams of specialists (e.g., scholars, technicians, private-sector engineers) and technical staff from publicly run testing and research institutions will be assembled, and they will visit plant sites and perform a comprehensive examination of manufacturing technologies and other factors of importance. These teams will then furnish advice on practical measures for technical improvements and assist the company in solving any obstacles it may face in striving to integrate such improvements into its production processes.

Here too, the national and prefectural governments bear a matching 50% share of the expenses from services rendered by these traveling advisory teams. Again, the corporate customer has to pay nothing.

During fiscal 1994, Tokyo had such teams visit and assist 807 companies on request. Its fiscal 1995 budget for this service was ¥16 million (including subsidies from the national government).

3.4 TQC Systems of Selected Recipients of the Deming Prize for SMEs: Japanese Case Studies

3.4.1 Company D

(1) Company background

Following on development work initiated the preceding year, in 1937 Company D became the first manufacturer and seller of automotive ignition coils in Japan. Though at least 40 companies were active in the field by the 1940s, Company D maintained its emphasis on quality in a market known for shoddy merchandise, and thus remained as the only independent maker. Indeed, it still maintains its top ranking in the market to this day.

Drawing on its technical prowess in electronics, in the 1960s Company D moved to expand its business scope by developing controllers and ignitors for air-conditioning units. Though a rival firm at the time dominated the market for air-conditioning unit controllers, Company D gradually earned recognition in the marketplace for its position of placing quality first and ultimately grabbed top market share.

In FY1994, it won the Deming SME Prize for its accomplishments as a company that had implemented TQC principles and shown impressive business gains as a result. As such, it will likely serve as a model for other SMEs striving to establish TQC systems of their own.

Company D currently employs a work force of 719 (average age: 30), and in the business year to Nov. 30, 1994 registered sales of ¥17.5 billion.

(2) TQC system

a. The TQC implementation process

Under the leadership of its president, in early 1980 Company D introduced TQC principles aimed at lifting the overall quality of its products and services still further, and in building an energetic workplace in which all its employees would be actively involved. Initially, however, there was little or no internal consensus of support for the program, and it accordingly lacked direction and a real sense of momentum. Nonetheless, the company continued holding their company-wide presentations of top QC circles twice yearly, and at last count had held 30 such events in all.

However, Company D proved unable to keep pace with the expanding workload that had accompanied its rapidly growing business scope and its development of new products and technologies in the late 1980s. And as a result, it suffered a shortage of qualified management personnel and experienced deficiencies in its ability to execute certain business tasks. These shortcomings in turn brought problems in product quality to the surface. As claims against the firm accordingly mounted, customer confidence declined. Eventually, Company D had to idle more of its facilities and its products suffered increasingly from chronic lapses in quality.

In 1991, it set up a TQC Promotion Office (reorganized into the TQC Promotion Headquarters in 1993), which, working in tandem with other TQC-related bodies, set about the task of actively addressing and resolving the above-cited problems.

Company D sought to alter and improve its corporate character by shifting from its passive stance as a firm striving merely to accommodate customer needs, to that of an active purveyor of solutions that harnessed its own technologies. As such, it focused the priorities of its TQC activities in the following areas:

(i) Comprehensive forms of policy management aimed at achieving the goals of its long-term business policies
(ii) Adequate frameworks for quality assurance hinged on the introduction of new products and technologies, and
(iii) The cultivation of human resources capable of exercising their creative strengths and showing initiative in tackling and solving problems.

b. Organization and operation

Company D has set up a secretariat responsible for TQC program planning and promotion, and placed it under the jurisdiction of its TQC Promotion Headquarters (headed by the company president himself at the time the company won its Deming Award).

In addition to these permanent organizational structures, the company has also established several TQC-related committees.

(i) The TQC Promotion Headquarters Conference
Principal functions: deliberations and decisions on key issues having to do with the promotion of TQC.
Chairman: company president
Members:
administration directors

business division directors
appointed department managers
Frequency of meetings: once per month
Secretariat: TQC Promotion Headquarters Secretariat

(ii) TQC Promotion Committee
Principal functions: deliberations on, and the promotion of, TQC activities in each company business division
Chairman: business division director
Members: department and sectional managers
Frequency of meetings: once per month
Secretariat: Production Department

c. Policy management

As its fundamental position on policy management, Company D aims to implement its five-year business strategy on 1) a fiscal year basis, and 2) a divisional basis, and achieve its desired business objectives on the basis of a company-wide "3-3 Movement."

Though teams of management executives within the company had been responsible for policy-related deliberations and decision-making prior to 1990, their actions did not initially have adequate understanding from all layers of the internal management hierarchy, and also, were not very consistent with policies set by the lower echelons. To remedy these shortcomings, in 1991 Company D instituted a three-level program of group discussions and adopted a new framework for policymaking that would be driven by a deeper mutual awareness of current business conditions and a consensus on the company's future direction. Specifically, responsibilities for deliberation-based policymaking were appropriated in the following manner.

(i) Fiscal year policies: the president, other managing directors, and business division directors
(ii) Business division policies: business division director, department managers, and section managers
(iii) Department policies: department manager, section managers, and supervisors.

Further, to improve the cohesion of policies established at different levels, in 1992 the company initiated a thorough process of vertical, "catch-ball style" dialogue among its various management echelons and in 1994 adopted a formal policy matrix.

These actions enabled it to put together a framework for the formulation of policies exemplified by improved feasibility.

Prior to 1990, the company's policies typically proved lacking in realism, and placed priority almost exclusively on the achievement of numerical objectives. Largely for that reason, they failed to win the understanding and support of employees engaged in the actual production stages, and ultimately met with relatively little success. In 1985 the company launched its so-called "3-3 Movement" as a means of improving the problem-solving abilities at the mid level management level, and as a vehicle for policy enforcement.

To deal with those drawbacks, since 1991, the company has sought to bolster the feasibility of its policies by utilizing the movement as an all-out vehicle for policy enforcement. Under the 3-3 Movement, section managers draw up programs to put department policies into effect. Every three months, three program themes are selected for refinement. Also, to provide additional stimulus to activities, the company holds a special week-long 3-3 Movement Guidance Conference every three months. The conference is for outside TQC specialists and all managing directors other than the president, and is aimed at prioritizing issues on the agenda for attention and informing them of outcomes of all program themes.

The President's Award as well as awards for ingenuity are conferred on employees who demonstrate commendable results in the 3-3 Movement. The company has also worked to spur employee enthusiasm in other ways: for instance, in 1993 it held a company-wide presentation program under the auspices of its QC circles and the 3-3 Movement. (Operations were shut down for that event, which had the participation of all employees.)

For some time, monthly checks and on-site inspections by the president were the principal methods by which the company sought to gauge its progress in policy management affairs. However, measures or actions to deal with the problems uncovered by these approaches proved time-consuming and often simply fizzled out. To remedy that situation and develop more-practicable measures, in 1992 the company began requiring that proposals for improvements in areas deemed problematic be submitted to the president, and that business division management committees monitor the implementation of any remedial actions ultimately pursued. Furthermore, the company initiated formal reviews of its fiscal business policies starting in 1991, and since then has also taken steps to reflect the findings of its quarterly 3-3 Movement Guidance Conference in policies for the next fiscal year, and in the activities of the 3-3 Movement,

as well. These actions have together enabled Company D to achieve what it terms a smooth "PDCA" ("Plan, Do, Check, Action") cycle.

d. Human resources development

To cultivate its human resources, Company D has followed a number of strategies, including in-company educational programs for different levels, that is, for employees ranging from young recruits to seasoned workers. In addition, it has applied on-the-job training and has had its employees participate in outside training programs conducted by the Union of Japanese Scientists and Engineers, among other organizations. These efforts have enabled it to cultivate qualified engineering personnel rather quickly, particularly for the more-technical areas of its business.

What is more, it is striving to familiarize its employees with the methods of statistical quality control (SQC) taught by the above-cited Union, and to that end conducts in-company study seminars for participating groups of around 5-10 employees every year.

e. General benefits

Since adopting its TQC system in earnest in 1991, Company D has registered a number of tangible benefits, as follows:

(i) In keeping with its policy management strategy, the company has geared its 3-3 Movement to the solution of management-related issues. As a result, despite the collapse of Japan's economic bubble, it has witnessed gains in its sales of new products, its customer base, and its gross-profit ratio.

(ii) By striving to build in added quality through strengthened design review (DRs), pursuing product quality improvements through adequate process control, and engaging in activities aimed at preventing the recurrence of lapses in product quality, the company has cut customer claim rates as well as the absolute number of claims, and has since been honored with awards for quality excellence by various foreign carmakers.

(iii) Employee training programs and headway in the 3-3 Movement have effectively boosted the number of industrial property rights applications and proposals for improvements. In addition, the company's QC circles have become much more energetic in pursuing their own activities.

Furthermore, the company has also witnessed a number of intangible benefits.

(i) The philosophy of placing quality first extended company-wide, while improvement activities and management practices that emphasized the company's traditional sources of strength spread and took root.

(ii) TQC activities helped the company heighten awareness of QCD ("quality, cost, delivery") principles and implement a smoother PDCA cycle for the promotion and achievement of policy management goals.

(iii) Company D found itself better positioned to pursue its fiscal policies within terms of its long-range business policies; in addition, its employees were empowered to apply their efforts toward achieving the company's business targets.

3.4.2 Company K

(1) Company background

Founded in 1946, Company K is a manufacturer of functional automotive components. Many of its products have found their way into practically all Toyota's car models as well as some models of other carmakers, including Mitsubishi and Mazda.

From its foundation in the metal lathing field, Company K has been working to build its business on the following strengths: (i) the development of technologies and processes for lathe-based precision grinding; (ii) the provision of quality assurance and technologies for integrated manufacturing from the parts-cutting to subassembly stages; and (iii) prowess in designing and producing tools and specialized machinery for the manufacture and maintenance of its products.

Like Company D, it received a Deming SME Prize in FY1994, and will likely serve as an exemplary model for other SMEs striving to establish their own TQC systems.

Company K currently employs a work force of 302, and had sales of ¥17.4 billion in the business year to Sept. 30, 1994.

(2) TQC system

a. The TQC implementation process

Having focused its metal-lathing business in the processing of automotive parts, Company K built on its corporate scale as the automotive industry thrived and advanced. However, as carmakers intensified their competition for market share and the spiraling yen eroded the cost-competitiveness of Japanese-made products, Company K's customers became increasingly uncompromising about the issues of quality and cost.

To accommodate them, the company decided to expand its post-lathing processes and viewed quality assurance as the hurdle of highest priority then confronting its business. Leaping beyond that hurdle and strengthening its foundations thus demanded that Company K do several things. First, it was essential that all levels of management--from top executives to managers and supervisors on down--align themselves and help build a solid consensus regarding the company's future course. Second, in contrast with the essentially passive, haphazard path it had followed to date, the company was compelled to focus on its management processes and think and act on the basis of hard data.

Accordingly, convinced that TQC principles would be the quickest and most effective means of achieving those goals, it implemented its own TQC system in 1989.

b. Organization and operation

Company K reshuffled itself organizationally in tandem with the introduction of its TQC system. It set up a TQC Promotion Office (the directorship of which was filled concurrently by senior managing directors), put together a framework for policymaking activities shaped by QC principles, improved its budget-management capabilities, standardized internal rules and regulations, and in other ways sought to strengthen its management foundations.

The TQC Promotion Office currently has the responsibility of promoting TQC activities company-wide, formulating the company's fiscal policies, and conducting QC training programs for employees in different ranks of the management hierarchy.

Company K has also set up a couple of additional TQC-related bodies: its Management Conference, and a Policy Monitoring Conference (which meets once a month).

c. Policy management

In keeping with its fundamental philosophy of "quality above all," Company K has sought to develop its own, independent manufacturing methods by elaborating on the pre- and post-lathing processes for its products. Further, to maintain its competitive

edge, the firm adopts a new, strategic vision every five years and has an established, long-term business plan. To achieve the objectives of that plan, it drafts and implements company-wide business policies on a fiscal basis.

In formulating its fiscal policies, the company strives to address issues arising from a review of the performance of each division the year before, and takes into account such factors as the business environment and customer trends. The TQC Promotion Office draws up the policy proposals, and the company's top executives determine their fate.

Fiscal policies are put into action on either a monthly or half-year schedule through implementation programs at the departmental and sectional levels. Once every month, the Policy Monitoring Conference convenes to measure the progress of those programs and the extent to which their targets have been met, and to give them clearer direction, if need be. Top company executives conduct general evaluations of the company's policy implementation efforts twice per annum.

d. Current efforts in quality control

Company K's programs and follow-up activities in the arena of quality control now span company-wide: from sales and procurement to manufacturing technology, production, and quality assurance. Furthermore, its fundamental position is that quality assurance comprises the following: establishment of an assurance framework adapted to process expansion with priority on activities aimed at building in quality from the preliminary tooling stage to the initiation of actual mass-production; maintaining the levels of quality derived therefrom; and by so doing, striving to live up to the trust placed in it by its customers.

To give an example, in tooling up for production in FY1992, the company's quality assurance activities were characterized by the following priorities, levels of implementation, results, and challenges. Priorities, per se, were shaped on the basis of company policies for FY1992 as well as issues faced the previous year.

Priority 1: Clarify methods of quality-assurance for the purpose of satisfying newly defined quality criteria by putting more strength into preliminary studies.

Implementation: Having accepted orders for subassembly components that it had no past experience with, Company K found it essential to assure that various new quality criteria were met at the post-assembly stage. Its Quality Assurance Division was placed in charge of that undertaking, and in that role engaged in a dialogue with customers to

define specifics and criteria for quality assurance, and compiled an itemized list of subassembly-component quality-assurance criteria to be met.

Next, working in tandem to lay out clear methods of quality assurance for the processing stages, the responsible company departments devoted study to pertinent process-control criteria and objectives, and came up with a set of clear guidelines for implementation. Altogether, these actions had the effect of clarifying the new quality assurance criteria to which the company had committed itself.

Priority 2: Establish comprehensive checks against repeated failures in quality control by putting more weight into pre-production studies and monitoring.

Implementation: Reviewing the oversights of quality-control studies and monitoring efforts the year before, the company moved to draw up an itemized list of criteria for scrutiny prior to setting plans for production and product inspection, and, on the basis of problems anticipated or already experienced by its divisions, highlighted areas deserving extensive improvement. Supervisors in its Manufacturing Technology Department devoted attention to the effects of these actions in their preliminary studies and reflected the findings in their production plans. Additionally, meetings devoted to the study of slated production and inspection programs examined and approved proposed improvements and thereby sought to minimize the recurrence of lapses in product quality.

Benefits: Company K succeeded in putting together a quality-assurance framework that effectively accommodated a range of new quality criteria. In addition, by incorporating the findings of preliminary studies into its production plans, it established a set of firm safeguards against any new lapses in quality.

Remaining hurdles: Defects were detected during the initial processing stages for certain products in FY1992. That suggests the company did not adequately study individual component characteristics that would have provided it a better grasp of subassembly characteristics, per se. Accordingly, the company has been confronted with the necessity of developing a solid understanding of the impact that individual components can have on the complete product, and establishing clear strategies of quality assurance for all stages of the production process that will enable it to meet quality criteria demanding guarantees.

e. General benefits

Since implementing its TQC system in 1989, Company K has registered steady advances in its sales performance, cost-cutting drives, and quality-assurance programs.

In addition, to adapt to the changed business environment following the collapse of Japan's asset-inflated economic bubble, it has successfully shifted from a sales-oriented to profit-oriented management philosophy. Among the specific benefits:

(i) Though sales growth remained essentially flat from FY1989 to FY1993, the company registered gains in current profit by lifting value-added productivity.

(ii) During that time-span, the company experienced not even one instance of a serious problem with product quality, and registered zero delays in product delivery.

(iii) Its employees submitted an increased number of creative and resourceful proposals.

In addition, the company also witnessed several intangible benefits.

(i) Business programs were put into effect with the active participation of divisional directors, not just top company executives. This approach allowed all management echelons to better align themselves and lead the company's operations together.

(ii) By developing new methods and putting together a framework for effective quality assurance at all stages of each manufacturing process, the company laid the groundwork for the production of subassembly components, which is its future mainstay business.

(iii) Problem-solving undertakings by each division, together with routine process-control activities, have fostered company-wide acceptance of quality-control principles.

3.5 Recommendations to the Argentine Government

In order to overcome the hurdles mentioned in 3.1.2, the impelkementation of following measures is recommended. Those measures are essential that Argentine SMEs could improve quality of their products, secure their competitive edges and achieve exports.

All of those measures are applicable to Argentina and should be undertaken within a couple of years. At the implementation, the foreign cases mentioned in 3.2, 3.3 and 3.4 are very helpful, especially Japanese assistance to IBQP project in Brazil, the establishment of a nationwide network in Brazil and Mexico, and the subsidy system to SMEs' quality improvement projects. The development of practical programs and establishment of a nationwide network among the following recommendations should be implemented at the same time to take more effective. From the viewpoints of necessary amount of investment fund and the necessary time span to produce effectiveness, the order of the priority of the following recommendations will be a, b, d, and then c.

a. Development of practical programs in Argentine quality-control research and education organizations

Japan's experience shows that companies can fully recover the costs that have to bear in their quality control activities at least in its earlier stage if they are guided rightly. It is also proved in Argentina by the fact that some surveyed SMEs have demonstrated impressive gains in terms of lower rates of defective products. Their activities primarily involve the introduction of 5-S program, quality self-control systems and Poka-yoke ("foolproof") systems in plants.

Many of the SMEs are wishing for more practical seminars and/or training courses that have an immediate effect. Argentine quality-control organizations need to develop such seminars and courses. The seminars and courses should include the benchmarking of those successful SMEs. A study is necessary to identify the ways to improve their contents to meet the SMEs' needs. In order to improve services of their quality-control organizations, the Brazilian and Chilean governments have sought technical assistance from the Japanese government. In Brazil, the technology transfer on TQC, standardization and policy management has already started as an essential part of IBQP project. If Argentine quality-control organizations have some difficulties to develop the seminars and training courses that SMEs need, they should work together with organizations, be domestic or foreign, highly specialized in the quality improvement activities.

b. Establishment of a nationwide network for quality improvement services

Argentina is a relatively large country with SMEs located nationwide. Most SMEs naturally would prefer to have access to assistance at the local level. To that end, the government should support the establishment of provincial foundations similar to the one in the city of Rafaela, equip them with their own quality-improvement centers, and build a nationwide quality-improvement service network that links each of these centers with the aforementioned organization for quality-control research and education in Buenos Aires. Mexico, for instance, has put together a comparable network connecting the Fundacion Mexicana para la Calidad Total in Mexico City with 18 regional quality centers around the country. In addition, Brazil's IBQP has plans to connect with a nationwide SEBRAE network and offer its services in areas outside the five states where it will have offices.

c. Subsidies for SMEs quality-improvement projects

Some SMEs have followed ambitious programs in quality improvement since 1990, e.g., by contracting with private consultants or recruiting outside quality-control experts. And as a result, they have shown appreciable gains. Nonetheless, many SMEs, despite being strongly interested in quality improvement, per se, still lack the financial resources to translate that interest into action. It thus seems imperative that the government explore potential frameworks for subsidizing the consulting and training costs such SMEs could be expected to face. It would financially be efficient to limit the provision of subsidy to those SMEs being strategic in expanding export and supporting FDIs. As it happens, Chile, Australia, and Malaysia already run programs of that kind, effectively subsidizing from 50 to 70 percent of the costs accrued from corporate quality-improvement projects.

Additionally, the Argentine government needs to consider streamlining application procedures and easing credit terms for the present public loans companies seek as financing measures aimed at helping them gain ISO 9000 certification.

d. Development of a system to supply SMEs with long-term, low-interest financing

Even the SMEs which have already cut their rates of defective products by impressive margins still face the necessity of pushing those rates down by the further single-digit range if they intend to acquire a competitive edge in the global marketplace on into the years ahead. To that end, it is essential that they move to enlarge and reinforce their existing quality-control systems and pursue all-out modernization drives aimed at replacing outdated plant facilities. Most such firms do not have enough capital on hand, however, to cover the necessary levels of investment these undertakings would likely

demand. Accordingly, it is strongly hoped that the government will erect a system for the supply of long-term, low-interest financing.

Appendix to Chapter 3

Appendix to Chapter 3

1. ISO 9000

Total quality management/total quality control is nearly a synonym for company-wide quality control. The concepts and reqirements of ISO 9001 or Deming Application Prize mean company-wide quality control, so they are assumed to be specific models of total quality management/total quality control. If Argentine SMEs that already carried out quality control systems and activities in plants enough want to introduce total quality management/total quality control, it is recommended that they challenge ISO 9000, Deming Application Prize for Overseas Companies and so forth. Other SMEs should begin with quality control systems and activities in plant not with total quality management/total quality control.

The ISO 9000 series is a group of quality management/quality assurance standards that International Organization for Standardization has instituted. This series is comprised of a total of five different standards.

Any one can buy a product certified to be in compliance with a nationally enacted quality assurance standard without a quality concern. This holds true also in the world of international trades. However, the quality concepts and requirements naturally differ nation-to-nation. For this reason, it could very well happen, for instance, that an article, though it conforms to the standard of its supplier country, may not necessarily meet the standard of its purchaser country. In consequence, an increasing number of companies everywhere in the world today look to and actively use this ISO 9000 series as something acceptable world-wide, and seek more practically some third party recognition that they conform to the ISO standards, eying the conformance as one of the business prerequisites.

The ISO 9000 series, as stated earlier, includes five standards. Among them, ISO 9001, ISO 9002 and ISO 9003 are the quality assurance standards to which a company or registrant aspirant is to be audited and registered. The scope of the quality audit elements differ somewhat between these three, i.e., ISO 9001 is the most extensive of the three and does include all such elements of ISO 9002 or ISO 9003 and something more. ISO 9000 provides a guide as to which standard should be selected to receive an audit on. ISO 9004, on the other hand, provides some general guidelines and methods for a company to consider in its carrying out of in-house quality management activities.

ISO 9001 is the standard applicable to a quality assurance structure that performs design, development, production, installation and servicing. This standard is so extensive in its scope that it includes everything specified of ISO 9002 and ISO 9003 (plus a few more things). It is, however, no specification for any particular product.

To be certified to ISO 9001, it is necessary for a company to have its quality assurance system audited by an accredited certifying body. This requirement is the same when a company desires to be certified to ISO 9002
or ISO 9003.

The auditee company must, of course, be performing such quality assurance activities as are specifically required by ISO 9001. Simply stated, no ISO certification shall ever be granted to an organization who carries out its own quality assurance activities self-styled at variance with the quality assurance requirements that ISO 9001 specifies. This is by no means to say that a company cannot build a quality assurance system unique to its company. Unless a conmany is so aggressive that it dares go beyond simply conforming to the requirements of a standard to explore into some unrivaled quality endeavors of its own, the company cannot ever hope for a level of quality assurance performance high enough to excel over its competitors.

ISO 9001 specifies a total of 20 quality system elements. Each such quality system element describes the ISO 9001 requirements more specifically and in greater detail. Something unique to the ISO 90001 requirements is that activities are often required to be "written into a procedure", "documented", and/or "recorded". Another focus in the standard is "verification", which it specifies to be done for a wide range of quality-related activities.

Table VI-A3-1 ISO 9001 Quality System Elements

1. Management responsibility	11. Control of inspection, measuring and test equipment
2. Quality system	12. Inspection and test status
3. Contract review	13. Control of nonconforming product
4. Design control	14. Corrective and preventive action
5. Document and data control	15. Handling, storage, packing, preservation and delivery
6. Purchasing	16. Control of quality records
7. Control of customer-supplied product	17. Internal quality audits
8. Product identification and traceability	18. Training
9. Process control	19. Servicing
10. Inspection and testing	20. Statistical techniques

After a company is certified to an ISO 9000 series standard and so registered, then it will, as a conforming and registered supplier, receive a periodic surveillance at the

frequency of once every six months after certification. Here the company will be audited as to whether it continues to meet the requirements of the standard. The focus of this audit is more on the effectiveness and fruits of its quality system than the initial audit (with its focus more on compliance). In the report of this surveillance audit its quality improvement efforts in both trends and activity status and major quality issues facing the company are also assessed. These assessments further lead to the evaluation of the company's handling of customer complaints/claims to date, the status of implemented corrective actions, the results of internal quality audits carried out, etc., all of which are combined to arrive at an overall evaluation of the company's quality system. To add to all this, a total renewal audit takes place once every three years.

2. Deming Prize

Immediately after World War II, Japan's foremost task was to raise its standard of living through economic rehabilitation. To achieve this objective, it became essential for the country, which is quite short on natural resources, to increase exports. The impression that prewar, made-in-Japan products were cheap in both price and quality had to change. To do this as effectively and concretely as possible, information about quality control was disseminated throughout Japan that met the need of the time. In July 1950, Dr. W. E. Deming, the foremost promoter of quality control in the United States, was invited to Japan by the Union of Japanese Scientists and Engineers (JUSE). Upon his visit, Dr. Deming taught statistical quality control through his "Eight-Day Course on Quality Control" and through other courses as well. His teaching provided great impetus to quality control in Japan, which was in its infancy.

To commemorate Dr. Deming's contribution and friendship in a lasting way, and to promote the continued development of quality control, Deming Prize was established in 1951 by a resolution of JUSE's board of directors.

As a consequence, quality control in Japan has evolved into company-wide quality control, or total quality management, has been remarkably and widely disseminated throughout Japanese industry and has drawn considerable attention world-wide. In the industrial sector, the number of companies that want to apply for the Deming Prize, and want to improve their level of quality control activities through the effort required to win the aprize, has been increasing. The reputation of Deming Application Prize-winning companies has been enhanced, not only domestically but internationally as well. As a result, the significance of the Deming Prize has been considerably heightened since the time of its inception. To say the least, the Deming Prize has greatly contributed to industrial development in Japan.

The categories of the Deming Prize are: the Deming Prize for Individuals, the Deming Application Prize and the Quality Control Award for Factories. The Deming Prize for Individuals is given to those who have made outstanding contributions in the study, application and dissemination of company-wide quality control using statistical methods (CWQC). The Deming Application Prize is awarded to companies or divisions of companies that have achieved distinctive performance improvemrnt through the application of CWQC. The Quality Control Award for Factories is awarded to factories or plants that have achieved distinctive performance improvemrnt through the application of quality control in the pursuit of CWQC.

Because its initial purpose was to encourage the development of quality control activities in Japan, the Deming Prize was at first restricted to Japanese companies. In recent years, however, strong interest in the Deming Application Prize by non-Japanies companies has surfaced. The Deming Prize Committee, therefore, established the Deming Application Prize Administrative Regulations in 1984 to allow overseas companies to apply for and receive the Deming Prize upon successfully passing the examination.

The Deming Application Prize is an annual award presented to a company or division of a company that has achieved distinctive performance improvemmts through the application of CWQC. Quality control activities examined for the Deming Application Prize are company-wide and are defined as follows:

CWQC is a set of systematic activities carried out by the entire organization to effectively and efficiently achieve company objectives and provide products and services with a level of quality that satisfies customers, at the appropriate time and price.

a. "Systematic activities" means organized activities that involve everyone at all levels and all pats of the company. Such activities are led by management and guided by establishing appropriate quality strategies and policies.

b. "Carried out by the entire organization to effectively and efficiently achieve" means it is necessary to use appropriate scientific methods, including statistical techniques, and to repeatedly rotate the management cycle of PDCA (plan, do, check and act) to maintain and improve the quality of jobs and human resources that are involved in the process of "providing" as mentioned in item 4. In maintaining and improving the quality of jobs, CWQC activities address not only the quality (Q) of products and services, as mentioned in item 5, but also cost (C), quality and delivery (D) safety (S) and motivation (M). In

maintaining and improving human resources, not only education and training but also self- and mutual-development are important.

c. "Company objectives" refer to securing approproate profit for the long term. Also, they include contributing to the happiness and satisfaction of customers, society, and employees.

d. "Provide" refer to activities from producing "products and services" to handing them off to the customers, including survey, research, planning, development, design, product preparation, purchasing, manufacturing, installation, inspection, order-taking, sales and marketing, maintenance, after-sales services, and disposal and recycling after usage.

e. "Products and services" include manufactured products (finished products and parts and materials), system products, software, energy, information and all other benefits that are provided to customers.

f. "Quality" refers to usufulness (both functional and psychological), reliability and safety. Also in defining quality, influence on the third parties, society, the environment and future generations must be onsidered.

g. "Customers" include not only buyers but also users, consumers and beneficiaries.

Two or more examiners selected by the Deming Application Prize Subcommittee will conduct the on-site examination, with reference to Description of QC Practice. The subcommittee will review examination findings based on results achieved and will report these to the chairman of the Deming Prize Committee. The chairman then reviews the findings with the Deming Prize Committee and designates each applicant company's status as passing or "continued examination." The applicant is informed of the determination. The evamination process is not open to the public.

On the basis of 100 possible points, all of the following conditions must be met to pass the examination.

a.	The executive session	70 points or more
b.	Whole company average, excluding the executive session	70 points or more
c.	Any examined unit	50 points or more

A checklist for the examination was developed to clarify the examination items for the Deming Application Prize. The checklist should be used as reference material for organizations that promote quality control and that challenge for the Deming Application Prize as follows.

a. Policy

- Quality and quality control policies and their place in overall business management

- Clarity of policies (target and priority measures)
- Methods and processes for establishing policies
- Relationship of policies to long-and short-term plans
- Communication (deployment) of policies, and grasp and management of acheving policies
- Executives and managers leadership

b. Organization

- Appropriateness of the organizational structure for quality control and status of employee involvement
- Clarity of authority and responsibility
- Status of interdepartmental coordination
- Status of committee and project team activities
- Status of staff activities
- Relationships with associated companies (group companies, vendors, contractors, sales companies ,etc.)

c. Information

- Appropriateness of collecting and communicating external information
- Appropriateness of collecting and communicating internal information
- Status of applying statistical techniques to data analysis
- Appropriateness of information retention
- Status of utilizing information
- Status of utilizing computer for data processing

d. Standardization

- Appropriateness of the system of standards
- Procedures for establishing, revising, and abolishing standards
- Actual performance in establishing, revising, and abolishing standards
- Contents of standards
- Status of utilizing adhering to standars
- Status of systematically developing, accumulating, handing down and utilizing technologies

e. Human resources development and utilization

- Education and training plans and their results
- Status of quality consciousness, consciousness of managing jobs, and understanding of quality control
- Status of supporting and motivating self-development and self-realization
- Status of understanding and utilizing statistical concepts and methods
- Status of QC circle development and improvement suggestions
- Status of supporting the development human resources in associated companies

f. Quality assurance activities
- Status of managing the quality assurance system
- Status of quality control diagnosis
- Status of new product and technology development (including quality analysis, quality development and design review activities)
- Status of process control
- Status of process analysis and process improvement (including process capability studies)
- Status of inspection, quality evaluation and quality audit
- Status of managing production equipment, measuring instruments and vendors
- Status of packaging, storage, transportation, sales and service activities
- Grasping and responding to product usage, disposal, recovery and recycling
- Status of quality assurance
- Grasping of the status of customer satisfaction
- Status of assuring reliability, safety, product liability and environmental protection

g. Maintenance/control activities
- Rotation of management (PDCA) cycle
- Methods for determining control items and their levels
- In-control situations (status of utilizing control charts and other tools)
- Status of taking temporary and permanent measures
- Status of operating management systems for cost, quantity, delivery, etc.
- Relationship of quality assurance system to other operating management systems

h. Improvement activities
- Methods of selecting themes (important problems and priority issues)
- Linkage of analytical methods and intrinsic technology
- Status of utilizing statistical methods for analysis
- Utilization of analysis results
- Status of confirming improvement results and transferring them to maintenance/control activities
- Contribution of QC circle activities

i. Effects
- Tangible effects (such as quality, delivery, cost, profit, safety and environment)
- Intangible effects
- Methods for measuring and grasping effects
- Customer satisfaction and employee satisfaction
- Influence on associated companies
- Influence on local and international communities

j. Future plans
- Status of grasping current situations

- Future plans for improving problems
- Projection of changes in social environment and customer requirements and future plans based on these projected changes
- Relationships among management philosophy, vision and long-term plans
- Continuity of quality control activities
- Concreteness of future plans

3. Quality Control Systems and Activities

a.5-S Programs

5S stands for Seiri (sorting), Seiton (putting things in order), Seiso (cleaning), Seiketsu (cleanliness) and Sitsuke (making a good habit). The name comes from all these virtues each beginning with s when written in Japanese.

Production mottoes such as quality improvement, cost reduction, delivery-time making, safety enhancement, earning rate hikes and what not are all strived for by first carrying out the foregoing 5Ss thoroughly. Among the 5Ss, Seiri (sorting), Seiton (putting things in order) are the very fundamental of all fundamentals, meaning no less than going all the way yet one more time putting tools, parts, etc., in shape on the production floor. Seiso (cleaning) is the exhortation to do the daily sweep-up thoroughly, a precondition to anything more involved, say, innovation. Seiketsu (cleanliness) represents a level to be achieved by the preceding 3Ss, while the last S, sitsuke (making a good habit) is the means to perpetuate in everyone's deeds all these preceding 4Ss. The 5S drive should not only be so tackled that it may help build an efficient production structure but also that it will help build systems that readily detect, identify and visualize any problems or even something abnormal.

Seiri (sorting) is defined here as the act of making a clear physical distinction between things necessary and things unnecessary to discard things unnecessary on the spot. Unnecessary things will become waste over time and go hidden from the surface and generate a variety of evils from the hiding, i.e., high cost, operational mistakes, machine failures, late delivery. When performing seiri or sorting, it is important to make a rule to set up first a clear-cut criterion to decide what is necessary and what isn't. And it is also important that the activity is pushed ahead as a company-wide initiative. A general rule is that the criterion positively consider the frequency of use and take the assumption that what's necessary is something we use or will use and what's not necessary is something we don't or can't use.

Seiton (putting things in order) is defined here as the act of placing and identifying things needed in a way neat and ready to use them, obviously identifiable to anyone as to what they are. This, of course, preconditions the discarding first of all unnecessary things. Seiri and Seiton are, therefore, combined in a pair to serve in the same cause. First by seiri (sorting), only the necessary things survive. Now, re-place them so that they may most efficiently serve the production activity and then perpetuate that status into a rule, lest should it ever be tampered with. And further, for that rule to continually stay in effect it is important that the way they were first re-placed is standardized in ways easily understood by anyone. The earlier used word "identifying" is to distinctly indicate the identity and the omni-present performers of this act are familiar Kanbans or signboards.

Seiso (cleaning) is to sweep and clean all the time. Cleaning and quality go hand in hand so closely related that everyone agrees that a factory swept and cleaned to every corner produces quality product. It is basic that floors are swept with a bloom and machines are wiped off with cloth. It is more important to device ways to generate no dirts or contaminants to begin with. In particular, chips, scales and leaking oils among the things are needed to address first at their very source rather than they are allowed to come forth to wipe off or remove later. It is desired to integrate shop cleaning with a day-to-day machine maintenance program into a comprehensive clean-and-check activity. The operator knows best how his machine or equipment behaves. He just can never fail, while he wipes off his machine, to detect something unusual from the normal daily way, for instance, the symptom, however small, of leaking oil or odd odor, if he keeps his good practice of cleaning and checking his machine day after day. It is important that the barrier between the operators on the floor and maintenance specialist is removed and everyone involves for a more effective company-wide maintenance initiative.

Seiketsu (cleanliness) comes fourth of the 5S. It differs somewhat from the preceding 3Ss. It is because the first three are all verbs each representing a certain motion, whereas Seiketsu originates from an adjective, which qualifies how the thing at issue is as a result of something or at a certain point of time. What situation the word seiketsu or cleanliness describes now is a question here and it can be answered in a way somewhat like this. Seiketsu or cleanliness is most closely associated, in particular, with seiso or cleaning though it is also related to seiri (sorting) and seiton (putting things in order). It is the cleaning (seiso) that sweeps and cleans machines, equipment and their peripherals to keep them from being contaminated with oil, dirts, etc. Cleanliness (seiketsu) sounds alike but it implies that uncontaminated state of things to stay long. Another worthwhile thought may be that we should improve, innovate and thus strengthen our 5S initiative to a height of not resting satisfied with the cleanliness attained

by cleaning up something dirty, but of achieving the cleanliness permanently ensured by some built-in mechanism so designed as to keep parts uncotaminated ever. Cleanliness (seiketsu) can also be defined as sustaining the results of 3S; seiri (sorting), seiton (putting things in order) and seiso (cleaning).

Shitsuke (making a good habit) is defined as turning the behaving of oneself well into one's habit, particularly in respect of rules to abide by. This even associates itself with the foundation of a company that supports it firmly for evolutions ahead. Shitsuke or making a good habit is rooted deep in one's evolving consciousness and, as such, forms a nucleus of the 5S, which should after all involve every soul to be successful. The other 4Ss would not accomplish much if they were devoid of this last S, shitsuke, or making a good habit. Neither could the success of a company be hoped for it if were not for this most important and conclusive S, shitsuke.

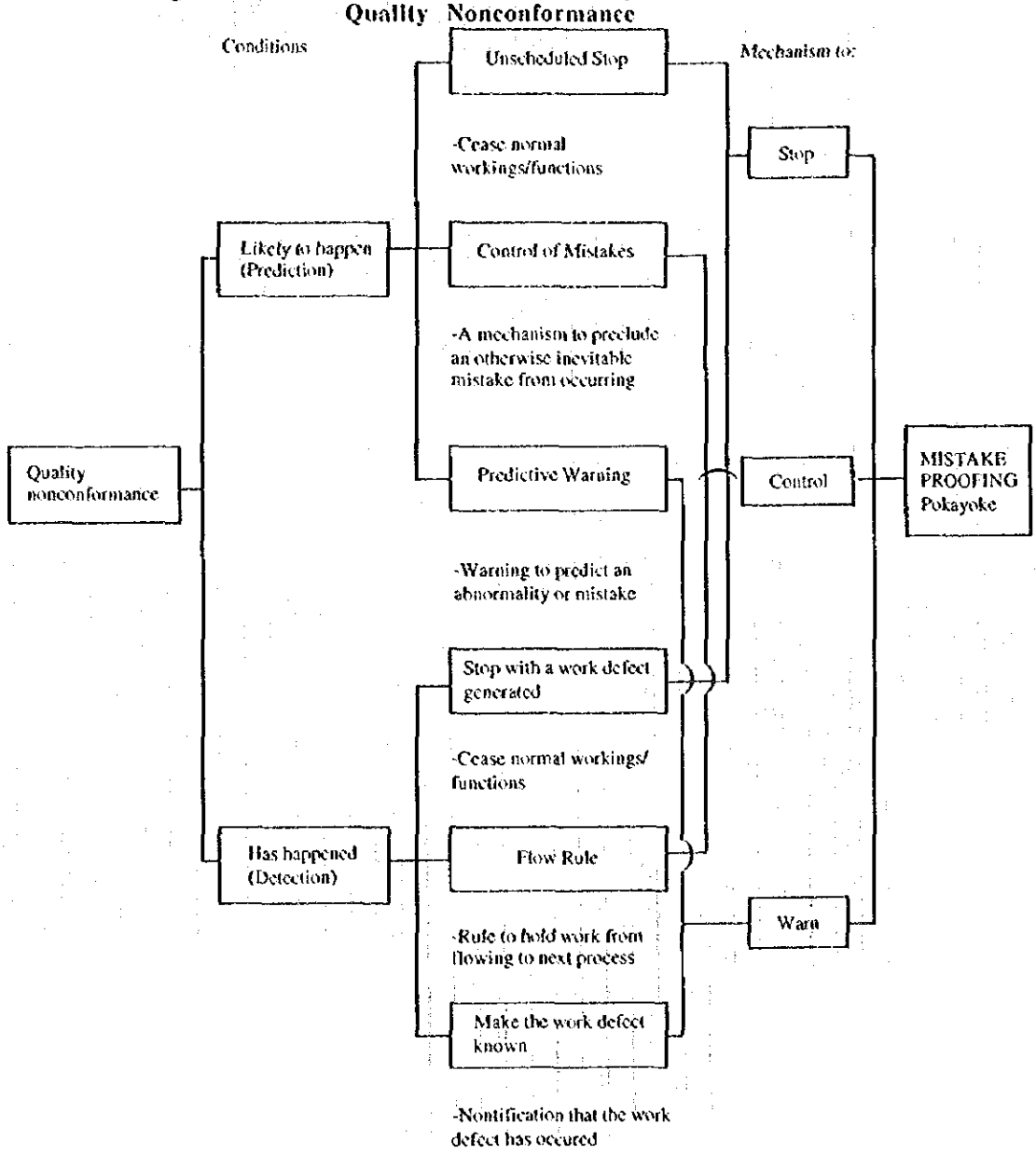
b. Quality Self-control Systems

This is the type of inspection in which an operator inspects his own work done, addresses any possible work deficiency on his own responsibility and comes up with ways never again to make the same mistake. To do all this in addition to what he is responsible for as an operator is called "self-implemented inspection." In addition, to perform this type of inspection as a group activity involving its own manufacturing process is called " self-in-process inspection." In order for this practice to be successful, workers must be multi-skill trained to a greater degree and process flows more rationalized to suit this type of production.

c. Poka-yoke Systems

Human-caused work deviations are generally called Poka Mis in Japanese, which literally means inadvertent mistakes. Also pertinent is the term Pokayoke, which means mistake-proofing, an idea or mechanism that is intended to preclude a physical defect or nonconformance even in case an inadvertent mistake should occur. Pokayoke, therefore, is one of the means that help achieve zero defects and, as such, is extensively incorporated in machines and equipment in general. The workings of Pokayoke are, if organized into the semblance of a system, can be described as stop at something abnormal, control mistakes, predict and warn, stop at a generated defect, control work flow, make the defect known, and like acts.

Figure VI-A3-1 Relations between Pokayoke Mechanism and Quality Nonconformance



Chapter 4
Essence of SME Policies in Selected Countries

Introduction

In most of the countries, SMEs constitute more than 90% of all the enterprises and they are significant contributors to economic growth making the country more innovative and vigorous.

As a common trend, many countries have been enhancing the support to SMEs in recent years being conscious of the importance of SMEs not only from the view point of the dynamic growth of economy but also job creation.

The following are brief descriptions of selected countries in relation to (1) the definitions of SMEs, (2) the role and contribution of SMEs to the economy, (3) the role and policy of the government for supporting the SMEs.

4.1 The Definition of SMEs

How are the SMEs defined in each country? The definition differs from country to country and it differs even in the same country according to the supporting institutions, government body or governing law.

Usually the number of employees is a fundamental criteria. In many countries, those with up to 300 employees belong to SMEs in manufacturing sector. The definition of micro companies is also introduced in some countries. In the case of financial institutions, they usually take account of annual sales, net worth and assets to define SMEs. It is noteworthy that the cross-border definition Mercosur is also introduced. This may be the first step to apply supranational joint policy in the member countries.

The following table is a typical definition of SMEs in each country.

The Definition of the Manufacturing SMEs in the Selected Countries

Country/ Region	Number of Employees	Other Conditions If Any	Basis for Definition
Australia	Less than 500 (small: up to 100)	--	Australian Bureau of Statistics
Brazil	Less than 500 (small: less than 100)	--	Foundation of the Brazilian Institute of Geography and Statistics (BRGE)
	Less than 500 (micro: less than 100)	--	SEBRAE
Argentina	Up to 300	Annual Sales: up to US$18 million Productive Assets: up to US$10 million	Ministerio de Economia Resolution
Chile	Less than 200 (micro: less than 10)	Annual Sales: up to 50,000UF (about US$1.6 million) micro: less than 2,400UF	General Definition (No standard definition)
Mercosur	Up to 300	Annual Sales: up to US$10 million	Agreed among member countries
Mexico	Up to 250 (micro: less than 15)	Annual Sales: subject to the clasification of micro, small and medium	Government circular
Korea	Up to 300	--	Small and Medium Industry Promotion Corporation
Italy	Up to 500 (small: 11-50, artigiano: less than 10)	capital: less than Lire 3 billion	Government Law
Japan	Up to 300	Capital: up to ¥100 million	Small and Medium Enterprises Basic Law
U.S.A.	Up to 500	--	U.S. Small Business Administration

4.2 The Role and Contribution of SMEs to the Economy

In many countries, compared with large firms, SMEs have grown participating in the more labor intensive activities with less advanced technology. They participated in the market niches and they have been local-market oriented rather than outward oriented. Even today this trend has not changed. However, stimulated by opening of the economy, and high economic growth in some countries especially in Asian countries, many SMEs have started to modernize acquiring new technology, introducing new quality control systems and developing human resources. SMEs are increasingly outward-looking in many countries.

In general, the role of SMEs in the economic, industrial and social activities have become more important than before in every country.

The contribution of SMEs to the overall economic performance in selected countries is summarized as mentioned below.

(1) Australia

In Australia, small firms (less than 100 employees) make up 96.9% of all business operations in the private non-agricultural sector and account for more than 56% of private sector employment.

In 1993-94, there was a total of 780,700 non-agricultural private sector businesses operating in Australia, of which 756,200 were small businesses.

Small business employment stood at 3.5 million persons in 1993-94, an increase of almost 860,000 since 1985-86. Since the data series began in 1985-86, employment in small business has grown at an average annual rate of 3.6%, more than twice as fast as the growth in total employment. The corresponding growth in big business employment has been a moderate annual rate of 0.7%. Small business is estimated to absorb 45% of the total employment in 1993-94.

(2) Brazil

In Brazil, small and micro firms (less than 100 employees) account for 98% of all Brazilian businesses. The share of small business is high in countryside especially northern and middle part of the country.

There are approximately 3,500,000 micro and small businesses which, absorb about 60% of the nation's employment and contribute 42% of all the value produced by the private sector.

(3) Chile

In 1993 there were 75,636 small and medium sized enterprises and 400,529 micro enterprises. They account for 98.5% of all Chilean businesses and constitute 24.2% of the total sales and services of the year.

During 1990-93, the number of SMEs increased by 33%. Despite the significant rate of SMEs' growth both in number and annual sales, the growth of large firms was faster than SMEs during the period.

(4) Mexico

According to the SECOFI (Secretaria de Comercio y Fomento Industrial)'s estimation in June 1994, the number of SMEs in the manufacturing sector constituted 98% of the total registered enterprises (122,302) and generated 48.9% of total employment in the manufacturing sector.

Although the manufacturing sector's average growth rate was 3.1% per year during 1989-1993, many of SMEs have been suffering from the economic crisis stemmed from the Peso devaluation since the end of 1994.

(5) Japan

In Japan, in 1994 the SMEs account for 99.0% of all Japanese enterprises - or, 6.47 million of the 6.53 million enterprises.

They generate 76.5% of all Japanese employment - 41.4 million of the 54.2 million employees, contributing to the 51.8% of the value of output by manufacturing industry.

However, the number of SMEs has been declining and the relative magnitude of the SMEs has been declining in business and employment.

After the collapse of the bubble economy, the consumption recession, the revaluation of yen, and the increasing competitiveness of Asian countries are considered to be the main reason of such decline.

(6) Italy

In Italy, there are more than 200,000 SMEs at present. Approximately 120,000 firms are registered with Confindustria. The 95.2% of them belong to small businesses (less than 100 employees) and generate 52.23% of all the nations employment. SMEs' account for more than 50% of the total export at present.

In the past, especially during the period called "Economic Miracle" in 1960s, the source of growing economy was vigorous SMEs.

(7) U.S.A.

In the United States, the SMEs generate 60% of all the nations employment and contribute to 40% of GDP and 54% of net sales of all businesses.

Among the 21.5 million firms, large firms (more than 500 employees) are 14,000 only and therefore, most of them belong to SMEs. In the past ten years, 600,000 new firms have been born every year and the share of small businesses, particularly venture companies have been growing rapidly.