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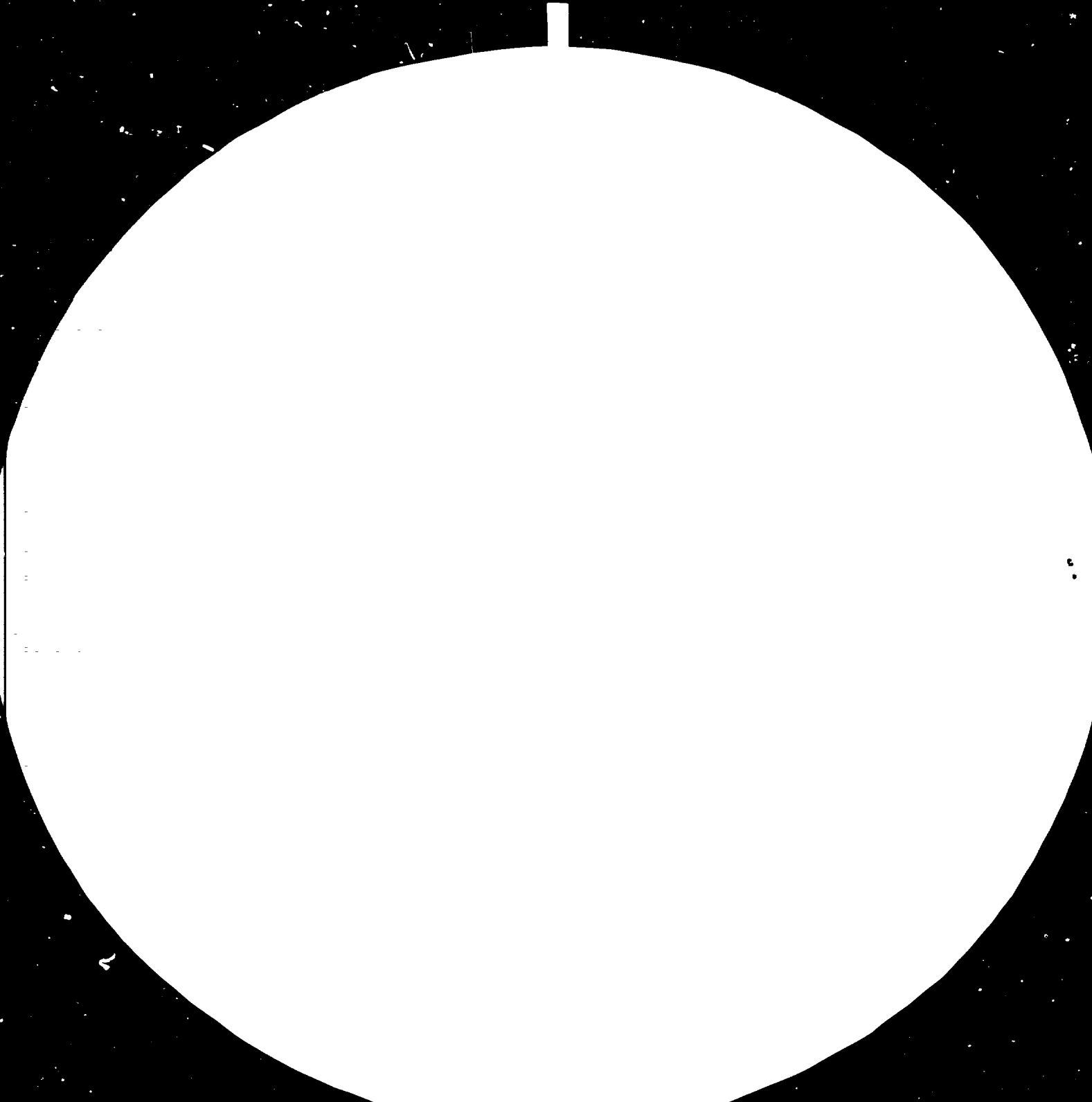

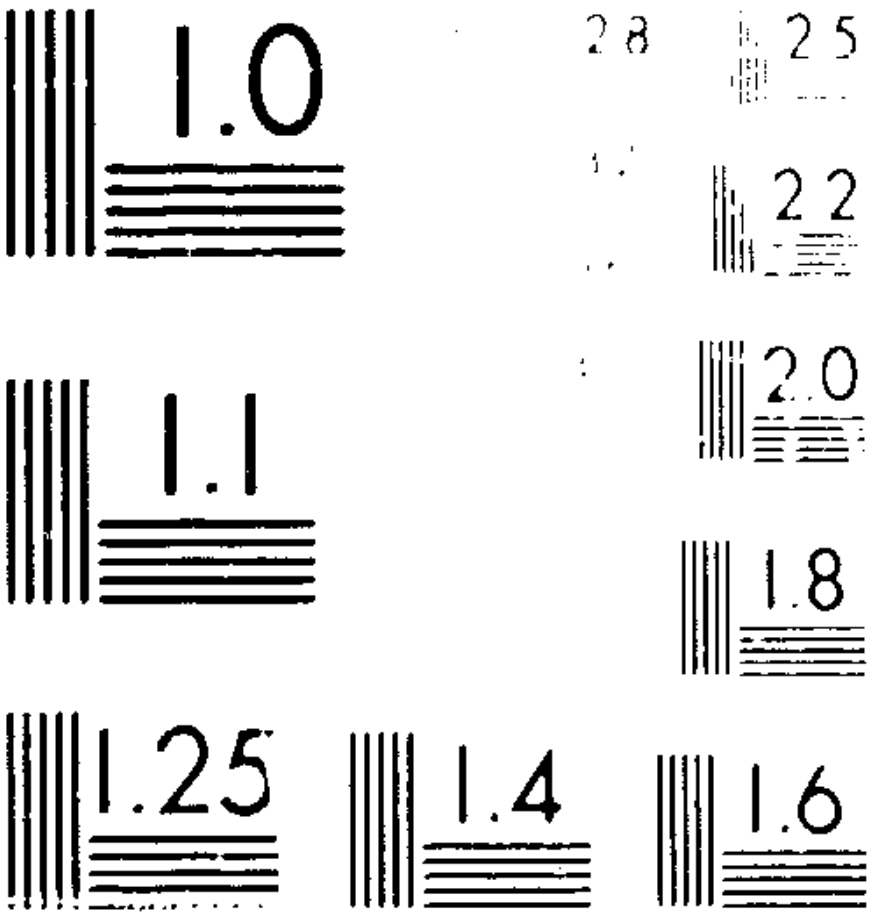
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United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.355/6
17 November 1981

ENGLISH

Sixth Meeting of Heads of Technology
Transfer Registries
Manila, Philippines, 25-28 November 1981

TECHNOLOGICAL INFORMATION EXCHANGE SYSTEM (TIES)

KOREAN EXPERIENCE ON TRANSFER OF TECHNOLOGY BY MEANS OF TECHNICAL SERVICE *

prepared by

Young Hun Kim **

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V.81-32277

CONTENTS

Introduction

Technical service can be defined as utilization of technology, experience or knowhow in a scientific method for applications to specific tasks, such as planning, research, diagnosis and design, for fixed charges. Major areas in which technical service is provided can be roughly divided into two; one is industrial development, such as development of key industries and energy industries, and the other is national development, such as community development and regional or area development.

Most developing countries are relatively weak in their technology base, and to strengthen and improve such a weak base they need to import and apply key industrial technologies of advanced countries for economic and industrial development, their long-term national objectives.

However, the inertia of reliance on foreign technology, formed over a long period, causes a very slow development tempo of local technology and vulnerabilities of technological infrastructure. This, in turn, hinders technological innovations and a balanced development of technology between industries, thus making growth of the national economy very difficult by retarding the planning and implementing of major national development programs. Under such circumstances, growth of the service industry, a technology-intensive industry based on technical experience accumulated over a long period, is hardly expected. In a country highly relying on foreign technology for its industrial growth, we can hardly expect development of the service industry, a maximum utilization of indigeneous technology and effective absorption, modification and improvement of imported technology.

In a country like the Republic of Korea, where the technological development policy puts stress on effective imports of appropriate key industrial technology of advanced countries for absorption, modification and improvement in order to contribute to the achievement of the national goal of economic development, there must be a policy of institutionalizing imports of technical service from advanced countries in parallel with development of the service industry in the country.
Today the ROK government has the basic goal of its economic and social development policy as industrialization of the country through economic and technological development for increased exports. To this end, emphasis is placed on the development of technology-intensive industries, such as heavy and chemical industries, along with the efforts to create demand for new products, construct modern industrial facilities, innovate industrial technology and maximize the use of local resources and capital goods. To support such policy goal and efforts, there must be measures institutionalizing government support for private industry's active participation in service industry. Without such measures, the development of engineering technology can hardly be expected.

The ROK government promulgated in 1973 the Engineering Service Promotion Law for the fostering and protection of local engineering firms and for effective imports and applications of foreign technical service. Under the law, local engineering firms are required to register with the Ministry of Science and Technology for their business activities, and imports of foreign technology must be approved by the Minister of Science and Technology. It was in 1972 when the country used many foreign engineers in construction of the Ulsan petrochemical complex that the ROK government came to be aware of the need to develop engineering technology.

In those days, local engineering firms were very low in their technical level and vulnerable in their business structure. They had no capability of taking any part in construction of industrial plants. They were not able to plan and evaluate plant construction, design, manufacture and install process equipment and supervise and operate plants.

As a result, imports of foreign engineering technology was inevitable for construction of petrochemical plants, and most of these projects were carried out on a turn-key basis, spending lots of foreign exchange. Under the circumstances, the ROK government came to face the need to maintain a balance between imports of foreign technology and development of local engineering technology. Accordingly, the government cancelled the registration of many insolvent engineering firms in an attempt to prevent cut-throat competitions in the technical service industry. On the other hand, it also took measures to review the appropriateness of foreign technical service for import before the government's approval so that imports of those technical services which are available from local engineering firms can be avoided.

I. Analysis of ROK Technical Service Imports

1) General Status of Technical Service Imports

ROK imports of technical service have been active since 1973 to support the economic development policy for advancement of industrial structure toward an industrial society through strategic assistance to heavy and chemical industries. In the past decade, imports of technical service rose at an annual average of 25 per cent. Especially during the Fourth Five-Year Economic Development Plan period from 1977 to 1981, the imports sharply rose with more than 100 projects every year, and this is attributed to the government's intensive investment in heavy and chemical industries (see Fig. 1 and Table 1). Imports of technical service during the five-year period account for 47 per cent of the total technology imports of the country in the same period.

Payments for technical service imports in the 1973-80 period totaled US$60 million, an average of about US$7.5 million a year. This represents about one seventh of the total amount of money paid for technology imports during the same period (see Fig. 2 and Table 2). The big gap between technical service imports and technology imports since 1977 is largely due to the many large projects done during the period, such as construction of atomic power plants and machinery plants, and the relaxed limits to royalty payments for technology imports under the technology import liberalization policy.

By industry, the metal & machinery industry is the biggest importer of technical service in terms of the number of projects, followed by chemicals, electric appliance and electronics in that order. But in terms of the amount of royalties paid, the atomic power industry comes first, paying an average of US$370,000 per project, followed by metal & machinery, chemicals, electric appliance and electronics, all paying an average of US$60,000 to US$90,000 per project (see Table 3).

By source country of technical service, Japan and the United States represent most of imports. Especially, reliance on Japan is heavy, with imports from that country accounting for 54 per cent of the total technical service imports (see Fig. 3). This heavy reliance on Japan is almost the same as technology imports.

In view of the need of developing countries to import key technology from its source on a selective basis, the reliance on a specific country is the pressing problem to cope with. In this connection, it is necessary for Korea to diversify the sources of technical service imports for the import of appropriate technical knowhow, even though it is expensive, rather than importing inexpensive, low-level technology. This can be said the best way for the country to increase effectively the international competitiveness of its products.

2) Reasons for Technical Service Imports

Reasons of Korean industry for technical service imports can largely be divided into three categories.

Firstly, there is the need for technical service in designing, constructing and maintaining industrial plants and equipment.

Secondly, Korean industry needs service of foreign experts for improvement of the existing process and knowhow and development and application of new technology.

Thirdly, Korean businessmen lack in the capability of establishing a basic plan of a new project and in management capability. Thus they need foreign technical service in starting a new project and in improving their management.

Of the above three categories of reason for importing technical service by Korean industry, the reason for needing foreign expertise in designing and constructing new plants or their ancillary facilities and the reason for requiring technical service in developing new products or new technology account for more than 20 per cent, respectively, of the total imports of technical service. Other reasons for importing technical service are improvement of the existing processes and knowhow and maintenance of the existing facilities and equipment (see Table 4).

Reasons for technical service imports are similar in many countries, but the objectives and characteristics (mainly knowhow based on empirical knowledge) of technical service imports differ by country, depending on the importing country's technical level. The lower a country's technical level is, the more it relies on foreign engineers in nearly all technical service, including project planning and evaluation, equipment fabrication, plant construction, installation, operation, supervision, repair and maintenance. But a country on a relatively high technical level imports technical service mainly in the area of engineering design.

Japan is an exemplary country of many successful technical service imports. Well aware of the importance of engineering designs to their business growth, most Japanese firms put stress on basic engineering designs in technical service imports, while endeavoring to develop with their own technical staffs detail designs based on the imported basic designs. As a result, Japan was able to build a reservoir of engineering technology in a relatively short period and a technical footing upon which to grow into a developed country.

Regardless of the reason for technical service imports, the technical service import policy should be such that design technology will constitute the mainstay of imports in order to build a reservoir of key technology.

3) Scope of Technical Service Imports

By scope of work, Korean imports of technical service had mainly been technology related to operation of industrial plants in the early 1970s when stress was put on the development of import-replacing industries, such as oil, fertilizer and cement. Especially, technology related to repair and maintenance of industrial plants carried weight (see Table 5).

Although basic design technology carried considerable weight, many Korean industries of the time had no capability of effectively applying the imported basic designs as their technical level was low then. They had to be content with receiving technical training in use of such imported designs from foreign experts. But it must be noted that the technology accumulated through imports of design data and technical training by foreign experts began to pay in the late 1970s when the country's industrial structure shifted from local market-oriented light industries to export industries with the growth of technology-intensive heavy and chemical industries, such as machinery, metalworking, petrochemicals, shipbuilding and electronics.

4) Pattern of Technical Service Imports

Technical service imports can generally be classified into six patterns as follows:

a. License of patents related to technical service to be imported.

b. Provision of technical data and information on applications of process knowhow.

c. Provision of design blue prints and technical specifications.

d. Invitation of experts for assistance in design, construction, supervision, installation of machinery and equipment, plant operation, etc.

e. Technical training of local engineers and technicians

f. Other technical consulting service.

The above six patterns of technical service can be grouped into three categories as follows: the first category is for provision of technical data and information, the second is on-scene technical advice and consultation service by invited foreign experts of technical service exporters at factories of technical service importers, and the third is on-the-job training of the importer's engineers and technicians at the exporter's factory (see Table 6).

In the case of Korean industry, the second category, invitation of foreign experts for on-scene technical advice and consultation, has prevailed in technical service imports, accounting for about 85 per cent of the total imports. These foreign experts have chiefly provided technical advice and consultation for design and construction of new factories and facilities, technical aid for repair and maintenance of the existing facilities and equipment and for process improvement, and technical training of local engineers and technicians.

One of the problems experienced by Korean industry in the invitation of foreign experts is the visit to Korea not only of experts who are capable of shooting the technical trouble the inviting firm wants to solve but also of an unnecessary management expert who comes to Korea as project manager. It may be desirable to get management advice and consultation when technical trouble is solved by invited foreign engineers, but because the amount of technical service fees is determined by the number and quality of invited experts, the visit of "unnecessary" foreign experts will only increase the financial burden on the inviting firm. Therefore, it is necessary for the inviting firm to study carefully the list of experts by quality provided by the service exporter firm in order to invite "necessary" experts only.

II. Problems in Request for Technical Service Imports and in Applications of Imported Service

Technical service importers generally take the following process to import and apply foreign technical services (see Fig. 4).

Firstly, technological needs must be identified. These needs are related to the development of new products under consideration or the current technical problems not solvable locally.

Secondly, the import feasibility of the technical service as a means to meet the identified technological needs must by analyzed and evaluated. Such analysis and evaluation should take into consideration technical environments at home and abroad, marketability of the service to be imported, economics of investment in imports and the appropriateness of the technical service for import to technological needs.

Thirdly, when the technical service for import is identified, sources of such technical service must be surveyed for the selection of the best possible source.

Fourthly, once the import of technical service is decided on, negotiations must be held with the source company for conclusion of a technical service contract, and then the government's approval of the contract must be sought.

Fifthly, technical service must be provided strictly in accordance with the terms and conditions of the contract.

Sixthly, imported technical service must be applied on the basis of the importer's empirical knowledge and technical knowhow for adjustment to local conditions, or modified and improved, if necessary, on the basis of indigenous technology developed by local research and development institutes for better applications.

In applying advanced industrial technology imported through the above-mentioned process of technology transfer, Korean industry has undergone not a few trials and errors and problems. Some important problems will be discussed below.

a. Technical Service Project and Project Feasibility Study

Technical service importers must first establish a technical service project and they must identify their technological needs in a feasibility study of the projected service import. For instance, in case technical service is imported for modification of the existing technology or equipment for product improvement, the price, performance and quality of the existing product must be comparatively analyzed with those of similar foreign products, or the process, machinery, equipment and operating conditions and efficiency of the existing factory must be studied in order to identify the points for improvement. In addition, problems in use of materials must be studied for determination of the possibility of replacing materials with new ones. Problems in production control, material control and personnel management must also be studied, and the vulnerable technical area must carefully be reviewed and identified. Needless to say, such project feasibility study and the technical service project based on such a study require the capability of technical evaluation and expertice.

Not a few Korean industries failed to establish such a project in the past, and accordingly they were unable to achieve the projected objectives after the import of foreign technical service. One of the typical cases of such failure can be found in "K" Steel, one of leading iron and steel manufacturers of the country. This company imported foreign technical service for the purpose of producing steel balls, a very lucrative item at the time of importing the service. The import contract was concluded without careful and detailed planning and a project feasibility study. The supplier this steel company chose was "B" Company of Japan. Under the contract, the Korean company made advance payments of a considerable amount to the Japanese supplier company, which then sent its technical and management people to Korea for technical advice and consultation. For these Japanese people's stay in Korea which stretch over one year, the Korean company had to pay per diem, too. Afther the one-year period, the Korean company was ready to produce the prototype of steel balls only to face an important problem. Another steel company, "C", has long promoted the import of steel ball technology from the United States and had just signed a technical assistance contract with "A" Company of the United States then. In other words, "C" Company was ready to import technology from the United States. "K" Steel's problem was that the quality of steel balls developed with Japanese technical service was much lower than that of the product "C" Company was to make with U.S. technical assistance.

Moreover, the production cost of "K" Steel was found so higher that it was not able to compete with the product to be manufactured by "C" company with U.S. technical assistance. Accordingly, "K" Steel, after many studies, had to cancel its steel ball production program.

b. Evaluation of Appropriate Technology and Selection of Appropriate Technology Supplier

It is very important to import appropriate technology on a selective basis, after carefully evaluating the appropriateness of technology for import, irrespective of whether the import is technical service or other forms of technology. Especially in the case of developing countries, active imports of appropriate technology are one of the important means of reducing the excessive burden of initial investment and increasing the international competitiveness of their products in the process of industrialization. In general, the evaluation of appropriate technology on the government level should take into consideration such parameters as the relationship of technology to national industrial development plans, the importance of technology to the development of import-replacing and strategic export industries, and the effects of technology on the projected equal income distribution, employment increase, population decentralization and balanced development of rural and urban areas. Parameters of business-level evaluation should include, on the other hand, investment scale, productivity increase, technological life-cycle, quality and performance improvement of the product, cost reduction, marketability and profitability. In other words, the effect of technology on business profit -making should be considered.

Suppose that a firm has imported inappropriate technology because of a mistake in the selection of technology it needs, it will incur great losses in business activities, especially in competition with other firms in the same trade, and will thus retard its business growth.

The selection of appropriate technology should also consider the possibility of obtaining the license of such technology, and therefore it is important to find the supplier of such technology who is ready to grant the license. A case of failure in technical service import due to insufficient evaluation of the appropriateness of technology for import can be found in a Korean construction firm.

This company, let's call it "S", was one of the many Korean construction firms aspiring to benefit from the construction business boom of the Middle East. To take part in an international bidding for a big bridge construction project, the company decided to import technical service of specific bridge construction engineering. With this import, it could get all information necessary in preparing a bid, such as engineering drawings and technical specifications, but the company failed in the bidding because its bid price was higher than the prices offered by other companies. It was later found that the engineering technology imported by this company required a higher construction cost than that adopted by other companies. This may be the problem of common experience for all developing countries, including Korea, owing to thei lack of the capability of evaluating the technology for import, and it is the problem that must be solved before concluding a technical service agreement.

c. Information on Technology Acquisition Sources

As in the case of technology imports, information on how (terms and conditions of import) and wherefrom (what firm of what country) technical service can be exported is very important to the success of a technical service project. Especially, of the terms and conditions, technical service fees, drawing charges and per diem are the matter of great interest to the recipient party. Because the amount of these fees differ according to the nature of technical service, the scope of work, the qualification of invited experts and the reputation of the giving firm, it is necessary to establish a technical information system for gathering data and information from foreign firms which have had experience of technical service imports.

Big Korean business firms use their branch offices and sales agents scattered around the world in obtaining the information on technology acquisition sources they need. But small businesses have no such information gathering system, thereby experiencing difficulties in obtaining information on technology acquisition sources.

d. Delay in Technical Service Project

As mentioned earlier, without a careful planning in advance, a technical service project can be delayed far from its implementing schedule. Some 26 per cent of the total technical service imports by Korean industry have been found to be delayed from the original schdule. Several reasons can be cited. The biggest reason is the recipient company's inability to understand the imported technology due to its low technical level. Coming next is the too short implementing schedule, with the result that the project cannot be accomplished within the import contract period and that the contract period is inevitably extended. The third reason is the inappropriateness of imported technology to local industrial conditions and accordingly a new supplier of technology appropriate to local conditions has to be sought. The fourth reason is the supplier's intentional avoidance to transfer core technology, and the fifth reason is the difficulty in purchase of materials, components and parts needed along with imported technology to carry out the technical service project.

e. Problems Related to Transfer of Technological Knowhow

In general, technical service means the transfer of technological knowhow developed on the basis of empirical knowledge accumulated over a long period of time. The recipient party wants the owner of such technology to release and transfer the whole of the technology. But the giving party, in implementing its technical service agreement, tends to give peripheral technology, not core technology, in an attempt not to make open core technological knowhow. Because of this conflicting interest between the two parties, the recipient party often fails to achieve the objective of its technical service project.

In the case of Korean industry, about 22 per cent of the total technical service projects have reportedly caused complaints about not receiving full technological knowhow from the service exporters. Especially, such complaints about the transfer of insufficient knowhow are frequently lodged by industries importing technical service for process improvement or development of new products and technology.

Of the reasons for transfer of insufficient technological knowhow to recipient parties in service transactions, the most important one is the giving party's passive and negative attitude against full release of knowhow.

f. Digestion and Improvement of Imported Technology

As in the case of technology imports, the digestion and improvement of the imported service in technical service projects are very important to the strengthening of international competitiveness through technological self-reliance. In order for the recipient party to digest fully imported technology, it must have technical capabilities, and it must also make research and development efforts to modify and improve the digested technology. In the case of Korean industry, some 50 per cent of the total technical service projects see investment in research and development for the improvement of imported technology, and such investment reportedly accounts for only one per cent of the annual sales. In about 17 per cent of the total technical service projects, such research and development investment has resulted in patents both at home and abroad.

III. Analysis of Major Clauses of Technical Service Agreement

A total of 467 technical service agreements concluded by Korean industries between 1975 and 1980 was analyzed and its results can be summarized as follows. The analysis put emphasis on major clauses of the agreements.

1) License of Patents and Trade Marks

Many technology transfer agreements have a clause licensing industrial property rights, but an agreement on simple technical service does not include such license clause of patents and trade marks. Of the technical service agreements signed by Korean industries in the 1975-80 period, about eight per cent included a patent license clause and five per cent a trade mark license clause. The agreements having such clauses are mostly on the transfer of technological knowhow for development of new products and technology. It may be said that such patented technology of foreign countries has made great contribution to the development of Korean industry in the six-year period from 1975 to 1980.

2) Restriction of Licensed Territory

Some agreements have a clause restricting the licensed territory of imported technology, and such a clause confining the licensed area of imported technological knowhow within the territories of the Republic of Korea only is certainly in disfavor of Korean industry in view of the need for active exports of technology developed on the basis of imported technology. On the part of a licensor firm of such knowhow, however, restrictions of the licensed area of transferred technology are necessary steps to prevent the recipient party from retransferring the technology and exporting the licensed products and to protect its technological confidentiality. The clause restricting the licensed territory of transferred technology is a matter of great concern to both parties to an agreement, and therefore this cluase should be carefully discussed on before signing the agreement.

Some eight per cent of the total technical service agreements signed by Korean industries include a clause restricting licensed territory, and these agreements are on the import of basic design and process knowhow of a big modern factory, production knowhow of highly technology-intensive products, such as medicine and special welding rods, and pollution prevention technology.

3) Restriction of Export Markets

As the clause restricting licensed territory, a clause restricting the export markets of licensed products is directly related to the interest of both parties to an agreement. Especially in the case of Korea endeavoring to develop industrial technology under the export-first industrial development policy, such a clause restricting export markets makes a big obstacle to the national economic development plan. Under the circumstances, the ROK government has recently taken firm steps against the inclusion of such a clause in international technology transfer agreements, regarding it as the cause of unfair and improper trade. However, the government considers it an unavoidable step in case the giver-licensor company has already had access to the restricted market with its own product or with the product already licensed to a third party, or is considered to have exclusive rights to such markets.

Only two per cent of the total technical service agreements signed by Korean industries in the past had such a clause of restricting export markets of the licensed product.

4) Tie-in Clause

Some technical service agreements include in the terms and conditions of technology transfer the obligation of the recipient party to procure materials, components, parts or equipment needed in the production of licensed products from the giver, or from the one designated by the giver, and such obligation is usually stated in a tie-in clause. The ROK government also considers such a clause as the cause of unfair and improper trade and is thus opposed to it, however, in case the required materials, components, parts and equipment are patented or the use of these items from suppliers other than the giver-licensor company or its designated firm cannot guarantee the quality and performance of the licensed product, it assumes the tie-in clause as an exception.

Technical service agreements including a tie-in clause account for about four per cent of the total such agreements signed by Korean industries in the past, and the clause is mostly for the licensor's exclusive supply of raw materials and components to Korean industries.

5). Data Return or Prohibition of Continued Use of Technology After Agreement Termination

Some technical service agreements also require the recipient-licensee party to return to the giver-licensor technical data and information or prohibit the former from using continuously the technology given or from selling continuously the licensed product after the termination of the agreement. A clause of such requirements is usually contained in a knowhow licence agreement, and in the case of a technical service agreement including this clause the requirement is frequently for the return of basic design blueprints and technical specifications.

Korean industries usually signed an agreement including such a clause when the transfer of both technology and technical service is required in the production of a licensed product. In the case of such agreement, the giver -licensor, considering that the termination of a technology transfer agreement entails the termination of the technical service agreement signed simultaneously with the former, requires the return of data and information provided under the latter agreement. Some two per cent of the total technical service agreements concluded by Korean industries in the past contain such requirements.

6). Restriction of Technical Training

As discussed earlier, technical service is meant to the part of the recipient party the license of patents, and the transfer of empirical knowledge and knowhow through invitation of experts, acquisition of technical information and training of the recipient party's engineers and technicians by the giver -licensor party. Thus the technical training clause carries weight in a technical service agreement.

In general, the technical training clause specifies the number of trainees, the training period and the training place, and the giver-licensor company generally wants to reduce the number of trainees and the period of training in order to increase its profits and prevent the release of its core technological knowhow. Because of this conflicting interest involved in this clause, it is necessary for both parties to an agreement to establish appropriate terms and conditions on the principle of reciprocity in this clause.

Of the technical service agreements signed by Korean industries in the past, some five per cent include a clause restricting the number of trainees and the period of training to a minimum degree.

7) Guarantee

The ideal international transfer of technology is made on the basis of mutual trust between the parties concerned, but in reality there are many cases in which one party fails to meet fully its requirements and accordingly causes a legal dispute because of the failure of the other party in fulfilling the terms and conditions of the agreement.

To avoid such problems, technical service agreements usually include a clause specifying the rights and obligations of both parties. Important in such a clause to the recipient-licensee party is the giver-licensor's guarantee of the quality and performance of the licensed product and technology, though the giver-licensor tends to avoide to give such grarantee. Especially in a technical service contract, the guarantee of the service provided is very important to the recipient company, because in case the recipient firm incurs losses owing to flaws in the design blueprints or technical specifications provided by the licensor firm, the former can claim compensations for such losses under such guarantee clause. It is therefore a must for the recipient firm to include a guarantee clause against the possible flaws of technical service in its technical service agreement in order to prevent possible failure or losses in its project based on such an agreement.

Most technical service agreements signed by Korean industries have been found to have no clear-cut clause of guarantee against technical flaws, but some 26 per cent of these agreements have a clause of specific guarantee of the licensed product's quality and performance and a clause of general guarantee against technical flaws.

8). Technical Service Fees

Means of payment of technical service fees can be divided into three big types; one is reimbursing payment, another lump-sum payment and the other running royalty payment. Korean industry has preferred the first type of reimbursing payment of the amount of per diem within a fixed ceiling for invited foreign experts under a technical service agreement. This payment type accounts for 63 per cent of the total agreements, followed by lump-sum payments at 32 per cent and running royalty payments at three per cent (see Table 7). Included in the type of lump-sum payments are some reimbursing payments of per diem to invited experts and other expenses accrued.

The average amounts of per diem paid to foreign experts invited in 1980 were US$180 for Japanese engineers, US$323 for U.S. experts and US$318 for European engineers (see Table 8).

IV. Technical Service Promotion Law and Approval Procedures of Service Imports

The ROK government promulgated in February 1973 the Technical Service Promotion Law for sound development of the local engineering service industry and increased technical level of the Korean industry, thereby contributing to the development of the national economy. The law was revised in December 1976 to relax the requirements of local engineering service firms for registration and simplify the approval procedures for imports of foreign technical service.

Under the provisions of Article 13 of the law, when a local firm wants to import foreign technical service, it is required to submit to the Minister of Science and Technology an application for use of foreign technical service (see Table 9) for approval, and he considers the following criteria of evaluation in reviewing the appropriateness of such application.

First, whether the requested foreign technical service is available from local engineering firms.

Second, whether the requested use of foreign technical service is justifiable and required.

Third, whether the selection of the giver of the requested technical service is appropriate.

Fourth, whether the content of the requested technical service and the method of extending this service are appropriate.

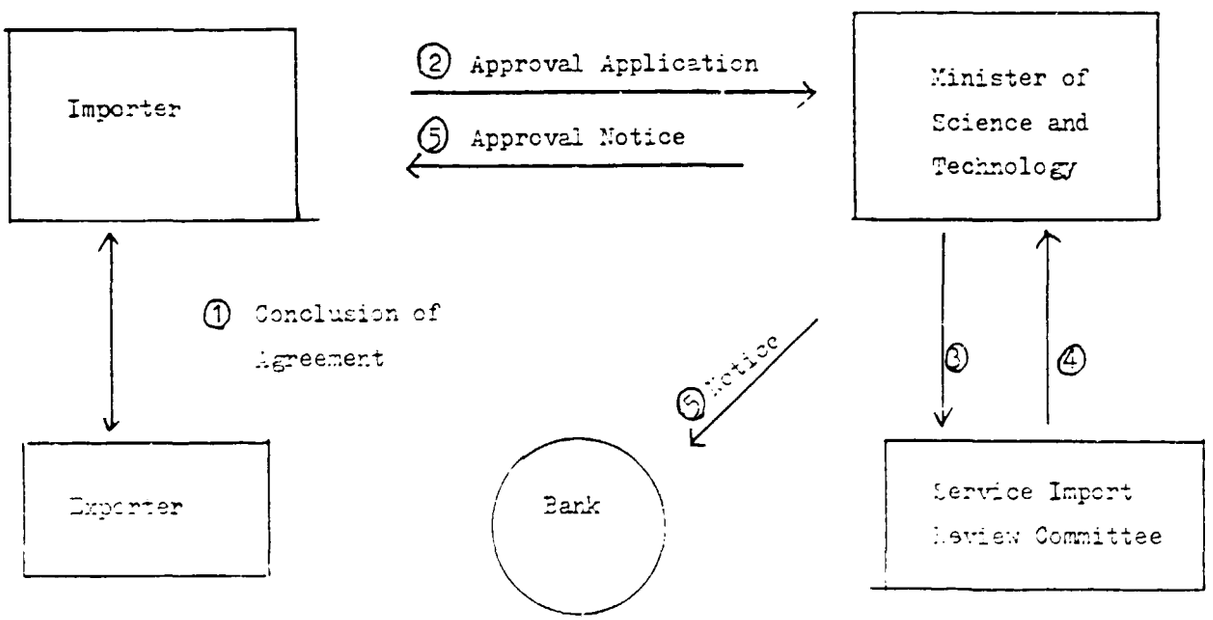
Fifth, whether the use period of the requested technical service and technical service fees are appropriate.

Sixth, other necessary matters.

Technical service is generally distinguished from technology import in that while the former is provided under an agreement of less than a one-year period, the latter means supply of technology other than service under an agreement of more than a one-year period. In both cases, payment is made in foreign exchange.

Approving an application for use of foreign technical service, the Minister of Science and Technology seeks an advice of the Service Import Review Committee which he himself chairs and which consists of bureau chief-level officials of pertinent government Ministries. But in case technical service fees are less than US$300,000, the requested service is for urgent repair and maintenance of key industrial facilities, an application is for amendment of the approved service import agreement, or the requested service is for classified industries, such as defense and atomic power industries, he is authorized to approve such applications at his own discretion.

The approval procedures for foreign technical service, as required under the Technical Service Promotion Law, are shown as follows:



The above law does not provide any tax favors for local industries in use of foreign technical service, and this may cause a problem to technical service imports.

In the case of technology imports, income taxes and corporate taxes are exempted for royalties being paid to technology exporters over a period of five years from the day of import, and then these taxes are reduced to 50 per cent over the three-year period after the above-mentioned five-year period.

In order to promote imports of the empirical knowledge and technological knowhow accumulated by foreign engineers over a long time of period, some tax holidays must be granted for the use of foreign technical service.

Conclusion

1) In order for developing countries to narrow their technological gaps with developed countries and to achieve technological self-reliance, they must create appropriate environments of science and technology and establish effective technological development policy. Especially the development policy for engineering service industry should be part of a long-term startegy of technological development for improved local capabilities of developing new technology and new products and for a bigger reservoir of industrial technology, for which the engineering service industry must be actively developed. The development of engineering technology, including basic and detailed design techniques, is possible when local technical service firms are properly protected and supported under effective technical service development policy encouraging imports of foreign core engineering technology on a selective basis.

2) In order to develop effectively the technical service industry, a law fostering and protecting the engineering service industry must be established, and this law must be designed to guarantee sound growth of the local technical service industry and improvement of the local technical level for contribution to the development of the national economy.

3) In order to increase local technical level and improve local capability of developing new technology industries importing foreign technical service must correctly identify their technological needs and then evaluate the feasibility of candidate foreign technical service to meet such needs in comparison with the service available locally. On the part of the government, efforts should be made to take measures encouraging local industries to use indigenous technology as much as possible. Under such measures, local industries should also be required to import only core technology not available at home in concluding an agreement with a foreign supplier, and not to include locally available technology in such agreement. In case a big industrial plant is built, the project should not be awarded to a foreign firm under a package agreement, nor should it be carried out on a turn-key basis by a foreign firm.

The prime contract should be awarded to a local firm, if possible, and only those parts of the project which cannot be done with local technology for their requirements for advanced core technology should be given to foreign experts under a sub-contract. This will help develop local technological capabilities and improve local technical level in a relatively short period. For instance, technical knowhow and information on basic design technology can be imported, but design blueprints must be developed by local technical staff, and should local engineers be not capable of drawing such blueprints the drawing work should be given to foreign experts under an agreement stipulating for participation of local engineers in the drawing for obtaining design knowhow on the job.

4) The selection of appropriate technical service suppliers, favorable terms and conditions of an agreement and the government's policy supporting technical service imports are major parameters that determine the result of a project based on foreign technical service. So industries planning to import foreign technical service must select appropriate suppliers of service that can meet their technological needs from among many candidates surveyed, and then start negotiations with the selected supplier on service import in such a manner as to establish terms and conditions of import in their favor. In going through this process, industries need lots of technical data and information, such as information on what firm of what country has the required technology and how much technical service fees are. The ideal information on such things can be obtained from local or foreign firms which have had experience of similar technical service imports after a study of their case. In this view, an exchange system of such information between developing countries is considered very important to the development of technical service in these countries.

5) The technical service agreement must include the following clauses of terms and conditions, and the recipient party of service to such agreement must see to it that terms and conditions are specified in every detail so as to protect its rights to a maximum degree.

a) Scope of Work: The scope of work for the recipient party must be clearly defined so that it may be distinguished from the giver's scope of work. Especially, the latter must specify the whole content and scope of technical service to be given in such a manner as to define clearly the responsibilities and obligations of the service giver.

b) Grant of Rights: It is necessary that the technical service agreement specify the type of granting technology, such as technological knowhow, technical data and patents, when technical service is provided. For instance, whether the grant of technology is for exclusive license, non-exclusive license, or sole license in the licensed territory must be clearly specified to protect the interest and rights of the recipient.

c) Title of Technical Information, Including Design Blueprints and Specifications: It is desirable that all technical information, including drawings and specifications, given under an agreement be entitled to the recipient's free use not only during the valid period of the agreement but also after that period.

d) Valid Period: The technical service agreement must also specify the valid period so that the giver is charged with the responsibility for completing the stipulated service work within that period. Should the giver fail to accomplish the stipulated work within the valid period, the recipient would incur consequential damage because of, for example, delayed start of factory operation for which the technical service agreement was concluded. So a clear presentation of the valid period in a technical service agreement is very important to the recipient party of the service.

e) Technical Service Fees: As in the case of technology imports, money paid for technical service can be paid in various type, such as initial payment, knowhow fees (technical information fees), patent license fees and running royalties. But a characteristic type of the money paid for technical service is per diem or monthly salary to experts invited for the purpose of using their high-level empirical knowledge and knowhow. The amount of such per diem or monthly salary differs according to the area of industrial technology in which invited experts are specialized and the qualifications and experience of these experts.

It is desirable that in deciding on the amount of per diem or salary of invited experts, the payer firm study the justifications of the amount, reviewing comparatively the amount of such expenses used by other firms for receiving similar technical service and the cases of foreign countries. In case technical service fees are computed in connection with the service for construction of a big modern industrial plant, a ceiling on the total amount of wages and salaries, including expenses for invited experts, should be fixed under the category of engineering fees. In this, the period of stay for invited experts should be so set as to enable these experts to finish their assigned work fully within that period. It is also desirable that not only wages and salaries but also expenses for fabrication and purchase of equipment be paid on an accrual basis.

f) Guarantee: In technical service, the giving party usually guarantees the quality of the licensed product, the transferred technical data and information, and the performance of equipment purchased or fabricated. In the case of product guarantee, full guarantee can hardly be obtained under an agreement stipulating for the transfer of technical information or for technical consultation; it can be obtained under an agreement stipulating for engineering service for construction of a factory on a turn-key basis. Thus under an agreement stipulating for the transfer of technical information or consultation the recipient party should be content with the giver's guarantee of the transferred information and the equipment purchased or fabricated at the giver's advice. In case a chemical plant is built under a technical service agreement, the recipient must get the following guarantees.

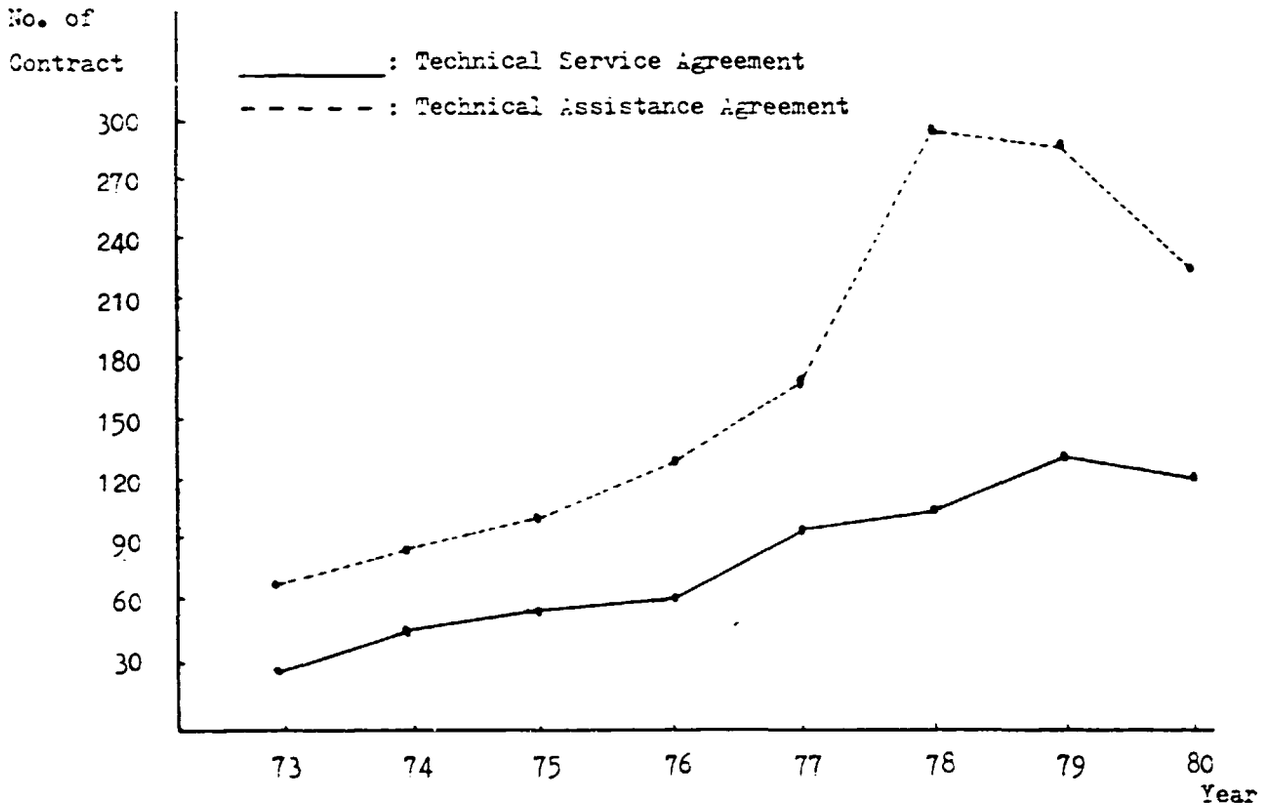
i. Process Guarantee
   - Yield or recovery
   - Quality
   - Capacity
   - Utility consumption
   - Chemical and catalyst consumption

ii. Mechanical Guarantee
   - Workmanship of materials and machinery
   - Mechanical and hydraulic operability of equipment

g) Compensation for Losses: A technical service agreement on construction of a big industrial plant must contain a clause stipulating for compensation of losses due to the service giver's failure. Especially to prepare against the case that the constructed plant under such agreement fails to achieve the agreed-on yield or capacity value, or utility consumption value, the agreement must clearly stipulate for the computation method of penalty. The agreement must also include a clause specifying compensation for damage due to the failure of equipment purchased or fabricated under the agreement. But it is general practice of technical service agreements not to claim separately compensation for consequential damage, such as damage or profit losses due to production delay as a result of repurchase or refabrication of equipment at the giver's own expenses.

APPENDIX

Fig. 1 Foreign Technical Service Agreement Trend by Year



Source: EPB, MOST

Table 1

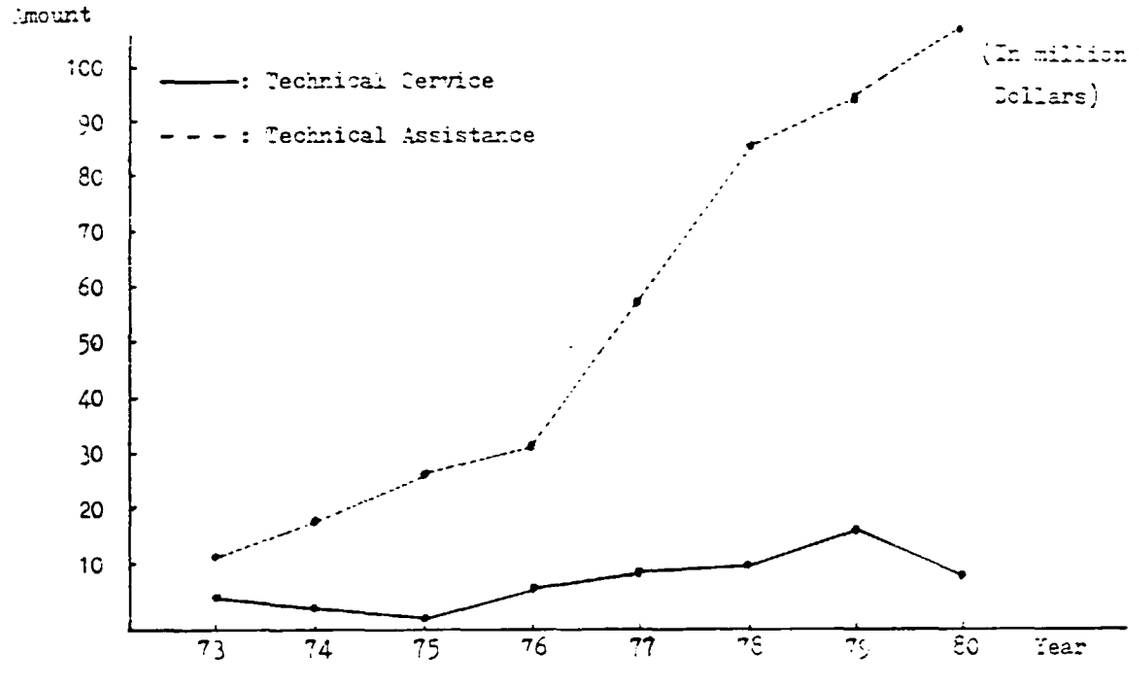
Foreign Technical Service Agreement Status by Year

Year		1973	1974	1975	1976	1977	1978	1979	1980	Total
Technical Assistance Agreement	No.	67	86	99	131	168	296	288	222	1,357
	Rate	-	28.4	15.1	32.3	28.2	76.2	-2.7	-22.9	22.1
Technical Service Agreement	No.	28	44	57	61	94	105	131	120	640
	Rate	-	57.1	29.5	7.0	54.1	11.7	24.8	-8.4	25.1

Source: EPB, MOST

Fig. 2

Foreign Technical Service Fee Trend by Year



Source: EPB, MOST

Table 2 Foreign Technical Service Fee Status by Year (In thousand US Dollars)

Year		1973	1974	1975	1976	1977	1978	1979	1980	Total
Technical Assistance Agreement	Amount	11,490	17,791	26,541	30,423	58,056	85,056	93,934	107,232	430,532
	Rate	-	54.8	49.2	14.6	90.8	46.5	10.4	14.2	40.1
	%	68.4	81.4	92.3	83.3	86.3	90.0	86.8	92.2	87.8
Technical [illegible]e Agreement	Amount	5,316	4,066	2,216	6,082	9,191	9,666	14,345	9,068	59,970
	Rate	-	-23.5	-45.5	174.5	51.1	5.4	48.1	-36.8	24.8
	%	31.6	18.6	7.7	16.7	13.7	10.0	13.2	7.8	12.2
Total	Amount	16,806	21,857	28,757	36,505	67,247	94,751	108,279	116,300	490,502
	Rate	-	30.1	31.6	26.9	84.2	40.9	14.3	7.4	33.6

Source: EPB, MOST

Table 3

Yearly Foreign Technical Service Agreement Status by Sectors

(In US Dollars)

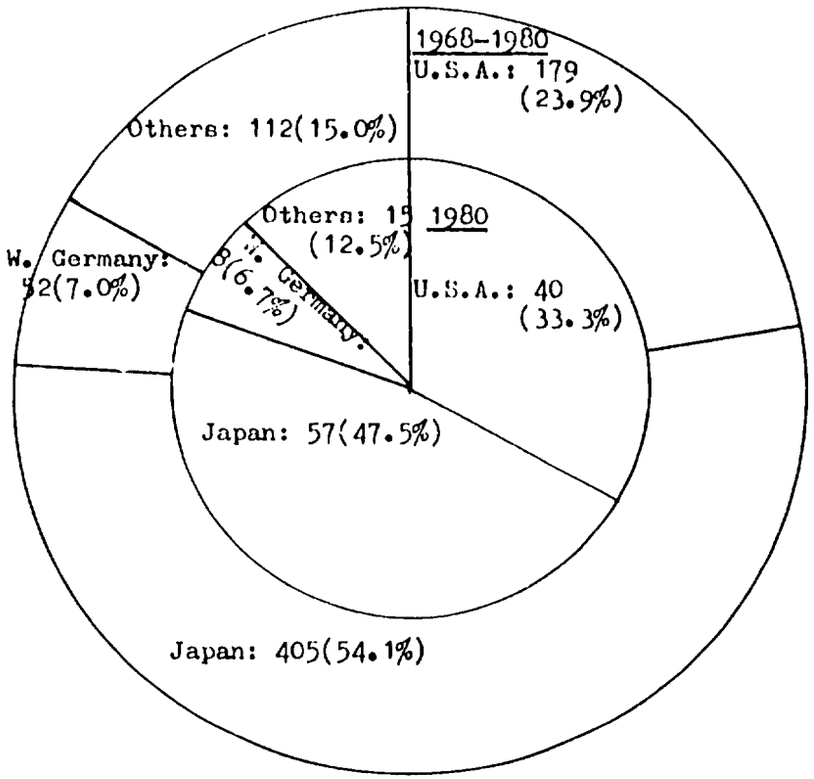
Sector \ Year		1973	1974	1975	1976	1977	1978	1979	1980	Total (%)
Metal & Machinery	Number	10	15	12	20	24	28	37	33	179 (28.0)
	Amount	1,250,344	866,703	328,770	1,682,358	1,525,496	2,109,214	2,095,000	1,625,016	11,482,901(19.1)
Chemicals	Number	7	9	12	12	11	18	23	21	113 (17.7)
	Amount	174,569	1,765,685	1,048,435	847,009	1,280,693	1,418,787	1,962,000	1,059,389	9,556,567(15.9)
Nuclear Power	Number	-	3	2	5	6	7	11	8	42 (6.6)
	Amount	-	465,921	138,400	1,330,972	2,731,036	2,485,669	5,986,000	2,310,553	15,448,551(25.8)
Construction	Number	2	7	4	1	8	13	10	21	66 (10.3)
	Amount	101,800	629,883	119,717	24,000	508,120	1,149,400	945,000	1,686,134	5,164,054(8.6)
Food	Number	1	1	-	-	2	2	2	2	10 (1.6)
	Amount	6,750	-	-	-	8,125	134,600	31,000	54,986	235,461(0.4)
Textile	Number	2	-	1	1	6	2	1	3	16 (2.5)
	Amount	298,012	-	166,752	30,910	575,122	56,370	8,000	57,001	1,192,167(2.0)
Shipbuilding	Number	3	5	2	-	5	3	7	1	26 (4.1)
	Amount	206,662	196,981	52,908	-	336,794	255,600	563,000	16,560	1,628,445(2.7)
Electric & Electronic Equipment	Number	-	3	9	12	21	16	23	18	102 (15.9)
	Amount	-	95,480	335,708	770,672	2,063,158	978,526	1,940,000	1,417,007	7,600,551(12.7)
Mining	Number	1	1	2	3	1	2	4	1	15 (2.3)
	Amount	64,800	44,957	25,065	1,395,600	15,000	257,800	234,000	75,000	2,312,222(3.9)
Others	Number	2	-	13	7	10	14	13	12	71 (11.1)
	Amount	3,212,860	-	-	-	146,997	839,903	581,000	766,251	5,547,011(9.2)
Total	Number	28	44	57	61	94	105	131	120	640 (100)
	Amount	5,315,797	4,065,610	2,215,756	6,081,521	9,190,541	9,685,869	14,345,000	9,067,837	59,967,931(100)

Source: MOST

Fig. 3

Foreign Technical Service Agreement Status by Source Country

Total: 748 (1968 - 1980)



Outer Circle: 1968 - 1980

Inner Circle: 1980

Table 4

Purpose of Service Agreement by Sector

Purpose \ Sector	Chem.		Textile		Machinery		Metal		Electronics		Electricity		Shipbuilding		Mining		Construction		Telecom.		Nuclear Power		Tech. Inform.		Pollut. Control		Energy		Others		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Construction of New Plant	25	21.4	4	19.0	20	15.4	9	25	–	–	1	12.5	1	12.5	2	40.2	23	58.0	–	–	3	13.0	–	–	7	70.0	3	11.1	2	14.3	100	21.4
Maintenance of Facilities	4	3.4	1	4.8	37	28.5	4	11.1	1	4	1	12.5	–	–	–	–	1	2.6	–	–	3	13.0	–	–	–	–	27	100	–	–	79	16.9
Extension of Facilities	10	8.5	–	–	16	12.3	1	2.8	–	–	1	12.5	–	–	1	20.0	1	2.6	–	–	–	–	–	–	1	10.0	–	–	–	–	31	6.6
Improvement of Manufacturing Process	21	17.9	8	38.1	14	10.8	5	13.9	3	12	3	37.5	1	12.5	–	–	1	2.6	–	–	3	13.0	–	–	5	50.0	1	3.7	2	14.3	67	14.3
Improvement of Manufacturing Know-how	24	20.5	3	14.3	12	9.2	10	27.8	8	32	2	25	2	25	–	–	2	5.1	–	–	–	–	–	–	2	20.0	1	3.7	6	42.9	72	15.4
New Product, New Technology Development	43	36.8	6	28.6	14	10.8	10	27.8	16	64	–	–	3	37.5	1	20.0	1	2.6	–	–	–	–	–	–	1	10.0	1	3.7	3	21.4	99	21.2
Procurement of Raw Material	9	7.7	1	4.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	2.1
Feasibility Study	7	6.0	2	9.5	3	2.3	3	8.3	3	12	–	–	–	–	1	20.0	11	28.2	1	100	8	34.8	–	–	1	10.0	3	11.1	–	–	43	9.2
Training	8	6.8	3	14.3	4	3.1	3	8.3	–	–	–	–	–	–	–	–	1	2.6	–	–	3	13.0	–	–	–	–	1	3.7	2	14.3	25	5.4
Improvement of Management	3	2.6	3	14.3	8	6.2	3	8.3	3	12	1	12.5	1	12.5	–	–	2	5.1	–	–	2	8.7	–	–	–	–	–	–	3	21.4	29	6.2
Others	2	1.7	1	4.8	2	1.5	–	–	–	–	–	–	1	12.5	–	–	–	–	–	–	3	13.0	3	100	–	–	–	–	–	–	12	2.6
Total	156		32		130		48		34		9		9		5		43		1		25		3		17		38		18		567	
No. of Surveyed Projects	117		21		130		36		25		8		8		5		39		1		23		3		10		27		14		467	

Note: 1) If one service contains more than one purpose, then it in entered in multiple.

2) The rate(%) is computed on the basis of the number of surveyed projects.

Table 5

Scope of Supplied Service by Sector

Sector / Contents	Chem.		Textile		Machinery		Metal		Electronics		Electricity		Shipbuilding		Mining		Construction		Telecom.		Nuclear Power		Tech. Inform.		Pollut. Control		Energy		Others		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Feasibility Study	12	10.3	1	4.8	11	8.5	6	16.7	1	4.0	–	–	–	–	1	20.0	13	33.3	1	100	8	34.8	–	–	1	10.0	2	7.4	2	14.3	59	12.6
Project Management	1	0.9	1	4.8	–	–	–	–	–	–	1	12.5	–	–	–	–	2	5.1	–	–	–	–	–	–	–	–	–	–	–	–	5	1.1
Know-How	62	53.6	9	42.9	33	25.4	20	55.6	15	60.0	4	50.0	3	37.5	–	–	9	23.1	–	–	4	17.4	1	33.3	4	40.0	1	3.7	4	28.6	169	36.2
Basic Design	32	27.4	2	9.6	18	13.8	6	16.7	8	32.0	–	–	–	–	1	20.0	16	41.0	–	–	–	–	–	–	6	60.0	1	3.7	1	7.1	91	19.5
Detail Design	12	10.3	1	4.8	8	6.2	2	5.6	2	8.0	–	–	–	–	–	–	2	5.1	–	–	–	–	–	–	3	30.0	1	3.7	1	7.1	32	6.9
Procurement Service	4	3.4	1	4.8	3	2.3	1	2.8	–	–	1	12.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	2.1
Test & Evaluation	–	–	–	–	2	1.5	1	2.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	0.6
Manufacture & Supply of Facility	8	6.8	2	9.6	34	26.2	5	13.9	1	4.0	1	12.5	1	12.5	–	–	–	–	–	–	–	–	–	–	–	–	2	7.4	–	–	54	11.6
Construction	3	2.6	3	14.3	5	3.8	2	5.6	1	4.0	2	25.0	1	12.5	–	–	–	–	–	–	–	–	–	–	1	10.0	–	–	–	–	18	3.9
Supervision	12	10.3	4	19.2	8	6.2	–	–	–	–	1	12.5	1	12.5	1	20.0	10	25.6	–	–	1	4.3	–	–	4	40.0	1	3.7	–	–	43	9.2
Test Operation	12	10.3	4	19.2	27	20.8	4	11.2	1	4.0	2	25.0	2	25.0	3	60.0	–	–	–	–	–	–	–	–	4	40.0	–	–	–	–	59	12.6
Operation	23	19.7	9	42.9	52	40.0	25	69.4	9	36.0	5	62.5	4	50.0	2	40.0	5	12.8	–	–	6	26.1	–	–	1	10.0	21	77.8	8	57.1	170	36.4
Others	1	0.9	–	–	–	–	1	2.8	–	–	–	–	–	–	–	–	–	–	–	–	4	17.4	2	66.7	–	–	–	–	–	–	6	1.3
No. of Surveyed Projects	117	100	21	100	130	100	36	100	25	100	8	100	8	100	5	100	39	100	1	100	23	100	3	100	10	100	27	100	14	100	467	100

Note: 1) If one service contains various contents, then it is entered in multiple.

2) The rate(%) is computed on the basis of the number of surveyed projects.

Table 6 Method of Service Supply

Purpose \ Method	Patent	Know-How	Drawings	General Information	Technician	Training	Consulting	No. of Surveyed Projects
Construction of New Plant	1	33	36	13	78	9	34	95
Maintenance of Facilities	-	20	2	1	78	-	72	79
Extension of Facilities	2	11	6	2	20	-	9	25
Improvement of Manufacturing Process	1	21	10	10	42	1	32	50
Improvement of Manufacturing Know-How	3	34	10	16	50	4	36	62
New Product. New Technology Development	14	49	22	23	61	8	34	75
Procurement of Raw Material	1	-	-	-	-	1	-	2
Feasibility Study	2	3	-	7	34	3	35	40
Training	-	3	1	2	7	4	4	7
Improvement of Management	-	4	-	6	23	4	19	23
Others	-	-	1	1	5	-	8	9
Total	24	178	88	81	398	34	283	467 / 1086

Note: 1) If one service contains more than one method, then it is entered in multiple.

Fig. 4 Procedure for Implementing Foreign Technical Service

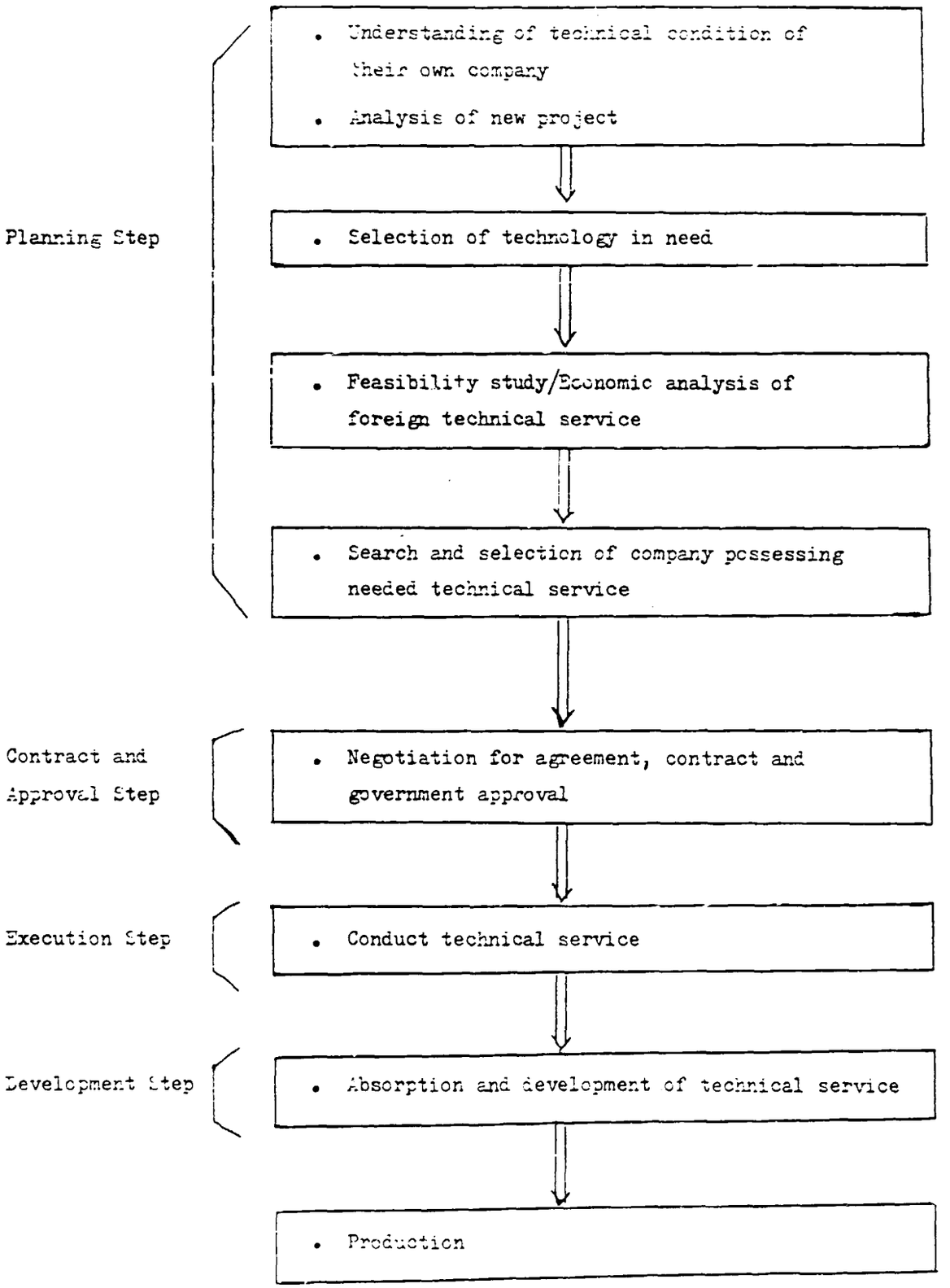


Table 7

Types of Service Fee Payment

Payment Type	Number (Rate)
Lump-Sum Payment	151 (32.3)
Reimbursement	293 (62.7)
Running-Royalty	14 (3.0)
No Payment	8 (1.7)
Others	1 (0.2)
Total	467 (100)

Table 8

Per Diem Average by Area

(In US Dollars)

Year \ Area	Japan	U.S.A.	Europe
1975	109	150	208
1976	113	195	190
1977	114	225	197
1978	126	265	242
1979	150	314	309
1980	179	323	318

Note: 1) Europe contains U.K., France, W.Germany, Swiss and Sweden.

2) Costs for transfortation, foods and accomodation in Korea are not contained.

Table 9

Foreign Technical Service Agreement Approval Application				Maximum Approval Dates: 30 days
1. Applicant (Technical Service Demander)	1 Name			
	2 Company			
	3 Address		4 Telephone	
	5 Main Purpose of Work		6 Capital	
2. Technical Service Supplier	7 Name			
	8 Company			
	9 Address			
	10 Nationality		11 Capital	
3. Contents of Contract	12 Purpose of Foreign Service			
	13 Contents of Foreign Service			
	14 Contract Period	Effective Period of Contract		
		Actual Period of Service		
	15 Service Fee			
	16 Number of Foreign Technician			

In accordance with the provisions of Paragroph 2 through Paragraph 3, Article 4 of the Technical Service Promotion Law and of Article 13 and Article 15 of the Enforcement Decree of the Law, I apply for the approval of Foreign Technical Service Agreement like above.

198 . . .

Applicant name and Signature

To the Ministry of Science and Technology

List of Technician from Technical Service Supplier

(Title of the Service:)

1 Name	2 Sex	3 Age	4 Attended School	5 Major	6 Main Career	7 Position	8 Period in Korea	Service Fee	
								9 Perdiem	10 Total