Project No. 2.3 Development of Total Quality Management System of Thailand

1. Rationale

1.1 Background

Automobile assemblers are currently shifting their efforts so as to expand export from Thailand, making their Thai subsidiary one of their key world supply hubs. This move requires Thai parts suppliers to meet with more stringent quality, cost, delivery and development demands from the assemblers, to be able to compete in the world market. There are strong possibilities for Thai local suppliers to lose their jobs to the new-entry global suppliers or even to imported parts, if the required higher level of quality, cost, delivery and development is not be met.

Even though efforts have been made to transplant Japanese TQC and production systems, to promote the certification of ISO9000, 14000 and QS9000 systems, mainly from marketing reasons, quality, cost, delivery and development of the Thai suppliers are yet to be adequately improved.

At the same time, there are persistent opinions among global automotive industry circles that legitimate Thai culture and behavior might not coincide with the requirement of present day manufacturing practices. Even though not openly discussed, this kind of perception can greatly deprive of the possibilities Thailand can enjoy from the efforts to make the country into a major production base for global industry.

1.2 Necessity of the Project

TQC, Japanese production systems, ISO, QS systems have been introduced to Thailand in a relatively short period of time, making it very difficult for Thai industry to digest and restructure these systems to suit the Thai situation, creating a blurred focus and confusion in industry.

There are several success stories in the industry, however, which can be used as excellent references, and the efforts to collect both success and failure stories shall be richly rewarded. It will also highly probable that some kind of an organized and comprehensive system can be structured from the survey.

It is vital for Thai industry circle to have their own Total Quality Management system to achieve the target with confidence and efficiency. Since the time left for Thai parts manufacturing industry to reach world level is quite limited, urgent action is required to define and implement the TQM system.

2. Purpose

Thai industry, especially automotive parts manufacturing industry, needs an urgent action to upgrade their QCDD (Quality, Cost, Delivery and Development) level up to world standards to meet with the stringent demand from their customers, global auto assemblers. It is imperative for that purpose to clearly define, develop and implement a Total Quality Management system acceptable and applicable to Thai environment.

3. Output of the Project

(1) Organized and structured TQM system for Thailand which covers requirements of ISO, QS systems as well as Japanese TQC and production systems, to meet with the satisfaction of global automobile assemblers.

(2) Documentation of the newly structured system with manuals and training programs (Training shall be done in cooperation with other institutes) which covers QS9000, ISO and Japanese TQC/Production systems.

(3) Monitoring and consultation can be offered systematically in conjunction with the Factory evaluation and consulting projects being planed by Thailand Automotive Institute.

4. Project Description

4.1 Target of the Project

The project targets to structure and organize systems introduced to Thailand, based on several success stories at key companies operating in Thailand. With over 30 years of accumulated success/failure cases throughout Thailand's industrial history in hand, combined with deep insight into Thai culture and alternative success cases, there is a strong possibility that an unique system suitable for Thai environment can be defined.

The conceptual skeleton on which the system could be built may look as follows. These elements or structure itself are subject to alterations according to the survey and studies to be conducted as a part of this project:

(1) Team Based Operation

Team based operation, which places strong emphasis on responsibility and positive participation, is one of the key success factors of manufacturing in recent years. The Japanese can work as a team without written or systematic training, but not in Australia or USA. Probably Thailand is closer to Australia or USA than to Japan in this regard, which could be the major reasons why QC circle activities so far implemented did not work in Thailand. An American company in automotive industry is said to be succeeding in this trial, so is one Thai mold maker.

(2) Work Process Definition and Documentation Based on ISO and QS, the Process Itself Incorporating Japanese Style Production and Quality Control Systems

In majority of cases in Thailand, ISO and QS process documentation is being done by a small number of ISO/QS team specially assigned by the management, which makes it extremely difficult when it comes to actual shop-floor implementation.

The initiative of the Team based Operation can be fully utilized here to let all the work team define and write their own process, with the support of senior

management or consultants and gradually target at higher level of control. This will lead to certification of ISO and/or QS systems on much more sure footing.

The process can be measured with "Performance Indicators" mutually agreed upon both by the management and the team, and it will serve as a starting point of KAIZEN (Continuous improvement) activities from which the improvement spiral will commence.

(3) Policy Management Based on TQC and Japanese Management Systems

One of the major reasons why the organization does not work properly is lack of communication and establishing consensus throughout the organization is a vital key for operational success. Straight line from the corporate mission, policy, down to the action plan by each work team promises successful operation. One global Japanese auto manufacturer may offer an excellent example in this regard.

5. Implementation Body & Financing Source

TPI and each industrial institute, supported by BSID.

Start implementation for automotive industry through Thailand Automotive Institute.
TPI can support the project by giving generalized concept training, ISO and QS Certification consulting, as well as documentation. Each industrial institute shall promote understanding, implementation and follow-up in their respective industry arena.

6. Activities

The project shall be divided into three phases, 3, 3 and 6 months for each phase. This implementation phase, however, may be prolonged and expanded according to the requirement and the necessity of the automotive and other industries.

6.1.1 1st Phase: Collection of Success/Failure Cases and Analysis

- Collect information on problems, suggested solution for improved systems from major JV as well as local companies.
- Collect success and failure stories on implementing TQC, Japanese production system, ISO and QS9000, their modifications and original applications.

6.1.2 2nd Phase: Study of Possible Solutions

- Structure proposed system based on the following skeleton:
- Policy Management to share problems and tasks to create consensus for the direction of work task and target.
- Team based operation but the team is organized as work teams. Teams are responsible for their scope of work, whereas the direction is set through policy management.
- Work Process Charts and documentation for ISO/QS prepared by work team. Teams are voluntarily monitor their performances, which of course is linked with corporate QCD targets. Elements of Japanese productions systems and practices are incorporated into the process flow charts.
- Periodical and Project by project Review session and feed back to Policy for continuous improvement and learning from experiences. (KAIZEN activities, results of which are to be reflected to process chart updates and policy review.

6.1.3 3rd Phase: Implementation and Expansion

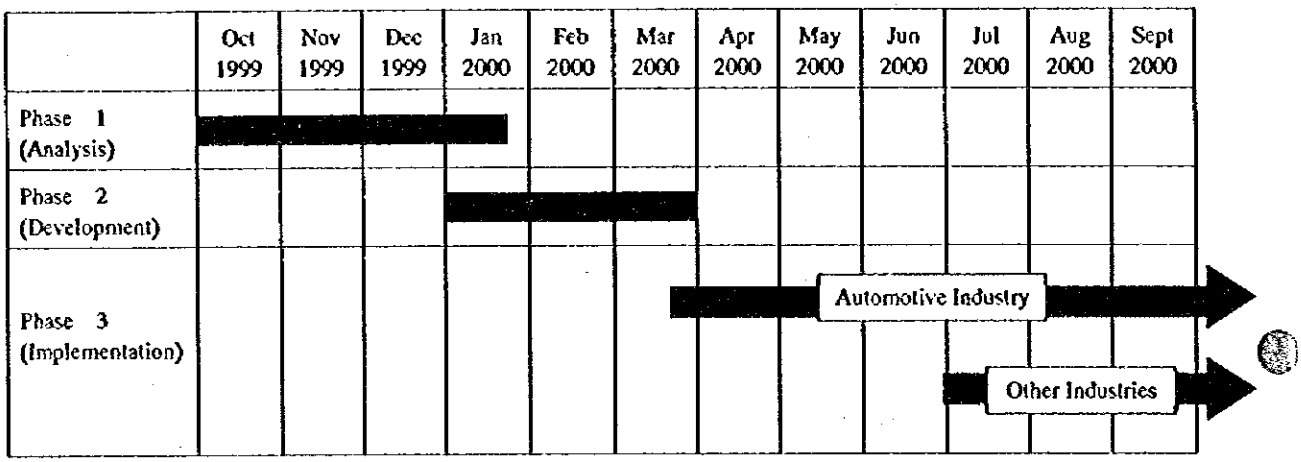
- Select model/sample companies
- Explain the total system until completely understood and accepted.
- Start implementation with the support of Specialist group from TAI.
- Monitor progress regularly and feed back.
- Start training by series of seminars as soon as the proposed system is defined.
- Full documentation and PR activities must start at the same time.
- After successful implementation is confirmed, introduce the system to other industry circles.
- Expansion to industries other than automotive.

- Feed back and review the proposed system

6.2 Expected Direct Job Creation

- 1 Japanese specialist (to be funded by JICA)
- 3 Thai experienced staff
- 1 Thai/English secretary/clerk (Female)

6.3 Project Schedule



6.4 Estimated Project Cost (for one year)

- Human Cost
  - Japanese specialist (funded by JICA) 0
  - 3 Thai experienced staff 3 MB
  - 1 secretary/clerk 0.2 MB
- Expenses
  - Transportation 0.2 MB
  - Communications 0.3 MB
  - Documentation's 0.5 MB
  - Seminars 1 MB
  - Other 1 MB

Total for 1 year 7.2 MB

The duration of the project shall be 1.5 to 2 years depending on the requirements of the industries.

7. Expected Benefit of the Project

(1) Thai industry circles will be able to see clearly, and, expectedly target for, a totally coordinated TQM system applicable and effectively utilized in their challenge to world-class manufacturing capabilities in Thailand.

(2) Credibility of Thai manufacturers will show a steady improvement, resulting in increased orders from global assemblers, including shipments to other destinations on the basis of global sourcing.

8. Weakness of the Project

(1) It is the best for Thai industry circle to recognize and lead the way toward world-class manufacturing by their own discretion. Due consideration must be paid to this project to make Thai industry circles to take initiatives.

(2) By the character of this particular project, there may not be single clear-cut system with which total consensus can be achieved. Rather it will be more like tailor-made multiple numbers of systems to meet with individual corporate culture and enthusiasm at the part of the implementing enterprises. Accordingly, the implementation process must to start with few selected numbers of candidate companies, and the success stories are to be spread before broadening the application arena.

Project No. 2.4 Provision of an Assistant Package for Incubation of SMEs

1. Rationale

According to the questionnaire survey carried out for the earlier master plan study on the supporting industries (March 1995), the managing directors of SMEs acquired their positions by the following routes:

Spinout from the existing firms	36.1 %
Internal promotion	32.8 %
Succession	31.1 %

Their business careers are as follows.

Technology	38.6 %
General affairs/ Accounting	30.5 %
Sales	24.0 %

These figures indicate that there are a large percentage or number of cases where people of ripe technical experience leave their existing firms to start a new enterprise. SMEs are usually vitalized through replacement of old-fashioned enterprises by new ones that are managed and operated by new entrepreneurs or internal successors of new generation. This project offers to incubate the potential entrepreneurs who intend to begin new enterprises. The main target of the proposed project is, but not confined to, assumed to be such technical-oriented people who want to start new business spinning out from existing factories. This kind of new entrepreneur might have the highest potential to success in doing business.

The most important three factors for incubating a new enterprise are said to be "technology", "market", and "capital." The targeted people may have a certain market in the former company for which they worked and be equipped with technology too. They lack investment capital to purchase production facilities. It is expected that some assistant measure are to e developed for them in order to

create new competitive SMEs in the country. This project offers an idea for such purpose.

Furthermore, introduction of modern management know-how can be another key factor for incubating new enterprises, judging from experience in the industrialized countries. In Thailand, the Bureau of Industrial Enterprise Development of the DIP has so far played an important role in giving basic training to potential entrepreneurs. The newly established ISMED is also expected to provide them with the same kind of training services. Few government agencies, however, have instructed potential entrepreneurs in modern management know-how for production control, merchandising, marketing, and so on.

2. Purpose of the Project

The purpose of the project is to assist potential entrepreneurs in starting their new enterprises.

3. Output of the Project

(1) Potential entrepreneurs can embark on their enterprises with a minimum of own capital.
(2) Potential entrepreneurs can acquire modern managerial know-how.

4. Description of the Project

4.1 Outline of the Project

The project takes the form of a packaged assistance of facilities investment and managerial guidance.

At first, potential entrepreneurs submit detailed plans for their new enterprises. A joint executive committee for the project carefully examines the feasibility of those plans to select those plans with highest feasibility. These applicants whose business plans have passed the assessment must receive a training course prepared for potential entrepreneurs by ISMED.

Factory sites and buildings are prepared in industrial estates which are managed by IEAT. Total floor area is supposed to be 2,000 m^2 for each project site or each estate. The said floor area will be good for 10 - 20 locators. In the building, some common service facilities (CSFs) necessary for starting business shall be equipped in the building, including office equipment, conference rooms and a reception office.

The proposed project provides entrepreneurs with assistance of the following measures as a package:

1) Technical and managerial guidance
2) SIFC loans guaranteed by SICGC
3) Investment from the proposed venture capital fund (Project 1.3)
4) Hiring of land, factories, machinery and the common service facilities at favorable cost which is in proportion to the amount of sales revenue of the new company.

It will take at least three to five years to judge success or failure of a new business, so that the above privileges last three years since starting the business. Basically three years later, succeeded companies shall be independent from the incubation project.

4.2 Implementation Schedule of the Project

Figure-1 Implementation Schedule of the First Project Site

	1st year	2nd year	3rd year	4th year	5th year
1) Preparation of the project					
2) Invitation and assessment of business plan					
3) Construction of factory buildings					
4) Training of new entrepreneurs					
5) Initial operation of factories (three years)					

(Note) The project will be expanded to five(5) project sites upon success of the first project site.

5. Implementation Body

It is recommended that an organization be established in ISMED for the incubation project named "Venture Plaza."

Cooperation bodies:
IEAT, Technical colleges, SIFC, SICGC, DIP/MOI, FTI, CC

6. Financing Sources

The following is a typical financing pattern to implement the proposed project:

1) Expenditure of the Venture Plaza - SME Promotion Fund
2) Factory sites - SME Promotion Fund or donation of IEAT
3) Factory buildings and CSFs - SME Promotion Fund
4) Machinery - SIFC loans guaranteed by SICGC and/or Venture Capital Fund
5) Working capital - Own capital of entrepreneurs and/or Venture Capital Fund

Entrepreneurs under the project may pay or repay the costs and charges derived from 1) through 5) above in proportion to the amount of sales revenue from the new businesses.

Project cost is very roughly estimated as follows in order of magnitude per project site or estate.

- Land cost: US\$60/m^2×4,000m^2= US\$240,000.-
- Factory building: US\$200/m^2×2,000m^2= US\$240,000.-
  (single story, steel structure)
- Investment capital: US\$45,000/factory×20 factories= US\$9,000,000.-

Total US\$9,640,000.-
(say US\$10 million/project site)

- The incubation project is implemented in five (5) project sites.
  US\$10 million×5 project sites= US\$50 million

7. Activities

(1) To secure lands and/or construct buildings for use by potential entrepreneurs
(2) To assess business plans proposed by applicants

(3) To train potential entrepreneurs whose business plans have passed the assessment
(4) To arrange financing to the potential entrepreneurs
(5) To give technical and managerial guidance to them for three years

8. Expected Benefits of the Project

New enterprises with high growth potential are expected to enter on. The rise of new enterprises will also increase employment opportunities.

9. Strength and Weakness of the Project

9.1 Strength

An SME promotion system is gradually prepared in Thailand, measures of which are fully utilized to the proposed project.

9.2 Weakness

The Thai government lacks for experiences in implementation of this kind of package program for entrepreneur incubation.

10. Target Group and Job Creation, etc.

10.1 Target Group

Potential investors or entrepreneurs are going to starting business.

10.2 Job Creation

Assumption:
1) 20 factories are incubated in a project sites.
2) The number of 50 employees are created by a factory.
3) The incubation project is implemented in five (5) project sites over the country.
4) A total of 5,000 jobs are created.

10.3 Success Indicator

The number of enterprises incubated.

Project No. 2.5 Enhancement of Technology Transfer from LEs to SMEs

1. Rationale

Weakness of the parts industry in both the automotive vehicles industry and in the electric and electronics industry has further become evident as a result of the economic crisis. Upgrading of the true competitiveness of automotive, electric and electronics or other final products manufacturing industry cannot be expected without strengthening parts suppliers (or subcontractors). Some assemblers are making an effort of technology transfer to subcontractors, and the others cannot afford to do so by limited resources of management. Even the former assemblers seem to be fired in continuing their efforts made since the 1997 crisis. Such efforts, however, should be encouraged on the basis of its contribution to industrial promotion and the national economy. This project aims at development of the parts suppliers (or subcontractors) by making use of human resources, and machinery and equipment of assemblers (or final products manufacturers), toward strengthening of subcontractors. In other words, it is a program led by the private sector and supported by the government. It should be noticed that assemblers have a right to decide whether they purchase parts and components from domestic SMEs or by import. Thus, assemblers or buyers shall be encouraged with incentives to foster subcontractors.

2. Purpose of the Project

To support and encourage technology transfer from LEs to their small and medium scale subcontractors.

3. Target Group

LEs and SMEs which are linked by subcontracting business.

4. Output of the Project

1) A well developed industry supporting structure

2) Increasing of competitiveness of the two industries

5. Project Description

The major player of technology transfer from LEs to SMEs is the private sector, particularly LEs, while the proper role of government is to encourage the program led by LEs. So, the government's support should be applied to the sub-sectors, the LEs of which intend to make effort of technology transfer to SMEs as well as to develop a subcontracting system.

5.1 Basic Survey of Requirements

For the 13 strategic sectors identified in the IRP the following basic studies are to be made.

1) Actual conditions of subcontracting, sector by sector.
2) Hearings at prime contractors (mainly LEs) regarding their experience with and views on subcontractors, regarding managerial, technological and human resources related issues.
3) Compilation of a list of the the SME subcontractor companies that prime contractors think deserve assistance to make further development.
4) Subjects of technological transfer that prime contractors are now involved in or expect to start, and related problems in implementation.
5) Prime contractors' desires regarding incentives the government could provide for transfer of technology.

The results of these studies are to be used to identify the high-priority sectors, and target SMEs to be assisted will be identified. It is expected at this time that these sectors would include the automotive industry, electrial and electronic industry, the gem and jewelry industry and the machinery industry. Subcontracting is strongly established in these industries.

An alternative, because it is a matter of high urgency, with regard to the automotive industry, it is conceivable that work would start with the second item above.

5.2 Execution of Technology Transfer

(1) Evaluation of companies by consultants

Consultants would visit SMEs that prime contractors have identified as being particularly worthy of being given assistance in order to develop further, to provide them with technical and management advice. These consultants would be Japanese or Thais who are engaged in the Factory Evaluation System Project (Project 2.1) or instructors who have completed the training course for this work.

(2) Formation of plans for transfer of technology by LEs

A plan for transfer of technology from LEs to individual or groups of SMEs would be prepared on the basis of the evaluation by the consultant. Implementation of the transfer would be separate for what is done by the LEs themselves and what is done by other parties.

(3) Implementation of transfer of technology

Regarding transfer undertaken by the LEs on their own, it is thought that the following steps would be followed.

1) Engineers employed by LEs would be dispatched to SMEs; included in this would be engineers sent out by parent companies of the LEs abroad.
2) Training of SME personnel would be done at the training facilities of LEs.
3) LEs would use their own production lines as venues for OJT of employees of SMEs.
4) SME employees would be sent overseas for training at LE parent companies or elsewhere.

As the implementing agency(ies) that are likely to do the transfer of technology tasks other than those by the LEs themselves, there are the sectoral-specific institutes, universities, public laboratories, education and training institutions, consultants and other entities.

5.3 Incentives to Be Provided

Support measures would include providing a tax exemption equal to or greater than the costs of the LEs, exemption from income tax for technology transfer experts invited from abroad, and facilitation of issuing of visas, as well as other measures. Costs payable to others by the LEs could be fully covered by making use of the SME Promotion Fund. Those LEs that are particularly active in this project could be given public recognition, in the form of awards.

Note that it would be essential to apply the incentive scheme to LEs that are engaged in the transfer of technology at this time (time of adoption of the recommended plans).

6. Implementation Body and Financing Source

A Government organization shall manage the proposed project and coordinate institutions related to the project. DIP shall initially take care of it as an activity to promote SMEs. After the SME Promotion Office is established under SME Promotion Act, the Office will be responsible to the project.

7. Activities

(1) To make a basic survey on requirements of LEs' desire for technology transfer to subcontractors.
(2) To choose model SMEs which are assisted by the Project.
(3) To formulate an incentive scheme to the technology transfer.
(4) To make corporate diagnoses of the model SMEs by consultants.
(5) To support the technology transfer with the prepared incentives.

8. Expected Benefit of the Project

Direct benefits

1) Encouragement of LEs' effort in making technology transfer to SMEs by establishing a mutually beneficial subcontracting system for both LEs and SMEs.

2) Upgrading of production and management technology of SMEs which improves quality, cost and delivery of parts supplied to LEs.

3) Enhancement of competitiveness of final products assembled by LEs.

Indirect benefits

1) Promotion of the provincial SMEs
Through the process of developing subcontracting system, not a few LEs tend to choose provincial SMEs as its subcontractors in view of the lower labor costs.

2) Modernization of machines of the LEs and SMEs
The technology transfer will cause a flow of machine renewal within the subcontracting system. A new machine which is first introduced to a LE will be adopted by a subcontractor in short time.

3) Promotion of foreign investment
When a foreign assembler of international scale invests in a new overseas assembly plant, it tends to choose a country where supporting industry operates well.

9. Weakness of the Project

It might take long time to introduce the incentive scheme because the Thai government is not familiar with this kind of system and it requires legal preparation.

Project No. 3.1 Establishment of the Institute for SME Development (ISMED)

The ISMED was established on June 18, 1999 and has started its activities. Overall view of the ISMED is gradually clarified. Therefore, this paper is limited to rather explanatory introduction of the project.

1. Rationale

The most critical aspect in the development of an SME is the qualities of the managers and executives. However, these qualities are not improved easily. Furthermore, it is said that the modernization of the SMEs is accomplished by replacement of enterprises, or a metabolic process. Strengthening of the SME management is the subject of this project. The plan for establishment of the Institute for SME Development (ISMED) is one of important and concrete signs of Thai Government interest in this subject.

The Minister of Industry became interested in Japanese SMEs promotion policy and training activity when he visited Japan. After returning to Thailand, he saw the potential in establishing an institution that would use ideas from Japan. Establishment a plan was submitted to the Cabinet and approved in April, 1999, and the Institute for SME Development (ISMED) started activities in June, 1999.

To train SME Diagnosticians (comparable to Japanese MITI registered Management Consultant) is one of its its activities. It is very similar to the Factory Evaluation System in the IRP. However, the Factory Evaluation System had been planned as a project before the ISMED plan. Factory Evaluator Training was decided to be handled by the Factory Evaluation System Committee in March, 1999 as an activity that was separated from ISMED.

2. Purpose

ISMED was jointly established by the Department of Industrial Promotion, Ministry of Industry and Thammasat University. It is an independent foundation and will operate by working with concerned sections in both governmental and

private sectors throughout the country. It targets the SMEs of all sectors with the aim of the diffusion of the technology and knowledge of management.

The purpose of ISMED is to train and assist managers, business successors, provincial administrative officers and new entrepreneurs. It is to accomplish the following specific objectives.

(1) Increase knowledge and skill of management for existing SMEs and creation of new entrepreneur.

(2) Improvement of institutional management for training, e.g. the improvement of the methods, equipment, and research support of the education and training program.

(3) Development of a nation-wide system to support educational programs and management for SMEs

3. Output of the Project

(1) A nationwide network is established in close collaborative efforts between government agencies and educational institutions.
(2) A certain number of managers and employees are educated and trained by ISMED
(3) A certain number of enterprises benefit from improved management by means of ISMED programs
(4) A certain number of enterprises start and succeed in new businesses
(5) A certain number of enterprises beneficially use ISMED's network and information service

4. Project Description

4.1 Organization

The Secretary General of the Ministry of Industry is a chairperson of ISMED's management board. And the Asian Convention Center in Thammasart University at Rangsit will be used as a general office for ISMED. A network of

eight universities has been formed, with the general office in Thammasart University at the center.

4.2 Management Plan

A 5-year business plan was announced along with a plan for urgent, and medium- and long-term activities. As its capital, ISMED will seek through a government budget allocation, the SMEs Fund which will be set up under the SMEs Promotion Act, contributions from the private sector, support from foreign countries, and its business income. A government allocation of 864 million bahts was decided in FY 1999.

4.3 The Present Condition and Subject

Actual activities have just started with the two-day training course, "Tactics to build SMEs Business," on June 18. Both short and long-term training programs are being planned.

5. Implementation Body and Financing Source

Department of Industrial Promotion, Ministry of Industry & Thammasat University

6. Activities

Urgent activities

(1) To encourage interest and create a vision to inspire and encourage SMEs and the target group.
(2) To set up short or medium term courses for SME entrepreneurs, trainers, and consultants by making best use of suitable existing courses at each organisation.
(3) To provide loans for business expansion to the entrepreneurs who are being helped under the project and act as an intermediary for the guarantee and co-ordination with financial institutions considering granting of credit to SMEs.
(4) To coordinate with the operating plan for establishment of the Evaluation System Project under the IRP and also to work with financial institutions in

order to quickly create evaluators and credit analysts to help improve the liquidity situation of SMEs.

Medium and long term activities

(1) Development and improvement of long and new courses for each target group
(2) Development of training equipment
(3) Research and study about SMEs
(4) Preparation of a capability index
(5) Development of an SMEs network
(6) Database development about SMEs and resource persons (expert pool)
(7) Continuously development instructors and advisors

7. Expected Benefit of the Project

Regional SMEs have additional source to hold a consultation about their business. This is one of the big benefit.

8. Weakness

There is still lack of awareness in the local people about the existence and activity of ISMED.

Project No. 3.2 Institutional Supports for Securing Manpower for SMEs

1. Rationale

According to the Team's questionnaire survey, the responding companies have answered that employment (recruitment) has become easier than before the economic crisis. In tandem with this, job hopping has declined due to the soft labor market. Nevertheless, from a long term view point, as discussed in regard to human resources development, it is necessary to provide information to facilitate matching the demand of enterprises and supply from the labor market in an adequate way. So far as the function of Ministry of Labor and Social Welfare is seen, there are many existing functions concerned with the assistance and protection of labor and the unemployed, vocational training education for people who want to find a job, and the national skill certification system. However, what is lacking is the function of matchmaking between an offerer of a position at a company enterprise and job information to the public.

IRP also makes has as priority projects "Survey of Skilled Labor Requirement and Shortages in the Industrial Sector for Systematic Re-development of the Labor Force," and "Retraining of Labor for Effective Assimilation of Medium and High Technologies" and so on. These require the ministry to investigate the labor market and inform it to related organizations.

2. Purpose

From the above background, the purpose of this project is to help SMEs with recruiting employees.

3. Output of the Project

(1) Awareness of demand and supply of labor by skills and standards
(2) A System of matching of demand and supply in the labor market

4. Project Description

The project is to establish an information network for matching demand and supply of workers.

5. Implementation Body and Financing Source

Department of Employment (DOE) and Department of Skill Development (DSD), Ministry of Labor and Social Welfare

6. Activities

Main activities are following three.

(1) To survey annually demand and supply situation of labor by job
(2) To have vocational training centers aware of demand of SMEs
(3) To establish the information system into the centers of job-less people and employers

7. Expected Benefit of the Project

The purpose of this project can be attained by inputting building of the network which it makes use of one's existent department and training institutions and by inputting the new function of the information into there. Therefore, the budget for the investigation in the first year should be secured. It considers that the other specified budget doesn't occur.

8. Weakness

(1) Lack of awareness of importance of matching of demand and supply
(2) There is little connection between MOL and MOI

Project No. 3.3 Establishment of a Certified Skill-Standards in Cooperation with the Private Sector

1. Rationale

The Team proposes that the government shall approve graduates from private enterprises' in-house vocational school setup to train their own employees as publicly qualified personnel. Identical proposal was made in the previous Supporting Industry Study Report by JICA submitted in March 1995. It appears, however, that expected fruits were not obtained. Main reason is limited number of the target business categories. Therefore, we propose this time, by-going one step farther, to grant public skill certification to those who have finished training courses of private-sector enterprises for training their employees.

The proposal is originally based on the fact that a diploma of a certain global enterprise's vocational school is being highly evaluated in transferring a job, etc. The decisive factor to realize this project will focus on how much incentive the government can provide to large enterprises having their own vocational schools. The advantages are clear that the government, as a beneficiary, can reduce its burden through private-sector vitalization, and that more workers can obtain public qualifications.

Industrial development and demands of the marketplace have caused the requirements for specific levels of specific production work skills to be upgraded. Also, the rate of advance of technology is extremely swift. Because of these reasons, public institutions cannot adequately meet HRD requirements in the form of advanced skills training and especially certification of the skill levels of workers. It is difficult to execute similar courses by the public sector.

2. Purpose

To authorize the existing schools managed by private enterprises as issuing schools of the public certificate so as to complement a lack of public facilities.

3. Output of the Project

(1) Authorization of private training schools to issue certification of skill-standards; thereby, improved public-private linkage.

(2) An improved skill-standards certification system.

(3) An increase in the number of certified skilled workers.

4. Project Description

4.1 A steering committee made up of industrial engineers, government officials and representatives of academia will decide on what skills are to be given emphasis and what schools will be requested to participate in the scheme, and be evaluated to ensure they qualify for issuing certificates.

4.2 The objectives are expected to be three:

(1) High-tech products
For example, copiers, facsimiles and semiconductor, etc.
(2) Automobile industries
Fine machinery, assembly, inspection and maintenance.
(3) Other machinery
Machine tools, construction machines, pumps and refrigerators.

4.3 Total cost estimation cannot be made at this point. The level, specific tasks and plans for actual operation will be important factors influencing cost, but they are not yet known. Only personnel expenditure can be estimated, at 3 million bahts per each of the three objectives. Enterprises will provide machinery, materials, facilities, etc. Therefore this cost does not include these matters.

5. Implementation Body and Financing Source

Ministry of Labor and Social Welfare, Ministry of Industry, Federation of Thai Industry and its member companies

6. Activities

(1) To survey the present state of training schools managed by private enterprises.

(2) To study the public and private facilities doing testing and certifying workers for skill standards.

(3) To provide incentives for private training schools to join this project.

(4) To formulate criteria for authorization of private training schools.

(5) To examine qualification of the schools in terms of software and hardware equipped in the schools.

(6) To certify graduates of authorized schools as meeting skill standard requirements.

7. Expected Benefit of the Project

Significant expansion of Thai workers certified regarding skill levels especially in strategic industries.

8. Weakness of the Project

It is not clear whether the private sector will have incentives to cooperate with the proposed project.

Project No. 4.1 Introduction of a Preferential Purchasing System of SME Products by the Public Sector

1. Rationale

SMEs have a disadvantage in marketing power in general. Especially, when SMEs develop new market, they face a more severe situation than the large-size enterprises. One idea to support marketing efforts by SMEs is for the public sector to open its market by granting more opportunities to SMEs for supplying contractual services and goods. The public sector including governmental offices periodically purchases goods and services in large quantities so that if those offices and institutions allocate a certain volume of business to SMEs it can have a substantial impact. This system can be seen in many countries including Japan and the U.S., but has not been adopted by Thailand.

For reference:

- Target amount of the Japanese Government in 1998 was 4,906 billion yens.
- Target amount of the Federal Government of the USA in 1995 was 61.7 billion dollars.

2. Purpose

To preferentially provide SMEs with access to the market for public sector purchases of goods and services.

3. Output of the Project

(1) Legislative base for the preferential purchase of SMEs by the public sector
(2) Increased opportunities for SMEs to supply goods, works and services to the public sector

4. Project Description

(1) To release advance information related to purchase of goods and others.

(2) To determine those items of goods and services purchase of which is to be a matter of priority for SMEs, and to accept competitive bids from SMEs for purchase of these goods and services.
(3) To simplify the proceedings from bidding to contracting and to simplify the required documents.
(4) Establishment of a law will be required for implementation of this project.
(5) The objective of this project is to increase the opportunities of SMEs to receive orders.

5. Implementation Body and Financing Source

Thai government and public institutions are the implementation body of the project. No significant special expenditure will be needed.

6. Activities

(1) Official organizations (including state corporation) should submit to the SMEs promotion office in each fiscal year for its approval, the amount of procurement of goods and services including the amount of contracts for construction work, in the form of estimated amounts of the contracts with specific description of the target amount to be allocated to the SMEs.
(2) The offices shall summarize this and publish the information as governmental policy for expanding the opportunities for SMEs to do business with the government.
(3) Official organizations should report the actual results to the office at the end of each fiscal year. The office is to be empowered to request the authorities concerned to submit measures to increase the opportunities of the order to SMEs if required.
(4) By registering the names of SMEs that wish to become a general contractor, or subcontractor, to the government in database, access to governmental organizations should be facilitated. In order to assure smooth operations so as to allow SMEs to participate, an efficient ordering system should be built by reducing paperwork and simplifying procedures, as well as by providing a window for advice on public sector procurement.
(5) From the standpoint of local area development, the procurement by local public organizations should be made to the enterprises from the local area or neighboring area as much as possible.

7. Expected Benefits of the Project

Improved market access for SMEs.

8. Weakness of the Project

Difficulty in ensuring equitable treatment to all companies, and in justifying preferential treatment for SMEs.

Project No. 4.2 Strengthening of Export Promotion Activities

1. Rationale

The key factor for expanding exports of SME products is to improve their international competitiveness in terms of quality, cost, delivery, and development. The improvement of SMEs' international competitiveness, however, is thought to premise the following conditions.

(1) Thai SMEs make their products better familiar to foreign consumers.
(2) Thai SMEs have enough information about export demand.

It would be impossible for SMEs to improve the competitiveness of their products if these conditions were not fully met. Apparently, SME products are less familiar with foreign consumers than LE products and SMEs have less information on export demand than LEs.

The above conditions, however, cannot be satisfied by SMEs' marketing efforts alone. It will be necessary for the government to support their strenuous efforts in cooperation with industrial associations.

Moreover, according to the new questionnaire survey on SMEs, "marketing/sales promotion" ranks first in their response to the question about, what they desire from the government. Among 201 SMEs, 87 (43.3%) hope for marketing/sales promotion by the government. The government's marketing/sales support to SMEs can be thought to mean the improvement of their marketing conditions.

2. Purpose

The purpose of the project is to assist SMEs in upgrading their marketing capability.

3. Outputs of the Project

(1) Thai SMEs make their products more familiar with foreign consumers.
(2) Thai SMEs can have more information about export demand.

4. Project Description

The project targets SMEs which are not well-known to the export markets and do not have enough information about export demand. The project is implemented by the government agencies and industrial associations, and intended to lay the foundation of export promotion by SMEs.

The project is composed of various kinds of activities which can be divided into two groups with different aims. The first group aims to make the existing SME products more familiar with foreign consumers. Its activities include making databases for SMEs and their products, opening of home pages for SME products, encouraging SMEs to participate in foreign trade fairs and exhibitions, giving packaging services for SME products, and campaigns for SME products via the mass media. The second group aims to make SMEs more familiar with demand in the export markets. Its activities include making a database of potential buyers in foreign countries, holding seminars on the market trends of foreign countries, and dispatching trade missions abroad.

The project aims at supporting SMEs' efforts for export marketing, through the above activities. For the implementation of the project, the DIP and the DEP will work out a five-year program, in cooperation with the FTI and the TCC.

5. Implementation Body and Financing Source

The DIP and the Department of Export Promotion (DEP) of the Ministry of Commerce should form a joint committee in cooperation with the Federation of Thai Industries and the Thai Chamber of Commerce. At the DIP, the Bureau of Industrial Sector Development (BISD) and the Bureau of Supporting Industries Development (BSID) should play leading roles as the government organizations working for the SMEs.

The DIP and the DEP should make the most of the FTI and the TCC to collect information on SMEs and their products, to carry out trade fairs and exhibitions, and to give marketing support like joint packaging services. Furthermore, Industrial Promotion Centers of the DIP should act as the core organizations for expanding export promotion activities in each region.

For financing the project, the government should make an annual budget.

6. Activities

(1) To make a database of potential foreign buyers
(2) To make a database of Thai SMEs and their products
(3) To make home pages for Thai SMEs and their products
(4) To develop packaging designs for Thai products
(5) To hold regular trade fairs for Thai SME products in Bangkok and other provinces
(6) To participate in trade fairs held in foreign countries
(7) To make marketing surveys on Thai SME products
(8) To hold regular seminars on export demand
(9) To dispatch trade missions abroad to collect marketing information
(10) To carry out campaigns for publicizing Thai SME products

7. Expected Benefits of the Project

The project can encourage SMEs to promote their export sales. Through the implementation of the project, exports from SMEs will increase in volume, value, and variety, to correct the trade imbalance and create employment.

8. Weakness of the Project

The project will not have immediate effects on the project purpose. Since the project is "foundation work," it may take much time to be effective.

Project No. 5.1 Development of Information Networks for SMEs

1. Rational

The surroundings of business firms are changing constantly. In particular, the progress of information-centered society, as represented by the internet and electronic commerce, is remarkably fast. Large enterprises are using advanced information technology to take strategic measures which go beyond mere rationalization. On the other hand, small and medium-size enterprises are far behind LEs even in the use of information technology for productivity improvement due to shortage of management resources, insufficient knowledge of information technology, or unwillingness to accept anything new. In Thailand too, there is no doubt that the delay in the use of advanced information technology will become a great obstacle to business activities in the future. In fact, for SMEs in the inland areas, it has already become a difficult problem how to obtain information which is useful for gaining access to their potential markets.

In order to disseminate information technology in remote areas, the Ministry of Industry is about to implement specific plans. However, those plans are intended primarily to improve the communications between the central and local offices of the Ministry of Industry. They do not contain measures to provide SMEs with direct support for participating in the on-going information revolution. Even so, the information improvement projects the Ministry of Industry is going to implement this year can be taken as its first step to support SMEs in using information technology. It is, therefore, realistic to work out an information promotion project for SMEs based on those projects of the Ministry of Industry. Of them, the projects being implemented by DIP and DIW can be a stepping stone for the proposed project.

(1) Dissemination of information on investment and trade for SMEs through IT

This is one of the IRP projects for this year. DIP is implementing this project in cooperation with the NSTDA, DEP, FTI, BOI, and others. The purpose of the project is to build a database of investment/business information in local areas and publish it through DIP's website. By this,

DIP aims to promote investments and business negotiations and increase employment opportunities in local areas. DIP first builds the database in nine months. In order to install terminal devices in the PIO offices throughout the country, PIO has purchased personal computers to train the staff of its local offices. The database is to contain the following information.

Geographical information
Investment opportunities
Governmental supports
Information about sites for industrial plants
Population, education, labor, etc.
Industrial structure and characteristics of individual industries
Strategic local industries

(2) DIW information network plan

This is a project being implemented by DIW, which manages the registration of industrial plants located throughout the country, for building an information network within it. For the moment, the information network will be used to exchange plant data between Bangkok and local areas. Ultimately, DIW plans to link the network to the LAN scheme of the Ministry of Industry. In order to install terminal devices in the PIO offices throughout the country, DIW Bangkok has already purchased personal computers. Currently, they are loading the personal computers with necessary software. According to one of the persons involved in the information projects of the Ministry of Industry, the SMEs that have introduced personal computers still account for less than 50% of all SMEs in the country. Thus, as far as SMEs are concerned, the improvement in terms of computer hardware is needed more urgently than the improvement in terms of software. During this year, each PIO office will have acquired two terminal devices, including one for DIP. The 11 local offices of DIP already have more than one personal computer. Using these terminal devices to show concretely the characteristics of information technology and demonstrate its usefulness to the managers of SMEs in local areas is the first step of information support to SMEs.

2. Purpose

(1) To provide SMEs in local areas with a support for introduction of information technology

(2) To promote investments and businesses of SMEs through the supply of accurate, reliable information

3. Output of the Project

(1) An information network for promoting economic activities of SMEs will be built.

(2) Proper maintenance of information for promoting economic activities of SMEs will be implemented.

(3) Mutual enlightenment among SMEs will be promoted through the use of the information network.

4. Project Description

In order to enable SMEs to expand their economic activities through the use of information technology and help to advance their management innovation smoothly, the project provides them with information support in the form of computer hardware and software. For SMEs in local areas which introduce information processing hardware, consulting services and a favorable depreciation plan or a tax incentive shall be offered. In terms of software, the use of the information network for effective utilization of information technology, the maintenance/supply of certain types of information, the consulting service of advisers, etc. shall be afforded to the SMEs. All these should be incentives for SMEs to introduce information technology. Concerning the education and training of employees of SMEs which are introducing information technology, there are already a good number of private institutions which provide appropriate services. In this project, therefore, they are left out of consideration.

The project focuses on the enlightenment of SMEs in information technology. Depending on the contents of incentives offered to SMEs, it will become necessary to provide a budgetary measure for encouraging SMEs to introduce information technology.

Linkage of information network between MOI and other ministries and public institutions will also be taken into consideration for further IT development.

5. Implementation Body and Financing Source

Industrial Information Center, Bureau of Industrial Promotion Policy and Planning of MOI; Budget Bureau of MOF

6. Activities

(1) A working group for disseminating information technology among SMEs in local areas shall be installed within the Ministry of Industry. This working group shall consist of representatives of IIC of DIP (the main member) and of BIED, ISMED, DIW, and OIE.
(2) The working group shall discuss means of information support of the government and make necessary adjustments with related agencies.
(3) IIC shall deploy the investment information data base project of IRP that is being implemented in specific areas in other areas as well and carry out demonstrations through local offices of the Ministry of Industry.
(4) In order to promote the investment in information technology by SMEs, the Ministry of Industry shall engage in enlightenment activity at its local offices.
(5) Certain incentives shall be afforded to SMEs which invest in information technology in line with the present project.

The roles that the individual departments and bureaus of the Ministry of Industry can play in the enlightenment activity at the local offices shall be discussed by the working group.

7. Expected Benefit of the Project

(1) SMEs in local areas can expand their economic activities by obtaining reliable product information.
(2) The information available at DIP's website helps promote investment.
(3) Much of the money that would otherwise be spent on the development of new markets in the Metropolitan area and overseas can be saved.

8. Weakness of the Project

The communication network infrastructure has been developed and maintained in the greater part of Thailand. There are, however, some areas where the infrastructure is incomplete. Besides, in terms of line speed and line capacity, the communication network infrastructure in Thailand is still inadequate.

Project No. 5.2 Improvement of Standards and Conformance Infrastructure to Promote Export

1. Rationale

1.1 Background of the Development of Standards and Conformance Infrastructure

The purpose of a national standards and conformance infrastructure is to provide the technical basis for everyday economic activities which include orderly commerce, national and international trade, technical coordination between manufacturers, and governmental regulatory activities. Fundamental to the achievement of this is an effective infrastructure for physical measurement, standards writing, testing, trade measurement, competency assessment and compliance certification.

The standards and conformance infrastructure facilitates the efficiency and competitiveness of a nation's industry. It contributes to economic performance by providing a common ground for members of a community to express volumes, quantities and technical characteristics of objects such as goods, services and systems. A highly respected and efficient standards and conformance infrastructure is a vital element in achieving international credibility and competing with the world's best.

1.2 What Is "Standards and Conformance Infrastructure" ?

The standards and conformance infrastructure is an important element of the set of infrastructures that support a nation's economic activities. The infrastructure can be generally divided into three components; measurement systems and services, the development of voluntary and regulatory standards, and conformance testing and certification.

(1) Measurement: Measurement provides the foundation without which our commercial and scientific activities would fail. A readily identifiable,

strongly scientifically based, and comprehensive measurement system is the foundation of a high quality standards and conformance infrastructure.

(2) Standards provide the basis for efficiency in producing and trading goods suited to the needs of the community.

(3) Conformance provides confidence in performance and certainty that goods and services meet specifications and that regulatory needs are being met.

BASIC FUNCTIONS OF STANDARDS AND CONFORMANCE INFRASTRUCTURE

Measurement System	Standards Development	Conformance
• Establish and maintain primary standards (physical standards) and secondary standards of measurement • Approve measuring equipment • Calibrate measuring equipment	• Develop and publish standards (standards writing) for goods, services and systems	• Accredit testers and certifiers to recognise their competence • Provide certification that products or systems meet standards • Test the attributes of goods, services and systems

Source: IDCJ Y/S

1.3 The Case in Thailand

Unfortunately most of the developing economies are little behind the world tendency on this issue. In case of Thailand, voluntary and compulsory standards are not yet clearly defined and regulated, and there are not many testing and calibration laboratories that are accredited and utilized. These issues are more critical for those SMEs that try to promote business on the basis of their products' quality and the company's credibility since they are not able to afford in-house testing laboratories as owned by large companies and multinational companies.

The above chart shows the components of standards and conformance infrastructure, and the proposed project is targeting at "Standards Development" and "Conformance" whereas currently in Thailand, National Institute of

Metrology (Thailand), with the support from the Government of Japan has been in the process of development of a national metrology system (targeting at left side of the above chart.) Therefore, both projects would complement each other.

2. Purpose

To support and improve the competitiveness of Thai industry to be accepted by overseas market through the improvement of standards and conformance infrastructure.

3. Output of the Project

(1) Study on economic impact for standards development by sector.
(2) Develop documentation and standardization of voluntary & compulsory standards with TISI.
(3) Comformity Assessment Infrastructure for Standards to be accepted by the international market.
(4) Establishment of strong position of Thai government to Mutual Recognition of Agreement.

4. Activities of the Project

4.1 Study on Economic Impact for Standards Development by Sector

4.1.1 Underlying Conditions

Table 1 indicates the "Manufactured Exports by Technological Category (1980-1995)." Thailand's exports analyzed by their technological base are still relying on cheap labor oriented or labor intensive manufacturing products. As of 1995, 36% of total exports is labor intensive although it has been continuously decreasing since 1980. Technologically complex products which include scale-intensive, differentiated and science based products have a 53% share and that is moderately increasing since 1990 when it was 40%.

In order to promote the exports of those technologically complex products, it becomes necessary to demonstrate the conformance on international standards or ISO/IEC standards. In the case of Thailand, looking at the export trend by commodities, electrical and electronics products are constantly increasing

(refer to Table 2). Since the electrical and electronics industry has three concepts as above mentioned (scale-intensive, differentiated, science based products), the study sets its target on this sector.

Table 1 Manufactured Exports by Technological Category 1980-1995

Unit: %

Thailand			
Type of Exports	1980	1990	1995
Resource based	22	14	11
Labor-intensive	47	46	36
Scale intensive	8	6	8
Differentiated	22	14	20
Science based	1	20	25
Technologically	31	41	54

Technologically complex products include scale-intensive, differentiated and science based products.

The study should be conducted in four phases as follows.

4.1.2 Phase I: Verify the Actual Situation of Document Standards and Set up Strategic Direction

(1) Study on electrical and electronic market: To find out the most influential products and country as well as their potential.
- World trend (imports & exports) in the electrical and electronics market
- Electrical and electronics market in Thailand based on its trading partners by country and by product and parts.

(2) Collect information on currently used compulsory and voluntary standards of TISI for the electrical and electronics industry in Thailand.

(3) Compare TISI standards with international standards (ISO/IEC) or documentary standards to verify the harmonization.

(4) Collect information of compulsory and voluntary standards of the electrical and electronics industry of major import and export countries.

(5) Establish strategy to implement the standards of voluntary standards which is essential for export promotion and compulsory standards (including safety standards and others).

(6) Hold a workshop to discuss the pros and cons of the implementation of strategy (5). The participants will be representatives of the Thai Chamber of Commerce, the Federation of Thai Industries, EEI, major export companies, MOI, MOC, MOSTE and other related organizations.

4.1.3 Phase II: Study on Calibration & Testing Activities in Electrical and Electronics Industry

The study will conduct the following:

(1) A questionnaire survey in Thailand of electrical and electronics companies
(2) Visits to electrical and electronics companies for interviews
(3) Getting information from the Chamber of Commerce and FTI
(4) Questionnaire survey to main trading countries such as Malaysia

4.1.4 Phase III: Study on Conformance Infrastructure in Thailand

The study will be executed by the following steps;

(1) Visit technical conformance related laboratories and organizations, such as NIMT, TISTR, DSS, EEI, TPI to collect information on actual activities and technical credibility. This includes the range of calibration services, testing services, uncertainties, period to complete requested calibration and testing service, fee charge, etc.
(2) Information on traceability of above mentioned related laboratories and organizations.
This is important for Phase 4.
(3) Workshop: Based on the result of this study by the participation of NIMT, TISTR, EEI, Chamber of Commerce, FTI and major exporters.

4.1.5 Phase IV: Study on Bottlenecks to Maintaining a Strong Position of the Government of Thailand to Achieve Mutual Recognition of Agreement

4.2 Develop Documentation and Standardization of Voluntary & Compulsory Standards with TISI

(1) Start to develop the documentation of voluntary and compulsory standards with TISI based on the above completed study.

(2) Promotional campaign to let the public understand the importance of the standards and conformance issue.

- Based on the study 4.1, the Government of Thailand coordinates with industry based organizations such as Chamber of Commerce and FTI about the practical effect of the introduction of compulsory standards.
- Facilitate the access to public and private testing and calibration services.
- Establish Thai safety regulations harmonized with international documentary standards.
- Application of voluntary and compulsory standards to Thai industry including but not limited to imported products.

4.3 Conformity Assessment Infrastructure Improvement for Standards to be Accepted by International Market

(1) Justify necessary standards' traceability charts and their technical acceptability in APEC.

(2) Promote intercomparison of standards of above 4.3 (1) which work for base of MRA

4.4 Establishment of Strong Position of Thai Government to Mutual Recognition of Agreement

(1) Promote the results of above intercomparison to APEC region countries to promote the technical credibility of standards infrastructure of Thailand.

(2) Promote the results of above intercomparison to industry and prepare directory of accredited laboratories to facilitate exports.

(3) Expand counter-part countries and sectors for Mutual Recognition of Agreement.

5. Project Description

5.1 Implementation Body

The Thai Industrial Standards Institute, MOI, is the core implementing agency of this project with strong coordination of Ministry of Industry, Ministry of Commerce, and National Institute of Metrology.

5.2 Implementation Schedule

	4th Q-1999	1st Q-2000	2nd Q-2000	3rd Q-2000	4th Q-2000	1st Q-2001
Study on economic impact						
Phase	■					
Phase	■	■				
Phase		■				
Phease		■				
Implementation of voluntary & compulsory standards			■	■	■	■
Improvement of conformity assessment infrastructure				■	■	■
MRA expansion activities						■

5.3 Points Needing to be Mentioned

For the success of this proposed project, Activity No. 4.1 "Study on economic impact for standards development by sector" is the most important part. The study should take place for six month in total as stated in the implementation schedule above. The following actions and strategies differ depending on the results of the study.

Human resource planning for the six months is as follows;

(1) One project manager (standards and conformance expert)
(2) One coordinator/economist (standards and conformance expert)
(3) One voluntary standards expert
(4) One compulsory standards expert
(5) Sector expert

Project No. S1: Setting-up of Thailand Automotive Institute

1. Rationale

1.1 Policy of the Ministry of Industry

1.1.1 Background of the Concept for Institutional Building

In January 1998, The Government of Thailand has announced its Cabinet approval of the Industrial Restructuring Plan proposed by the Ministry of Industry. The purpose of IRP is to cope with the Thai's economic recession through the improvement of Thai's international competitiveness and export expansion, and the "Concept for Institutional Building" is one of the means to execute IRP's Action Plans.

The Ministry of Industry consists of six departments, namely (1) Office of the Permanent Secretary, OPS; (2) Department of Mineral Resources, DMR; (3) Department of Industrial Works, DIW; (4) Department of Industrial Promotion, DIP; (5) Thai Industrial Standards Institute, TISI; and (6) the Office of Industrial Economics, OIE. Under Ministry of Industry there are three state enterprises and seven non-profit institutes some of which including Thailand Automotive Institute are in the process of setting up.

Although the MOI's main responsibilities are policy-making, budget distribution and monitoring, ministry has become deeply involved in service activities directly affecting the industries, such as research, inspection, testing and human resource development and training, and in turn, their main responsibilities were left behind. In order to focus on the policy-making, budget planning and distribution and monitoring, the MOI has been promoting institution building to transfer some of their activities to those institutes.

Thailand Automotive Institute is an independent and non-profit organization under Industrial Development Foundation, Ministry of Industry, was established in July 1998. The automotive related activities which Thai Industrial Standards Institute has been offering such as testing and certification services will be transferred to TAI. Mr. Alongkot Chutinan from the Siam Cement Public Company Limited was selected as Managing Director for Thailand Automotive Institute. The primary objective of the institute is to enhance the competitiveness of the Thai automotive industry in the global market. The budget for the first year beginning August 1998 was 16 million bahts. After five years the institute is to become independent from the Government support.

Its initial responsibilities when TAI was established were as follows;

(1) Provides testing for automobiles, automotive parts as well as raw materials in the following areas;

- Emission Testing
- Safety Testing
- Product Testing
- Material Testing

(2) Provides automotive-related information, consultation and training to elevate the standard of Thai automotive industry to the international level.

(3) Coordinates and cooperates among related agencies, including governmental and private and local and international agencies, to ensure systematic development of the Thai automotive industry.

(4) Conducts research on automotive-related topics in order to make recommendation on policies, strategies, and development plans for the industry.

1.2 Desires of the Automotive and Auto-parts Industry

Thailand leading automotive assemblers, mostly Japanese assemblers, have been shifting their effort from the domestic market to exporting market to cope with the

recession. In the structure of automotive industry, under assemblers, there are three types of suppliers:

(1) Global suppliers in Tier 1 suppliers

(2) Local suppliers in Tier 1 suppliers

(3) Local suppliers in Tier 2 suppliers or lower.

Tier 1 means the suppliers selling parts directly to assemblers, and Tier 2 means the suppliers selling parts to Tier 1.

There used to exist a small gap between global and local suppliers in overall capabilities, such as quality, cost, delivery and development. The gap is now getting wider because of the shift of assemblers' target from the domestic to the export market. The local suppliers are now being left behind that they are not able to improve their standards enough to cope with world competitions.

The Thailand Automotive Institute through its activities tries to solve those problems existing in the industry and to meet its needs in order to improve SMEs competitiveness for export. TAI will also act as a coordinator between the Thai government and automotive industry.

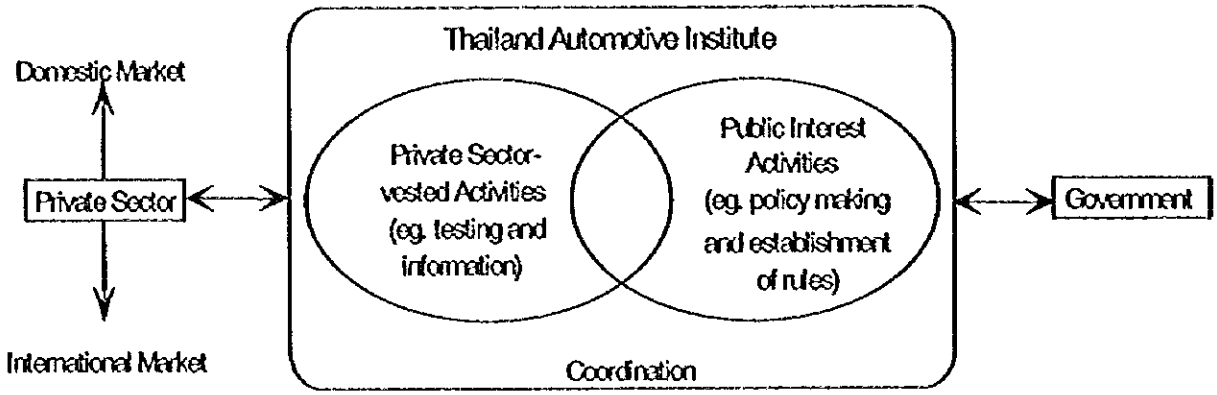
2. Purpose

The purpose of establishing of the Thailand Automotive Institute is to meet the needs of the private sector and to support and promote their competitiveness in the domestic and international market.

3. Output of the Project

The principal mission is to achieve good coordination between private sector and the government under the single umbrella of TAI.

Private Sector and the Government under the TAI Umbrella



3.1 Policy Making Support

In order to promote the automotive industry, the MOI needs all sorts of research and survey for the policy making process. TAI will execute those research and survey tasks on and the basis of contracts with MOI.

3.2 Information Service

TAI provides all sorts of information such as market and technology information through their publications and data base. With this service, TAI will assist the automotive industry.

3.3 Testing and Certification Services

TAI provides testing and certification services in order to contribute for the improvement of consumer protection for domestic market and to upgrade Thailand's automotive and autoparts market competitiveness.

3.4 Consultation Services

TAI transfers technology, and administrative and management skills in order to improve the competitiveness of automotive parts industry.

4. Project Description

This project is aimed at servicing private sector needs for testing, certification and consultation services. At the same time, the project will support the Ministry of Industry in strategy making for the automotive industry's development.

4.1 Implementing Agency

Thailand Automotive Institute is the implementing agency for this project. TAI was established by the Ministry of Industry and it is an independent, non-profit organization.

4.1.1 Location

(1) Head Office: For the first one year starting from May 1999

Address: 6th Floor, Technology Promotion Institute
534/4 Soi Phatthanakarn 18, Phatthanakarn Rd.,
Suanluang, Suanluang, Bangkok 10250

Expenses: Bt 250/sq.meter * 240sq.met = Bt 60000/month

From the second year

Address: BSID
Expenses: initial cost for renovation
rents free

(2) Testing Center: TISI-Bampoo Testing Center

4.1.2 List of Available Equipment and Facilities at TISI

Equipment and facilities of TISI-Bampoo Testing Center will be transferred to TAI and EEI, and they are now in the procedure of separation. TISI has following facilities and equipment;

Building and equipment for emission testing of benzine oil automotive
Building and equipment for measuring of toxic gas from benzine
Building and equipment for emission testing of motorcycle
Building and equipment for emission testing of small car using diesel oil
Building and equipment for emission testing of big car using diesel oil
Building and equipment for two-step engine oil testing
Safety testing equipment for helmet (Industrial Standard No. 369)
Safety testing equipment for automobile glass
(Industrial Standard No. 196,197, 198)
Testing equipment for tire especially for small cars
(Industrial Standard No. 367)
Testing equipment for tube (Industrial Standard No. 651)
Testing equipment for tire and tube for motorcycle
(Industrial Standard No. 682, 683)
Testing equipment for lead-acid type battery for automobile
(Industrial Standard No. 6)
Exhaust pipe testing machine for motorcycle (Industrial Standard No. 341)
Exhaust pipe testing machine for automobile (Industrial Standard No. 340)
Testing equipment for break pad of automobile and motorcycle
(Industrial Standard No. 97)
Vibro tester
Pincer tester
Coil spring tester

4.1.3 Government Budget Plan for Setting up TAI

For the five years starting with fiscal 1999, the TAI will receive a total of 100 million bahts. This five-years budget is considered to be an initial setting-up

budget. Afterward, the TAI can ask for a supporting budget to compensate for additional investment and operational cost.
Together, the head office and testing center are provided by MOI free of charge.

Total of Bt 100 million for 5 years

1st Year (Oct. 1, 1999 --Sep., 2000)

Bt 16.2 million (This amount is paid in three tranches)

(1) 5.97 million

(2) 8 million

(3) the rest

2nd Year Bt 20 million (tentative)

5. Implementation Body and Financing Source

Thailand Automotive Institute

6. Activities

In order to achieve the above mentioned output, the following sets of activities should be implemented.

6.1 Policy Making Support

It is important to set up an early warning system for quick monitoring of global economic and trade problems as well as the generation of proposals for appropriate solutions to maintain the competitiveness of the Thai automotive industry. This policy making support should be contracted for and paid for in reasonable compensation for the expenditure needed, by the government.

6.1.1 Automotive and Auto-parts Sector Studies

When asked by the government, TAI will always be prepared to offer the sector studies and trend, market projections and industry strategic analysis based on its sophisticated data base which is established with the activities listed in 4.2.

6.1.2 Policy Recommendation Studies

The TAI will fully utilize the voice and opinions of industry so that they can be reflected in policy recommendations to the government.

6.1.3 Specific Sector Studies

The TAI is capable of conducting specific sector studies such as emerging issues. Because it is close to the industry and keeps its database, it can response quickly to the issues of the industry and make current sound recommendations to the government.

6.1.4 Standards Development with TISI

TAI will support standards development with TISI for automotive industry and auto-parts industry.

The Industrial Product Standards Act, B.E.2511 (1968) has been the basis of industrial standards in Thailand for manufacturers and importers until now. These standards and regulations are implemented and maintained by TISI. In the Industrial Products Standards Act,B.E.2511, standards are defined as listed below.

Specifications on one or many of descriptions concerning the following ;

(1) Kind, type, shape, dimension, manufacture, equipment, quality, grade, component, faculty, durability and safety of the industrial products

(2) Methods of manufacture, design, drawing, usage, material used for the industrial products and safety concerning the manufacture of the industrial products

(3) Kind, type, shape, dimension of packages or other kinds of containers including the making of packages or other kinds of containers, and methods of packing, wrapping or binding and materials used therefore

(4) Methods of experiment, analysis, comparison, examination, testing and weighing and measuring in volume and size concerning the industrial products.

Based on the globalization, world is in the process of standardization of such product standards and methods of testing due to market demand and TAI will follow such movement to keep the competitiveness of Thai automotive industry. To achieve such a purpose, TAI will work together with TISI to develop new standards.

6.2 Information Service

6.2.1 Development of a Databases for the Automotive and Auto-parts Industries

TAI sets up and up-dates periodically the following data bases;

(1) Automotive and Auto-parts Industry Data

(1-1) Production Volume in Thailand & in the world (country by country) for passenger cars, 1-ton pick up trucks, heavy trucks, motorcycles, etc. The following categories should be included;

(a) Vehicle assemblers production capacity and utilization

(b) Parts manufacturers (engine, plastic, electrical equipment, etc.)

(c) Supporting industries (sheet metal, casting, plastic, molds & dies, etc.)

(1-2) Employment structure of (1-1) by category

(1-3) Sales volume in Thailand and the world

(1-4) Market share in Thailand by types of cars

(2) Automotive and Auto-parts Company Profiles

Thai and foreign companies active in Thai should be listed.

(3) Thai and Foreign Companies' Investment Trend in the Automotive and Auto-parts Industries

(4) Information source include the following

- Board Members of the TAI
- Office of Industrial Economics, Ministry of Industry
- Department of Export Promotion, Ministry of Industry
- Department of Industry Promotion, Ministry of Industry
- The Federation of Thai Industry
- Auto-Parts Industrial Club
- The Federation of Thai Industries
- Thai Automotive Industry Association
- Thai Auto-Parts Manufacturers Association
- Thai Auto-Parts Manufacturers Association
- Thai Society of Automotive Engineers
- Japanese Chamber of Commerce, Bangkok
- JETRO

6.2.2 Publication of Data and Data Analysis

Based on the information collected in 4.2.1, TAI can publish those data and data analyses.

6.2.3 Publication of Sector Studies

Based on the information collected in 4.2.1, TAI conducts sectoral studies as mentioned in 4.1 activities and publishes them.

6.2.4 Publication of Periodical Sector News

Based on the information collected in 4.2.1, TAI publishes its periodical sector news, distributed to TAI-registered or listed companies in return for their offering of data to TAI. Also, the publication can be used for marketing and public relations on behalf of TAI activities.

6.2.5 Development of a Consultants Database

The development of a database for consultants is directly connected to the activities of 4.4, the consultation services. The TAI lists the details of consultants including, name, contact address, status, and area of skills and technics, so that the TAI can match the needs of a company with an appropriate available consultants.

6.3 Testing and Certification Services

TAI executes testing and certification services based on Thai Industrial Products Standards Act 1968. These activities are directly transferred from TISI. The activities cover the following areas.

6.3.1 Safety Testing and Certification

The regulatory requirements of Thailand related to Automotive Testing to demonstrate of compliance and , such as;

TIS 196-2536 (1993) Automobile Safety Glass : Laminated Safety Glass
TIS 197-2536 (1993) Automobile Safety Glass: Tempered Safety Glass

TIS 198-2536 (1993) Automobile Safety Glass: Zone Tempered Safety Glass
TIS 721-2539: Automobile Safety Belts

6.3.2 Emission Testing and Certification

The regulatory requirements of Thailand related to Automotive Emission Testing and Certification, such as:

TIS 1440-2540 (1997) Gasoline Engined Vehicles: Safety Requirements: Emission from Engine, Level 5

TIS 1435-2540 (1997) Light Duty Diesel Engined Vehicles: Safety Requirements; Emission from Engine, Level 4

6.3.3 Testing for Importing Products and Parts Based on TISI Standards

Based on Ministerial Regulation No.6 (B.E.2516) issued under the Industrial Product Standards Act, B.E. 2511, a person who intends to import for sale in the Kingdom any industrial products which are required by Royal Decree to conform with the standard shall apply for testing to TAI.

6.3.4 Testing for Exporting Products and Parts Based on Counterpart Standards

Based on the counterpart standards, TAI will execute testing for exporting products and parts. For example, the following are the requirements from Australian Authorities (Federal Office of Road Safety) ;

Australian Design Rule 8/01 Safety Glazing Material
Australian Design Rule 37/01 Emission Control for Light Vehicles
Australian Design Rule 30/00 Diesel Engine Exhaust Smoke Emission
Australian Design Rule 70/00 Exhaust Emission Control for Diesel Engined Vehicles
Australian Design Rule 4/03 Seat Belts

6.4 Consultation Services

6.4.1 Factory-Clinic Services

Based on the Data Bank for Consultants as mentioned in 4.2.5, the TAI provides so-called "Pinpoint-Clinic Services" to clients. A client or company asks for advice and improvement of a certain issue to the TAI, and the TAI defines the issues and matches the most appropriate consultant to the client. Those consultants listed in the databank are not only from or connected to Thailand but also from all over the world.

6.4.2 R&D Support Services

Based on the Data Bank for Consultants mentioned in 4.2.5, the TAI also provides &D supporting services for SMEs through the TAI's factory-clinic services. The purpose of that is to improve the R&D capability for the SMEs.

6.4.3 Intermediary Services to Other Institutes

There are seven institutes under MOI including the TAI together with other private and non-profit institutes and organizations. The TAI can share the data base of those institutes and can act as an contact point in order to maximize the utilization of existing institutes.

7. Expected Benefit of the Project

The expected benefit of the project is two ways. One is that the project contributes to support Thailand automotive industry through their activities to meet the needs of private sectors and to support and promote their competitiveness in the domestic and international market. Secondly, the project contributes to the Thai Government for their policy-making on automotive industry development in Thailand.

There are some strength of this project to be successful such that (1) a huge demand is expected for the services offered by the TAI, (2) word-class assemblers in Thailand are supportive for the activities of the TAI, and (3) some of the equipment and machinery has already been prepared through TISI.

8. Weakness of the Project

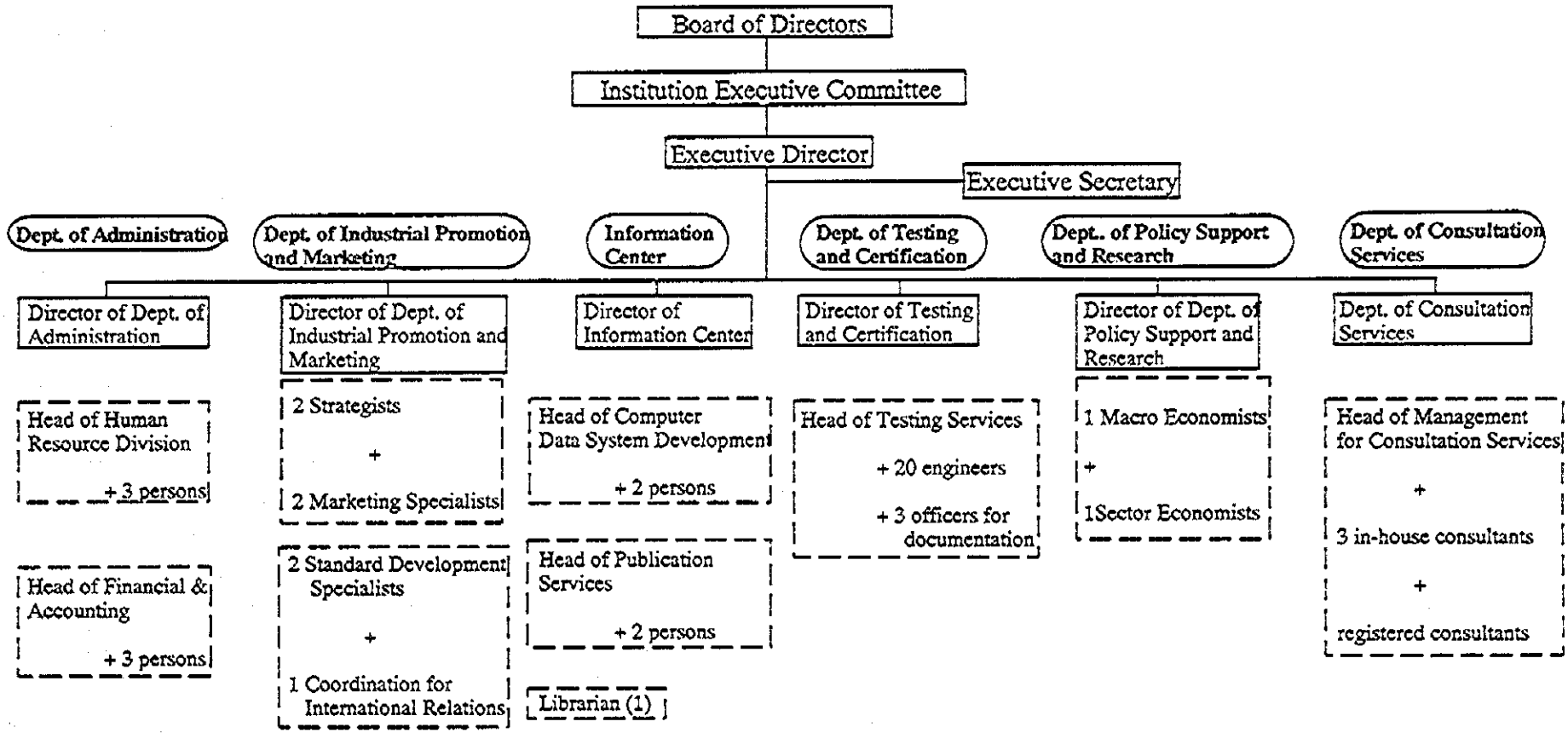
- A strong marketing effort is needed to take in as many players possible as in the demand market.
- A number of engineers should be trained.

9 Implementation Schedule

9.1 Implementation Schedule: 5-year Plan for the Thailand Automotive Institute

		1999	2000	2001	2002	2003
I. Policy Making Support						
	1.1 Automotive and Auto-parts Sector Studies					
	1.2 Policy Recommendation Studies					
	1.3 Specific Sector Studies					
	1.4 Standards Development with TISI					
	1.5 International Coordination for Standards Development and MRA					
II. Information Service						
	2.1 Development of Data Base for Automotive and Auto-parts Sectors					
	2.2 Publication of Data and Data Analysis					
	2.3 Publication of Sector Studies					
	2.4 Publication of Periodical Sector News					
	2.5 Development of Data Bank of Consultants					
III. Testing and Certification Services	Phase-1: Using Current TISI-Standards					
	3.1 Safety Testing and Certification of Products and Parts Based on TISI					
	3.2 Compulsory Standards Testing Based on TISI					
	3.3 Voluntary Standards Test					
	3.4 Safety Testing and Certification of Products and Parts Based on International Standards					
IV. Consultation Services						
	4.1 Factory Clinic Services					
	4.2 R&D Supporting Services for SMEs					
	4.3 Intermediary Services to Other Institutes					

9.2 Organization Chart and Human Resource Planning for Automotive Institute (1999-2003)



10 Financial Projection

10.1 Explanatory Notes and Conditions

(A) Salary Plan for TAI is based on the per-person salary amounts for the year of 1999 proposed by TAI.
*Compared with EEI, TAI sets their salaries higher, and this may become a burden for their cashflow.
TAI: B37,000/person-month EEI: B28,000/person-month
**No adjustment is made for inflation and the cashflow analysis uses year 1999 prices.

(B) Overhead is calculated as 100% of salary and wages and includes the following;
- Pension contribution
- Insurance
- Medical allowance
- Allowance for committee meetings
- Training and others

* EEI sets the overhead as 50% of their salary and wages.

(C) For the Material Expenditure, the TAI plans a budget of 1,400,000 bahts per year.

(D) For the Utilities, the TAI plans a budget of 1,980,000 bahts per year.

(E) For the Durable Articles, Land and Building, the TAI plans a budget of 2,000,000 bahts per year.

(F) The Miscellaneous fee is calculated as 10% of the total of Salary & Wages and Overhead & Other Expenditure.

(G) Total Operating Cost is considered to be, in turn, "Expected Income" or "Income Target." This Expected Income is divided among income generating departments in order to set a target income for their activities.

10.2 Explanatory Notes and Conditions in Detail on Income for Thailand Automotive Institute

1. Policy Making Support - Contract research for the Government

1.1 Study projects for sub-sector, policy recommendation and specific issues H

(1) For the 1st year: 5 studies/year x 300,000 bahts = B1,500,000/y

(2) One study shall be added annually until the 5th year

1.2 Coordination for making product standards I

(1) For the 1st year: 1 person x 8 man-months/year x B111,000 = B888,000/y
- three times the annual wage of B37,000-

(2) For the 2nd year to 5th year: 2 persons x 8 man-months/y x B111,000 = B1,776,000/y

1.3 Profit and Loss

Profit from the Policy Making Support services will be one of the main sources of revenue for the TAI.

2. Information Service

2.1 Member Fees

(1) For the 1st year: 100 companies x B20,000 = B1,000,000/y J

(2) 50 companies shall be added annually until the 5th year

* Member shall get the following free of charge

(a) Publication of data and data analysis reports

(b) Publication of sector study reports

(c) Publication of monthly newsletters

2.2 Publication (1) Publication of Data and Data Analysis Reports K

(1) For the 1st year: 50 copies x B500/copy = B15,000/y

(2) For the 2nd year to 5th year: 30 copies are added annually

2.3 Publication (2) Publication of Sector Report L

(1) For the 1st year: 50 copies x B500/copy = B15,000/y

(2) For the 2nd year to 5th year: 30 copies are added annually

2.4 Seminar M

(1) For the 1st year: not feasible

(2) For the 2nd year: One Seminar x B200,000 = B200,000/y

(3) For the 3rd year to 5th year: Two Seminars x B200,000 = B400,000/y

2.5 Profit and Loss

The Information Service is not the profit making services, however, regardless of this fact, their services are necessary for the industry itself as well as Thai Government to keep the records and statistics of the sector.

3. Testing and Certification Services

3.1 Testing and Certification Services N

(1) Number of units and price are based on the TAI proposal

(2) About Operational Ratio: O

- For the 1st year: Operational Ratio shall be 50% since half of the engineers and technicians will be receiving training.

- For the 2nd year to the 4th year: Operational Ratio shall be 70%, 80% and 90% consecutively.
- At the 5th year, Operational Ratio shall be 100% which is at the break-even point.

3.2 Profit and Loss

Testing and Certification Services will not make much profit for the beginning of the stage, however, with the development of compulsory and voluntary standards the needs for the services will expand and it will change to the profit making sector.

4. Consulting Services (Factory-Clinic Services: Consultation Services for R&D is also included) P

4.1 Conditions

- Two foreign experts will visit a factory once a month spending 3 days per visit for factory clinic services.
- The two can assist of 7 factories in one visit to Thailand and will continue a year for a factory or 3-day x 12-time visits for clinic.

4.2 Cost for Foreign Expert

- Remuneration: B400,000/mm x 12months/y = B4,800,000/y
- Out-of-pocket expenses: B100,000/mm x 12 months = B1,200,000/y
- Total Cost: B6,000,000/y (Cost per factory = B6,000,000/y)
- Each beneficiary factory will pay 25% of the total cost or B150,000/y and the rest shall be met by either government subsidies or foreign aid, or a combination thereof.

4.3 Income for the Institute

- 15% of the total cost or B900,000/y per pair shall be appropriated to management fee for the institute.
- For the 1st year: 3 pairs
- For the 2nd year to 5th year: 5 pairs

4.4 Profit and Loss

Consulting Service is also one of the profit making services.

10.3 Explanatory Notes for Maintenance Fee for Existing Equipment and Facilities of TISI

1. Maintenance fee for existing equipment and facilities which are transferred from TISI to TAI is considered as in Appendix3.
2. Those cost should be covered by an additional government subsidy.

10.4 Explanatory Notes and Conditions on Acquisition of New Equipment for TAI

1. The JICA-Team recommends that for TAI the acquisition of new equipment for testing facilities is necessary, however, not until or with the establishment of automobile and auto-parts related regulations which are harmonized with international standards.
2. There are basically only four types of safety test for automobile and auto parts regulated by TISI, therefore, sales from testing services will be very limited. Therefore, the development of standards for the automotive industry to cope with the international standards is the priority issue not only for TAI but for MOI-TISI and much effort is required.
3. Thus, the TAI for the coming five years shall concentrate on policy making support services and consultation services.

10.5 Expansion of TAI Branches

It might be rational for TAI to establish branches in other industrial zones of Thailand such as Rayong, in order to facilitate automotive plants in terms of training services, and to act as ports to obtain auto parts from these plants, to be tested in Bagpoo testing center. The expansion of TAI branches however, will be considered and in active after the given 5-year project schedule. The priority for TAI is to establish a strong base for this given 5 years to be self-sufficient in order to expand their activities in the future.

Cash Flow

PROJECTED CASH FLOW OF THAILAND AUTOMOTIVE INSTITUTE

(Unit: Million Bahts)

	Year 1 FY1999	Year 2 FY2000	Year 3 FY2001	Year 4 FY2002	Year 5 FY2003
A. Cash Inflow	**80.04**	**81.76**	**83.79**	**87.12**	**95.45**
A-1: Income from Operations					
(1) Policy Making Support	2.39	3.58	3.88	4.18	4.48
(2) Information Services	2.05	3.28	4.51	5.54	6.57
(3) Testing and Certification Services	6.00	10.50	16.00	18.00	25.00
(4) Consulting Services	2.70	4.50	4.50	4.50	4.50
A-2: Subsidies					
(1) Investment to Fixed Assets					
(2) Assistance for Factory Clinic Services	18.00	30.00	30.00	30.00	30.00
(3) Maintenance Fee for Equipment & Facilities of TISI	48.90	29.90	24.90	24.90	24.90
B. Cash Outflow	**98.21**	**109.77**	**114.54**	**118.45**	**122.35**
B-1: Operating Cost					
(1) Sales and Wages	11.54	19.98	24.42	26.20	27.97
(2) Overhead and other expenses	19.77	29.89	35.22	37.35	39.48
B-2: Investment to Fixed Assets					
B-3: Hiring of Thai and Foreign Consultants	18.00	30.00	30.00	30.00	30.00
B-4: Maintenance Fee for Equipment & Facilities of TISI	48.90	29.90	24.90	24.90	24.90
C. Gross Cash Surplus (Deficit) A-B	-18.17	-28.01	-30.75	-31.33	-26.90
D. Government Subsidy	16.00	22.00	22.00	20.00	20.00
F. Net	-2.17	-6.01	-8.75	-11.33	-6.90

Project Cost of TAI Institute
(Million Bahts)

	Cost Items	Cost	Remarks
A.	**Existing Facilities**		Facilities and properties transferred from TISI
A-1	Land at site	Rental, free of charge	TISI's Bampoo Testing Center
A-2	Buildings at site	Rental, free of charge	
A-3	Equipment & machinery	Rental, free of charge	See Appendix1 (list of existing equipment & machinery)
A-4	Head quarter office	Rental, free of charge	
A-5	Maintenance fee for existing facilities	153.5	See Appendix3
B.	**Acquisition of New Facilities**	**9.4**	
B-1	Equipment & machinery		
B-2	Office equipment	8.5	See Appendix2
B-3	Furniture & fixtures	-	See Appendix2
B-4	Miscellaneous and contingency	0.9	10% of B-1 to B-3
C.	**Operating expenses**	**271.8**	See Option3
C-1	Salaries & wages	110.1	
C-2	Overhead	110.1	C-1*100%
C-3	Material Expenditure	7.0	
C-4	Utilities	9.9	
C-5	Durable Articles, Land and Building	10.0	
C-6	Others	24.7	
Total Project Cost		**434.7**	**Million Bahts**

Human Resources Plan for Thai Automotive Institute

		1999	2000	2001	2002	2003
Executive Director		*1*	*1*	*1*	*1*	*1*
Dept. of Administration	Director	1	1	1	1	1
	Division Head		2	2	2	2
	Officer	2	2	4	4	6
	Dept. Total	*3*	*5*	*7*	*7*	*9*
Dept. of Industrial Promotion and Marketing	Director	1	1	1	1	1
	Strategist		1	1	2	2
	Marketing specialist	1	1	2	2	2
	Standard Dev. Specialist	1	2	2	2	2
	Internatinal Relations	0	1	1	1	1
	Dept. Total	*3*	*6*	*7*	*8*	*8*
Information Center	Director	1	1	1	1	1
	Division Head	1	2	2	2	2
	Officer		2	5	5	5
	Dept. Total	*2*	*5*	*8*	*8*	*8*
Testing and Certification Center	Director	1	1	1	1	1
	Division Head	1	2	2	2	2
	Engineer/Technician	7	14	16	18	20
	Officer	1	2	2	3	3
	Dept. Total	*10*	*19*	*21*	*24*	*26*
Dept. of Policy Support and Research	Director	1	1	1	1	1
	Economist	1	1	2	2	2
	Dept. Total	*2*	*2*	*3*	*3*	*3*
Dept. of Consultation Services	Director	1	1	1	1	1
	Division Head		1	1	1	1
	In-house Consultants	2	2	3	3	3
	Dept. Total	*3*	*4*	*5*	*5*	*5*
Executive Secretary		1	1	1	1	1
Driver		1	2	2	2	2
TOTAL		26	45	55	59	63

Salary Plan for Thai Automotive Institute

*based on the amount of per-person salary for the year of 1999 proposed by TAI)

(Bahts)	1999	2000	2001	2002	2003	TOTAL	
Average/person.month	37,000	37,000	37,000	37,000	37,000		A
Average/person.year	444,000	444,000	444,000	444,000	444,000		
No. of Staffs	26	45	55	59	63		
TOTAL COST FOR HUMAN RESOURCES (A)	11,544,000	19,980,000	24,420,000	26,196,000	27,972,000	110,112,000	

Overhead & Other Expenditure	1999	2000	2001	2002	2003	TOTAL	
1. Overhead (A) x 100%	11,544,000	19,980,000	24,420,000	26,196,000	27,972,000	110,112,000	B
2. Material Expenditure	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	7,000,000	C
3. Public Utility Expenditure	1,980,000	1,980,000	1,980,000	1,980,000	1,980,000	9,900,000	D
4. Durable Articles, Land and Building	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000	E
Sub-total (B = 1+2+3+4)	16,924,000	25,360,000	29,800,000	31,576,000	33,352,000	137,012,000	
5. Miscellaneous: (A+B) x 10%	2,846,800	4,534,000	5,422,000	5,777,200	6,132,400	24,712,400	F
TOTAL: (C)	19,770,800	29,894,000	35,222,000	37,353,200	39,484,400	161,724,400	

Total Operating Cost and Expected Income Analysis for TAI						TOTAL	G
Total Operating Cost (A) + (C)	31,314,800	49,874,000	59,642,000	63,549,200	67,456,400	271,836,400	
Breakdown by Income Generating Department							
Dept. of Policy Support and Research	3,131,480	2,770,778	4,066,500	3,971,825	4,047,384	17,987,967	
Information Center + Dept of Industrial Promotion and Marketing	7,828,700	15,239,278	20,332,500	21,183,067	21,586,048	86,169,592	
Dept. of Testing and Certification Center	15,657,400	26,322,389	28,465,500	31,774,600	35,077,328	137,297,217	
Dept. of Consultation Services	4,697,220	5,541,556	6,777,500	6,619,708	6,745,640	30,381,624	

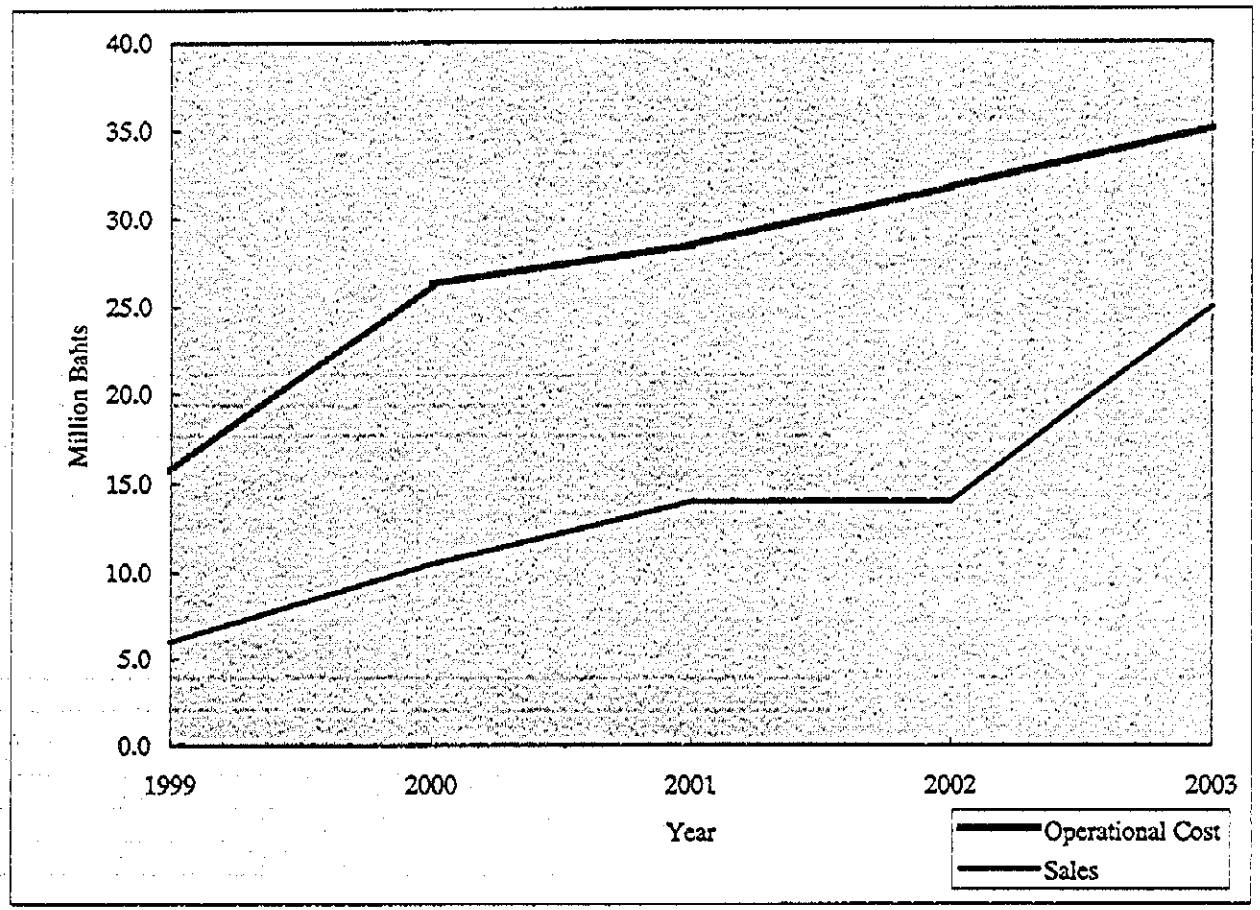
Sales Breakdown and Profit/Loss Estimates for Thailand Automotive Institute

(Bahts)	1999			2000			2001			2002			2003			*
	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	
1. Policy Making Support (Dept. of Policy Support and Research)																
1.1 Study project	5	300,000	1,500,000	6	300,000	1,800,000	7	300,000	2,100,000	8	300,000	2,400,000	9	300,000	2,700,000	H
1.2 Standards Development	1*8	111,000	888,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	I
Sub-total			2,388,000			3,576,000			3,876,000			4,176,000			4,476,000	
Operational Cost			3,131,480			2,770,778			4,066,500			3,971,825			4,047,384	
Achievement(%)			76.3			129.1			95.3			105.1			110.6	
2. Information Service (Dept. of Information Center + Dept. of Industrial Promotion and Marketing)																
2.1 Member Fees	100	20,000	2,000,000	150	20,000	3,000,000	200	20,000	4,000,000	250	20,000	5,000,000	300	20,000	6,000,000	J
2.2 Publication (1)	50	500	25,000	80	500	40,000	110	500	55,000	140	500	70,000	170	500	85,000	K
2.3 Publication (2)	50	500	25,000	80	500	40,000	110	500	55,000	140	500	70,000	170	500	85,000	L
2.4 Seminar	0	200,000	0	1	200,000	200,000	2	200,000	400,000	2	200,000	400,000	2	200,000	400,000	M
Sub-total			2,050,000			3,280,000			4,510,000			5,540,000			6,570,000	
Operational Cost			7,828,700			15,239,278			20,332,500			21,183,067			21,586,048	
Achievement(%)			26.2			21.5			22.2			26.2			30.4	
3. Testing and Certification Services (Testing and Certification Center)																
3.1 T/C Service	1,200	10,000	12,000,000	1,500	10,000	15,000,000	2,000	10,000	20,000,000	2,000	10,000	20,000,000	2,500	10,000	25,000,000	N
Sub-total			12,000,000			15,000,000			20,000,000			20,000,000			25,000,000	
Utilization Ratio & Sales		50%	6,000,000		70%	10,500,000		80%	16,000,000		90%	18,000,000		100%	25,000,000	O
Operational Cost			15,657,400			26,322,389			28,465,500			31,774,600			35,077,328	
Achievement(%)			38.3			39.9			56.2			56.6			71.3	
4. Consulting Service (Dept. of Consultation Services)																
	3	900,000	2,700,000	5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	P
Sub-total			2,700,000			4,500,000			4,500,000			4,500,000			4,500,000	
Operational Cost			4,697,220			5,541,556			6,777,500			6,619,708			6,745,640	
Achievement(%)			57.5			81.2			66.4			68.0			66.7	
TOTAL SALES			13,138,000			21,856,000			28,886,000			32,216,000			40,546,000	
TOTAL OPERATIONAL COST			31,314,800			49,874,000			59,642,000			63,549,200			67,456,400	
Profit/Loss(a)			-18,176,800			-28,018,000			-30,756,000			-31,333,200			-26,910,400	
Achievement(%)			42.0			43.8			48.4			50.7			60.1	
Subsidy(b)			16,000,000			22,000,000			22,000,000			20,000,000			20,000,000	
(a) + (b) =			-2,176,800			-6,018,000			-8,756,000			-11,333,200			-6,910,400	

Utilization Ratio for the Testing and Calibration Services

Operating Ratio	1999	2000	2001	2002	2003
10%	1,200,000	1,500,000	2,000,000	2,000,000	2,500,000
20%	2,400,000	3,000,000	4,000,000	4,000,000	5,000,000
30%	3,600,000	4,500,000	6,000,000	6,000,000	7,500,000
40%	4,800,000	6,000,000	8,000,000	8,000,000	10,000,000
50%	6,000,000	7,500,000	10,000,000	10,000,000	12,500,000
60%	7,200,000	9,000,000	12,000,000	12,000,000	15,000,000
70%	8,400,000	10,500,000	14,000,000	14,000,000	17,500,000
80%	9,600,000	12,000,000	16,000,000	16,000,000	20,000,000
90%	10,800,000	13,500,000	18,000,000	18,000,000	22,500,000
100%	12,000,000	15,000,000	20,000,000	20,000,000	25,000,000

	50%	70%	80%	90%	100%
Million Bahts	1999	2000	2001	2002	2003
Operational Cost	15.7	26.3	28.5	31.8	35.1
Sales	6.0	10.5	14.0	14.0	25.0


40.0
35.0
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Million Bahts
1999
2000
2001
2002
2003
Year
Operational Cost
Sales

Appendix 1: List of Existing Equipment & Machinery at TISI-Bampoo

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
1	High voltage testing device consists of			8,878,000		438/1					JICA	1990	4.00x4.50(18)
	1. Control board				C7.07.00	438/1-1	OGAWA SEIKI	OSK6593	1	108			
	2. Impulse generator	1			C7.07.00	438/1-2	TTC	-	1	108			in the cabinet
	3. Digital storageoscilloscope (for recording data)	1			B0Z0866	438/1-3	TEKTRONIX	2221	1	108			in the cabinet
	4. Oscilloscope camera	1			016-0359	438/1-4	TEKTRONIX	C-5C	1	108			in the cabinet
2	Card flexing tester consists of			4,156,000	Ca.10.00a	460/1	-	-	1	113	JICA	1990	1.00x1.00(1)
	1. Captyre cord flexing tester	1			44860	460/1.1	EVERTRON	-	1	113			in the cabinet
	2. Load box	1			44861	460/1.2	EVERTRON	-	1	113			0.70x1.80(1.26)
3	AC voltmeter	1		28,333	60AE3252 C1.03.00	427/3	YEW	2013 15,30V.	1	212	JICA	1990	in the cabinet
4	Life Test Rack for in Candescent Lamp	1		1,766,000	C-90A-04 G1.20.00	474/1-1	TOSHIBA	-	1	113	JICA	1990	0.50x2.00(1)
5	Life Test Rack for Fluorescent Lamp	1		2,869,000	C-90A-05 G1.21.00	474/1-2	TOSHIBA	-	1	113	JICA	1990	0.50x1.50(0.75)
6	Life Test Rack for Fluorescent Lamp	1		2,869,000	- G1.21.00	474/1-3	TOSHIBA	-	1	113	JICA	1990	0.50x1.20(0.6)
7	Set of Life Test Rack for Lamp	1	158,360			474/2	TOSHIBA	-	1	113	THAI	1994	0.60x2.00(1.2)
8	Variable AC source	1		1,629,000	00201 C7.06.00	424/18	MATSUNAGA	SVC-22136	1	113	JICA	1990	0.60x0.70(0.42)
9	Flexing tester on electrical machinery part	1				413/2		-	1	113	THAI	1992	0.70x1.80(1.26)
10	Stabilizer	1			90803	427/35	Stavol Matsunaga	TSA-1020F	1	212	THAI	1993	0.50x0.80(0.4)
11	Insulation resistance meter	1		414,000	CE2807QZ C7.18.01.1	202/11	TOA DEMPA	SM-10E	1	211	JICA	1990	in the cabinet
12	Insulation resistance meter	1		414,000	CE2797QZ C7.18.01.1	202/10	TOA DEMPA	SM-10E	1	211	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
13	Variable AC source	1		1,233,000	48489053 C7.05.002	424/16	TAKASAGO	AA 2000F	1	114	JICA	1990	0.50x0.60(0.3)
14	DC power supply source	1		300,000	12989013 C7.03.01.1	424/4-1	TAKASAGO	GP035-50	1	212	JICA	1990	in the cabinet
15	Insulation+breakdown tester	1		157,000	29120706 C7.03.01.1	442/1	KIKUSUI	TOS8700	1	207	JICA	1990	1.00x1.00(1)
16	Insulation transformer	1		5,000	1034 C7.12.00.1	439/7	MATSUNAGA	WTC-1K 1 Φ Max 4.5A	1	211	JICA	1990	in the cabinet
17	Insulation resistance meter	1		414,000	05791802 C7.18.00.1	202/8	ANDO	HR-4G	1	207	JICA	1990	0.45x0.90(0.40)
18	AC single phase voltage regulator	1		437,000	C00201 C7.01.00.3	437/6	MATSUNAGA	TA-229-V	1	207	JICA	1990	0.50x0.60(0.3)
19	Temperature ovem	1		790,000	PHL-T468/40 E1.04.00	484/1	TAKASUGI	9078	1	212	JICA	1990	1.00x1.50(1.5)
20	Flamability tester	1		2,042,000	FLAMABILITY E1.08.02	466/1	EXCEL	BT-1500A	1	208	JICA	1990	1.00x3.50(3.5)
21	Temperature & moisture controlling machine	1			-	484/3	-	-	1	208	THAI	1994	0.45x0.70(0.31)
22	Hydrid recorder	1		691,167	40RA0195 C5.03.00	436/5	YEW	3087	1	219	JICA	1990	0.30x0.34(0.10)
23	Computer machine	1			SG70301538	154/236	HEWLETT PAKARD HP	VL4 5/133 M 1280	1	212	THAI	1997	0.80x1.50(1.2)
	Monitor	1			KR65285164		HEWLETT PAKARD HP	D 2811	1	212	THAI	1997	
24	Computer machine	1			SG70301398	154/243	HEWLETT PAKARD HP	VL4 5/133 M 1280	1	212	THAI	1997	0.80x1.50(1.2)
	Monitor	2			KR65285527		HEWLETT PAKARD HP	D 2812	1	212	THAI	1997	
25	Impact tester	1	50,000		CA.27.00	561/1			1	211	JICA	1993	1.26x0.55(0.69)
26	DC power supply source	1		1,352,000	2890577 C7.04.02	424/14	TAKASAGO	GP035-200R	1	211	JICA	1990	0.50x0.62(0.31)

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
27	Arc resistance tester	1		1,398,000	KG3935-1-2 C7.20.02	445/1	TOKYO SEIDEN	OSK10229-C-SP	1	211	JICA	1990	0.62x0.62(0.38)
28	DC power supply source	1		329,000	17989018 C7.03.01.2	424/5	TAKASAGO	GP0250-10R	1	211	JICA	1990	0.45x0.50(0.22)
29	AC single phase voltage regulator	1		437,000	C00201 C7.01.00.1	437/2	MATSUNAGA	TA-229	1	211	JICA	1990	0.50x0.60(0.3)
30	Breakdown tester for electrical machine	1			Ca.22.00	492/1		-	1	212	THAI	1992	0.72x0.76(0.54)
31	Cord bending fatique tester	1		1,402,000	Ca.10.00b	460/2	TESTER SANGYO	BE-801-M	1	113	JICA	1990	0.67x179(1.19)
32	Thermostat tester for iron				-	575/1		-	1	212	THAI	1996	0.80x1.80(1.44)
33	High frequency breakdown tester	1		781,000	14N1269 C7.19.00	435/4	TOKYO SEIDEN	OSK 10231-SP	1	212	JICA	1990	0.43x0.40(0.17)
34	Volt slider	1		31,500	KF863 C7.15.02.1	440/6	MATSUNAGA	SD269-J	1	211	JICA	1990	0.26x0.23(0.59)
35	Temprature and moisture controlling oven	1	735,946		13002181	484/2	TAKASUGI	PR-1 ST 9028	1	212	THAI	1994	0.78x0.96(0.74)
36	Tumble barrel	1		486,000	Ca.12.00	462/1	TAIYO KEIKI	-	1	113	JICA	1990	0.60x1(0.6)
37	Digital model of resistance meter	1	78,645		-	441/4	HIOKT	-	1	212	THAI	1994	0.90x1.50(1.35)
38	Hybrid recorder	1		764,000	40SB0130 C5.02.00.1	436/1	YEW	3081	1	211	JICA	1990	0.44x0.37(0.16)
39	Lamp Chamber tester	1		1,355,000	G1.19.00	473/1	TAIYO KEIKI		1	212	JICA	1990	1.20x1.20(1.44)
40	Hybrid recorder	1		691,167	40RA0193 C5.03.00	436/7	YEW	3087	1	212	JICA	1990	0.32x0.35(0.11)
41	Glow-wire test apparatus	1	805,000	3,500,000	CA.29.00	562/1	HITACHI	HAT-214	1	211	JICA	1993	0.72x0.75(0.54)
42	AC voltmeter	1		28,333	70AD00064 C1.03.02	427/9	YEW	2017 30,75,150,300V	1	212	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
43	Watt meter	1		59,000	60AN0530 C1.01.02a	204/11	YEW	2041 5,25A,120x50W	1	212	JICA	1990	in the cabinet
44	Thermo-couple type ammeter	1		105,000	60AJ00164 C1.10.01	428/54	YEW	2016 5,10,20,50mA	1	212	JICA	1990	in the cabinet
45	Earth continuity tester	1		131,000	10020412 C7.22.00	447/2	KIKUSUI	TOS 6100	1	212	JICA	1990	in the cabinet
46	Electronic Voltmeter	1		102,400	131361 Lo.05.00	427/26	NF	M-174B	1	211	JICA	1990	in the cabinet
47	Volt slider	1		31,500	KF865 C7.15.02.2	440/8	MATSUNAGA	SD269-J	1	212	JICA	1990	0.25x0.25(0.6)
48	AC single phase voltage regulator	1		436,666	C000201 C7.01.00.2	437/5	MATSUNAGA	TA-2245	1	212	JICA	1990	0.50x0.60(0.3)
49	Insulation+breakdown tester	1		157,000	10018608 C7.17.00.5	442/5	KIKUSUI	TOS8650	1	208	JICA	1990	0.60x1.20(0.72)
50	AC ammeter	1		29,600	60AE3323 C1.08.04	428/32	YEW	2013 10,30,100,300m	1	212	JICA	1990	in the cabinet
51	Digital watt meter	1		222,333	50AH0016 C1.01.03	204/13	YEW	2509 MAX 10A	1	212	JICA	1990	0.60x1.20(0.72)
52	DC voltmeter	1		23,800	70AA02614 C1.09.01	428/34	YEW	2011 10,30,100,300m	1	212	JICA	1990	in the cabinet
53	AC three phase voltage regulator	1		1,325,000	00201 C7.02.00	437/7	MATSUNAGA	TA3-10-380G	1	212	JICA	1990	0.60x0.70(0.42)
54	DC power supply source	1		300,000	12989012 C7.03.01.1	424/3-2	TAKASAGO	GP035-50	1	212	JICA	1990	in the cabinet
55	Variable AC source	1		1,233,000	2890568 C7.05.00.3	424/17	TAKASAGO	AA 5000	1	211	JICA	1990	0.50x0.60(0.3)
56	Hybrid recorder	1		691,167	40RA0196 C5.03.00	436/6	YEW	3087	1	212	JICA	1990	in the cabinet
57	Hybrid recorder	1		764,000	40SB0131 C5.02.00.2	436/2	YEW	3081	1	212	JICA	1990	in the cabinet
58	Earth continuity tester	1		131,000	10020411 C7.22.00	447/1	KIKUSUI	TOS 6100	1	212	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
59	Testing circuits for fluorescent lamp	1		2,383,000	C-90A-07 G1.22.00	475/1	TOSHIBA	-	1	212	JICA	1990	0.78x1.82(1.41)
60	Testing circuit of starter	1		2,140,000	CA.24.00	552/1	Precision		1	211	JICA	1992	0.78x1.82(1.41)
61	Temperature oven	1	1,239,863		8466	484/5	Gallenkamp	HCC110.CF4.J	1	212	THAI	1997	1.32x1.95(2.5)
62	Moisture evacuation machine	1	15,300		-	125/3	-	-	1	212	THAI	1996	0.35x0.35(0.12)
63	Photometric intergrating sphere consists of			29,325,000	G1.08.00	470/1	-	-	1	213	JICA	1990	4.00x6.00(24)
64	Photometric bench consists of			10,195,000	C-90A-02 G1.09.00	471/1	-	-	1	213	JICA	1990	2.00x4.50(9)
65	Colorimetry consists of			18,391,000	G1.16.00	472/1			1	213	JICA	1990	2.00x3.00(6)
66	Mechanical endurances test for speed regulator: Rotary Type			3,271,000	Bo.05.01	486/1	TAIYO KEIKI	-	1	316-4	JICA	1990	1.00x2.00(2)
67	Mechanical endurances test for speed regulator: Push Type			2,804,000	Bo.05.02	486/2	TAIYO KEIKI	-	1	212	JICA	1990	1.00x2.00(2)
68	Step-up transformer			374,000	7686 C7.10.00	439/1	OGAWA SEIKI	OSK 10235	1	212	JICA	1990	0.50x0.50(0.25)
69	Small size of compressor		22,149		-	182/3	IWATA CSP	SPC-1SP.B.	1	207	THAI	1993	0.50x1.00(0.5)
70	Fault condition test apparatus		106,950	465,000	CA.30.00	560/1			1	207	JICA	1993	0.70x1.00(0.7)

Appendix 2: List of Office Equipment, Furniture & Fixture for TAI

No.	Items	Quantity	Price/Unit (Baht)	Amount (Baht)
1	Car for Exectutive Director	1	1,200,000	1,200,000
2	Office Car	3	900,000	2,700,000
3	Table and chair for Director of Institute	1	15,000	15,000
4	Table and Chair for Director of Division	6	12,000	72,000
5	Table and Chair for Officer	56	7,000	392,000
6	Table and Chair for Meeting Room	10	5,000	50,000
7	Cabinet for Documents	20	3,500	70,000
8	Copy Machine	1	90,000	90,000
9	Personal Computer	8	40,000	320,000
10	Printer	6	20,000	120,000
11	Table and Chair for Computer work	8	3,500	28,000
12	Projector which use for computer	1	250,000	250,000
13	Facsimile Machine	2	34,000	68,000
14	Telephone Machine	20	1,500	30,000
15	Mobile Phone	4	30,000	120,000
16	Air Condition for Office	10	35,000	350,000
17	Air Condition for Testing/Calibration Labo.	10	35,000	350,000
18	Electrical Typewriter	1	34,000	34,000
19	Telephone Box, Line Box, and Equipment	-	260,000	260,000
20	Place Decoration Fee	400/m^2	5,000	2,000,000
	TOTAL			8,519,000

Appendix 3: Maintenance Fee for Existing Facilities of TISI

(Thousand Bahts)	2000	2001	2002	2003	2004
1. Testing machinery and equipment for automobile pollution, evaporated oil and engine oil (6 items and total value is 30 million baht: avarage durability of item is 4 years for each.)					
1.1 Revitalization and Repair of existing fasilities	30,000	15,000	10,000	10,000	10,000
1.2 Calibration Charge (approximately 0.3% of the value)	900	900	900	900	900
1.3 Maintenance Cost (approximately 3% of the value)	9,000	9,000	9,000	9,000	9,000
Sub-total	39,900	24,900	19,900	19,900	19,900
2. Testing machinery and equipment for safety (50 items, total value is 100 million bahts)					
2.1 Revitalization and Repair of existing fasilities	5,000	1,000	1,000	1,000	1,000
2.2 Calibration Charge (approximately 1.0% of the value)	1,000	1,000	1,000	1,000	1,000
2.3 Maintenance Cost (approximately 3.0% of the value)	3,000	3,000	3,000	3,000	3,000
Sub-total	9,000	5,000	5,000	5,000	5,000
Total cost	48,900	29,900	24,900	24,900	24,900