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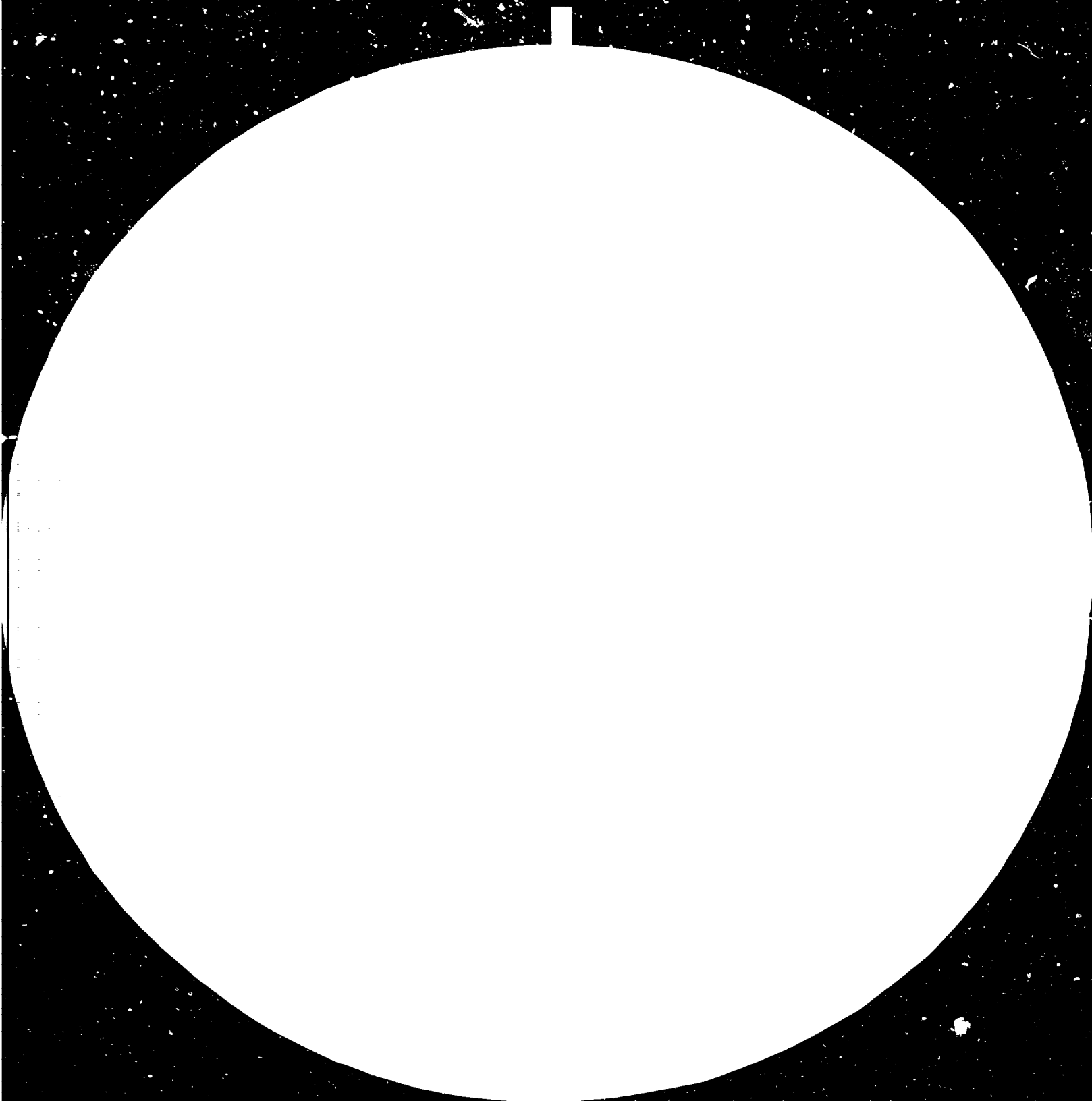

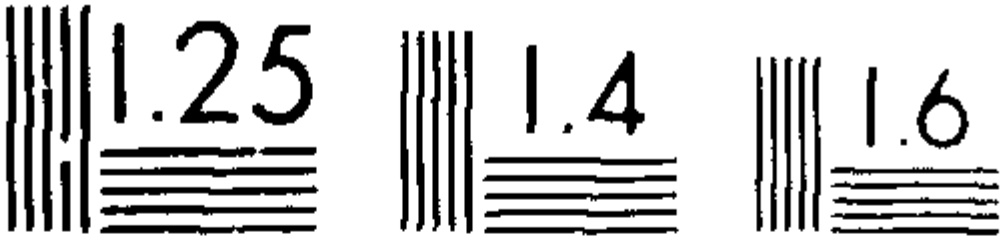
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NEWSLETTER

TECHNOLOGICAL INFORMATION EXCHANGE SYSTEM

Issue Number 14 — March 1982

12042

Dear Reader,

I would like to inform you that the General Assembly at its 36th Session decided to convene the Fourth General Conference of UNIDO in 1984 for which the host facilities have been offered by the Government of Kenya. For this purpose the Industrial Development Board at its 16th session to be held in May 1982 will begin functioning as a preparatory committee for the Conference.

In order to assist the Executive Director in the preparatory activities of the Conference, he has appointed a Task Force consisting of several staff members of UNIDO for the initial period with myself as Chairman. Through this Newsletter we will provide you with information on any significant developments in this regard.

G.S. Gouri
Director
Division for Industrial Studies

Registry activities

Report of Chinese Study Tour

Management and Legal Aspects of Technology Transfer Work in the Philippines, Mexico, Brazil, India and Portugal.

Report by the Chinese Technology Transfer Study Group, presented at the Sixth Meeting of Heads of Technology Transfer Registries, Manila, Philippines, November 1981 by Mr. Chen Renhuang, Foreign Relations Bureau, First Ministry of Machine Building.

Introduction

A Technology Transfer Study Group organized by the State Import and Export Commission, People's Republic of China paid a visit to the Philippines from 26 May 1981. After their visit, they split into two groups, one group visiting India and Portugal, while the other visited Mexico and Brazil. With the assistance given by UNIDO, the main purpose of their visit was to observe the management and legal aspects of the technology transfer work in the five countries.

The whole trip ended on 1 July 1981 including a short stay in Vienna and Geneva. Although the duration was short, they exchanged views with officials in UNIDO and UNCTAD on the work of technology transfer and their future co-operation perspective.

Departments and Units Visited

During their stay in the five countries, the group spent most of their time in discussions with the departments or organizations responsible for the technology transfer work and in exchanging views and experiences with the members of those departments in the field of management and legal aspects. In addition, they also made some technical and industrial visits to those manufacturers or factories where good results had been achieved as a result of technology transfer from abroad, so far as the absorption of imported technology was concerned.

Observations and Impressions

Throughout the visit, the study group was able to become better acquainted with the practices and experiences of various countries in the work of technology transfer and was able to collect information on its legislation. All the members of the group were able to learn a great deal from these visits.

(1) In the development of national economy and various industrial sectors, the five countries visited follow the policy of foreign technology acquisition and international collaboration on a wide scale. Every year these countries sign a number of technology transfer agreements and technical assistance contracts so as to get the advanced and updated technology from abroad in those departments and sectors where foreign collaboration was urgently needed, and to promote economic and technical development. For example, in 1980 the number of contracts signed in India was 526, 935 in Brazil, 613 in Portugal and 286 in the Philippines. The agreements and contracts involved a wide range of industrial sectors, such as machine building, chemicals, metallurgy, electric power, textiles, as well as food industries.

The technology transfer fees paid by these countries has also increased each year. For instance, from 1970 to 1976 the annual increase was about 16.7 per cent in Brazil and 6 per cent in Mexico while in India the annual increase was 12.7 per cent from 1970 to 1977.

Compiled by the Technology Group of UNIDO — P.O. Box 300, A-1400 Vienna, Austria

In the technology transfer promotional work, their practice and experience is to increase technology imports and to enlarge foreign collaboration so as to speed up the rate of production and update the technological level. They do not favour technology imports through the form of turnkey projects or complete plants. If they do, the number of cases are very few. All these experiences are worth learning from.

(2) In accordance with domestic needs and conditions, the five countries follow the policy and pay much attention to the import of appropriate technology. During the discussions officials in many government departments emphasized on several occasions that to import any advanced foreign technology, one should bear in mind and make an analysis whether the said technology is appropriate to local needs and conditions, especially in terms of employment increase, raw materials supply and the ability to absorb imported technology. Take India as an example. The Indian Government, in compliance with domestic economic development and specific conditions, has formulated a policy clearly indicating the industrial sectors which need to import foreign technology and lists industries where no foreign technical collaboration is considered necessary. All these practices and experiences are also suitable to present conditions in China.

(3) management system and mechanism in the technology transfer work: During our visit to the five countries, we noticed that the management system and mechanisms are mainly classified into 3 categories:

(a) no special mechanism is set up to deal with the technology transfer work, as in the case of India where in addition to the Foreign Investment Board, the Ministry of Industry and the Department of Science and Technology are involved in the evaluation and approval of technology transfer contracts. At the same time, there exists a Technical Evaluation Committee, a Licensing Committee and a Capital Goods Committee, composed of representatives from various departments to handle and evaluate technology import contracts as well as the import of capital goods;

(b) there is a special mechanism which allows the final decision-making power to one institution which is responsible for all aspects of technology transfer work. Mexico, Portugal and Brazil belong to this category. The National Registry of Foreign Investment and Technology Transfer in Mexico, the Foreign Investment Institute in Portugal and the National Institute of Industrial Property in Brazil. All these organizations are responsible for the overall technology transfer work and contracts approval;

(c) the case of the Philippines belongs to the third category. The Technology Transfer Board is responsible for the guidance of technology transfer and makes the final decisions. The Board consists of the representatives of the Ministry of Industry, the National Economic Development Authority, the Science and Technology Development Authority, the Philippines Patent Office, the Board of Investments, the Technology Resource Centre and the Central Bank of the Philippines.

The different management systems and organizational set-ups of the five countries are helpful for China to further reform our management system and to improve our management.

(4) Legislation and legal framework of technology transfer in the five countries and its implementation:

Generally speaking, these countries have undergone three stages:

(a) Liberalization (government non-intervention of technology transfer);

(b) Bank control stage where the government controls foreign exchange and formulates a special law or code;

(c) Government participation in the overall management or control.

In the case of the Philippines, prior to 1973 it had reached the liberalization stage. Between 1973 and 1978 the Bank controlled technology transfer. With the establishment of the Technology Transfer Board in 1978, the Government started to practice overall control of agreements and contracts signed.

In the case of Portugal, it was liberalized before 1973, with the bank control stage between 1973 and 1977 and the overall control starting after 1977. Brazil started much earlier compared to other countries. The liberalization stage started before 1958. Between 1958 and 1970 it had reached the bank control stage and the overall control stage began after 1970.

At present, the Philippines, Portugal, Mexico and Brazil have formulated special laws or codes for technology transfer. During the course of implementation, the laws or codes were revised and some countries even issued more detailed criteria. For example, the Mexican Government issued a "Summary of the General Criteria of Application of the Transfer of Technology Law" in 1974. Although it did not formally publish an executive order or regulation through legal channels it acted as an internal guideline to control various technology transfer contracts.

India has no special law or code on technology transfer. However the specific provision in the Industrial Development and Regulation Act issued in 1951 and "Guidelines for Industries" issued every year govern and guide the technology transfer work.

From the countries we visited, we noted that they had achieved remarkable success so far as results on strengthening legislation and management. Through government intervention and control, the private parties obtained a strong negotiating position with better, more favourable and fairer conditions and terms in technology transfer work.

China is now in the course of formulating a legal framework for technology transfer. The experiences of the countries visited were so valuable for us that they were used as a general reference in order that the technology transfer code or law yet to be formulated would best suit China's specific conditions.

Regarding the restrictive business practices and clauses, legislation in the various countries have listed in principle the detailed clauses and items which should not be permitted to appear on technology transfer agreements or contracts. For example in the Mexican Law there are 14 circumstances, 7 in the Portuguese Code and 10 in the Philippine Regulations, and there are also detailed provisions and clauses in the Indian and Brazilian laws or codes which are not allowed to appear in agreements or contracts.

In handling the restrictive business clauses, the regulating bodies in the five countries have paid much emphasis to combining the guiding principle of law with flexibility. With regard to different restrictive clauses, one has to differentiate between the various kinds of contracts, different parties involved and specific terms and conditions so that a case-by-case approach can be carried out. The approach to insist on principles and combine this with a certain flexibility is also applicable to the present technology transfer work in China.

(5) The countries we visited have formulated a more perfect system for reviewing, approving and registering contracts through which the technology transfer transactions can be controlled and managed. The co-ordinating bodies of these countries have gained a lot of practical experience and we have carefully studied their experiences and collected the information on specific procedures of examination and approval, the application forms to be filled in for registration, the process of making technical, economic and legal evaluation, as well as the duration for contract approval, remuneration and payment for technology transfer. We can take their experience and practices as our guideline in the course of formulating China's approval system for the technology transfer contracts.

Others

In the countries we visited, the group noticed with great interest that government sponsored or financed service agencies for technical information and technical consultancy have played an important role in the promotion of technology transfer work. The National Research and Development Corporation in India and the Indian Investment Centre have offered various enterprises with technical consultancy and other services. The Technology Resources Center in the Philippines is also a consultancy organization for the development of medium and small scale industries.

Simultaneously with technology importation, these countries also pay much attention to technology export. With the assistance of the Indian Investment Centre and the National Research and Development Corporation, India has exported technology to a number of countries during the past few years such as Nepal, Kenya and others. In the case of Portugal, there were 149 items of technology export and technical assistance offered between 1974 - 1979 and the total income amounted to several tens of millions of US dollars.

China has now just begun to export technology and we are going to study further the experiences in technology export so as to improve our own export work.

JUNAC Studies on Technology Transfer in the Pharmaceutical Industry

The Board of the Cartagena Agreement (The Board) and the United Nations Industrial Development Organization (UNIDO), carried out a sectoral study on the importation of technology in the pharmaceutical sector of the Andean subregion. The objectives pursued were those of presenting a general idea of the technology transfer process in the pharmaceutical sector in the Andean region, an evaluation of its mechanisms, terms and conditions that regulate the importation of technology and an assessment of the technological impact of this importation.

The undertaking of this study was of particular importance for the Andean Group due to the close relationship between the pharmaceutical sector and the satisfaction of basic health needs of the Andean population. In the meantime it is the first evaluation of the application of Decision 24 in a specific sector.

The following is a short summary of the major findings and conclusions. The complete report can be ordered directly (either in English or Spanish) from the UNIDO Technology Programme. The pertinent information covered the period 1975 - 1980.

Characteristics of the Industry

There are about 360 pharmaceutical enterprises in the Andean subregion which in 1977 generated approximately 17 per cent of employment in the chemical sector and 2.5 per cent of employment in the manufacturing sector. With regard to the value added to production, the pharmaceutical industry represented 7.7 per cent of the chemical sector and 2.3 per cent of the manufacturing sector. On the other hand, the number of occupied persons totals 29,000 averaging 84 workers per establishment, which is higher than the average for the chemical industry (75 workers per establishment), and manufacturing activity in general (41 workers per establishment). This indicates that the pharmaceutical sector in the subregion is significantly labour intensive.

Some tens of thousands of different products are registered in the Andean region, while on the other hand only 250 products would satisfy the health needs of the subregion. This wide spectrum of products is due to the many different trade names used for the same drug and gives rise to big differences in processes for products with identical therapeutic effects. The sales value of the pharmaceutical industry in the region reached $US 800 million in 1977 which represents almost 2 per cent of the global sales. However more than 69 per cent of the raw materials were imported during that year.

Taking a sample of 204 enterprises in the subregional pharmaceutical sector, it can be observed that approximately 70 per cent are

foreign enterprises (companies with more than 50 per cent foreign capital), 24 per cent national and 7 per cent mixed. As far as capital distribution among the different types of enterprises is concerned, it is seen that in the subregion foreign capital prevails, except in the case of Bolivia.

The enterprises from the earlier mentioned samples which were classified as foreign, received capital from the United States (34 per cent), Switzerland (14 per cent), Federal Republic of Germany (10 per cent), Panama (8.5 per cent) and from Canada (6.3 per cent). The percentage of participation of the United States would be higher if it is considered that Panama is a transit country for American capital since it does not generate its own technology.

Technology Contracts

The enterprises established in the subregion have signed technology acquisition contracts with suppliers based in 27 different countries, some Latin American, even registering intra-subregional technological co-operation contracts.

The greatest number of contracts originate from the United States (30.3 per cent), followed by those of France (13.9 per cent), Germany (10.7 per cent), Italy (7.8 per cent) and Switzerland (7.5 per cent).

In general the contracts have a validity period of five years, even though it should be pointed out that the majority of these are extensions of existing contracts or are subject to such extension.

85 per cent of the contracts involve licenses for the use of trademarks and are generally accompanied by the supply of technical information or quality control obligations.

None of the contracts agree on the execution of engineering studies, and less than 1 per cent of them include personnel training. From the analyzed sample, 21 transnational companies have activities in more than one Andean country. Together such companies have invested almost $US 105 million in 68 firms, while it can be observed that 13 transnational companies are present in 3 or more of the Andean countries.

Technology Regulations

Since 1970 legal mechanisms have been adopted in the Andean Group countries which have allowed the regulation for transfer of technology. Among these it is worth noting Decisions 24 and 85 of the Board of the Cartagena Agreement which contain subregional dispositions about the regulation on the importation of technology and the creation of national organisms in charge of evaluation of updating and registration of contracts.

As a consequence to the establishment of legal mechanisms, the payment of royalties from the subsidiaries to the home office or amongst subsidiaries of the same home office has been stopped, the licenses for the exploitation of patents of pharmaceutical products have been prohibited, restrictive clauses have been eliminated and the rate of the royalties as well as the period of validity of the contracts has been reduced.

Technological Level of the Subregional Chemical Pharmaceutical Industry

It is important to establish the difference between the part of the pharmachemical industry that elaborates active substances and the part of the pharmaceutical industry that produces dosified drugs.

The technology for transforming active substances into pharmaceutical dosified forms is not very complex and is contained in fabrication manuals which describe the processes and techniques in current use. The professionals of the subregion are qualified in the preparation and handling of the mentioned active substances. At present the majority of the Andean countries are producing about 80 per cent of their needs (with the notable exception of Bolivia which produces only 30 per cent). Given the nature of the technology involved, very little foreign assistance is required, apart from the trademarks necessary for capturing a share of the market. On the other hand, the technology for fabricating active substances requires more specialized knowledge and has not yet been developed in the Andean region.

Conclusions

It can therefore be said that the prospect for improvement of the technological level of the Andean region in this sector would depend entirely on the availability of foreign technology. It may be concluded that the regulation mechanism adopted by the Andean countries has contributed little to decreasing the technological dependence in this sector, although legislative measures have successfully coped with legal and economic aspects of technology transfer.

UNIDO activities

Technology Forecasting Meeting in Mexico

Our readers may be interested in a meeting that recently took place in Mexico City from 3 to 5 March 1982 on technology prospectives which was inaugurated by the President of Mexico and attended by numerous eminent persons. Its objective was to exchange views with the Mexican Government on the setting up of a permanent national team to monitor technological advances. It was considered that not only was the project of considerable importance, but also a challenge whereby for perhaps the first time a developing country is trying to formulate policies and plans, but keeping the dynamic international economic and technological scenario in view. Its successful completion may well provide a lead to other developing countries to formulate policies and plans in a dynamic context.

The Government of Mexico has already defined its perspectives for an accelerated growth of the industrial sector in the coming years in their General Development Plan and Industrial Plan, and came to the conclusion that in view of the rapid technological developments taking place in the world, systematic activity at the national level in the field of technological perspectives is needed in order to incorporate the knowledge of trends and tendencies in the development of world economy into national strategic decision-making in the future, as well as provide Mexico with the necessary technological readiness to react to, and anticipate, developments. In this context, the Government wished to design, organize and put into action a permanent national team in the field of industrial technology perspectives whose activities will assist the Government in its decisions in the fields of:

(a) Industrial policies and strategies
(b) Long-term technological policies
(c) Commercial and trade policies
(d) Investments in large strategic projects.

Some activities have already been initiated by the Mexican Government in this respect.

At the request of the Government of Mexico, a project in this regard is being implemented by UNIDO with financing from the Interim Fund for Science and Technology for Development (IFSTD). The first phase of the project envisages a set of initial activities which will provide a framework for the approaches to be adopted and actions to be taken in the further implementation of the project leading to the establishment of the permanent advisory team. As the first activity, it was proposed to bring together a few eminent experts and discuss with them the general approach to the conception and implementation of the project, eliciting suggestions concerning, inter alia, methodology to be adopted, studies to be conducted, countries whose experiences in this respect may be studied, institutions to be contacted, sources of information to be collected, etc. The meeting was intended mainly as a brainstorming session with limited documentation, allowing for sufficient time and opportunity to discuss broader issues and strategies involved. Information was provided by the Mexican Government, both on the project and the Government's policies and strategies. In addition, a list of specific issues or questions was presented to elicit specific and concrete suggestions and comments.

What was essentially sought from the eminent persons were suggestions based on their experience on how such an activity to monitor technological perspectives for decision making can be organized, what would be the essential aspects to be covered in such an activity, what methodologies and mechanisms could be adopted and what the experience of other countries or institutions was in this respect. The meeting was also intended to be followed by other activities of the project such as studies in specific sectors as well as of policies and mechanisms adopted by other countries to monitor technological advances. In one of our next issues we will return to this subject with a summary of the results of the meeting.

Technological Advisory Services (TAS)

Note by UNIDO Secretariat

Background

The Technological Advisory Services (TAS) was initiated by UNIDO*, with the sole purpose of providing rapid, objective and impartial advice to governments of developing countries on contracting major industrial projects (joint ventures, turn key contracts, etc.) in all fields of UNIDO activities.

The TAS became operational on a modest scale in early 1978 with a small revolving fund which could be drawn upon and replenished.

Scope of TAS

TAS services are available to provide any or all of the following assistance:

(i) Preparation for negotiation of major contracts in the area of joint ventures, turn-key deliveries, licences, know-how, management and franchising services including financial arrangements.

(ii) Assistance in drafting of agreements enumerated under (i) above.

(iii) Advice during negotiations or renegotiations of contracts enumerated under (i) above.

(iv) Other contractual areas.

How to obtain TAS Services

All governments of developing countries may request UNIDO for TAS services**. Public and private corporations in developing countries may also require TAS services, providing that the Government endorses such requests. Requests for TAS should preferably be presented through the local UNDP office.

Reimbursement for TAS Services

In principle, all services provided by UNIDO under the TAS scheme, should be reimbursed by the requesting party, upon delivery of the services. The services are reimbursed at actual costs incurred by UNIDO. It is also possible to cover current actual costs to UNIDO during delivery of the services.

* See Executive Director's Bulletin - UNIDO/EX/8.10.78.

** Letters or telexes requesting TAS services should be addressed to: Mr. G.S. Gouri - Director, UNIDO, P.O. Box 300, A-1400 Vienna, Austria, Telex: 135612.

In the case of LDC countries, governments are requested to cover all local costs only (DSA and local transportation and accommodation), while UNIDO will cover all external costs of provision of the service. Provision of TAS services to LDC countries will be reviewed on a case by case basis.

References

The TAS services have been so far been used by the following countries: Algeria, Dominican Republic, Ecuador, Egypt, Kuwait, Malaysia, People's Republic of China, Philippines, Portugal, Republic of Congo, Turkey and Venezuela.

In view of the strict confidentiality of the TAS service, reports are provided to the requesting side only. The nature of the TAS services so far provided, varied from assistance in the assessment of feasibility for the establishment of ampicillin plant, through revision of contract, use of computer software, advice on negotiation for turn-key plant deliveries, advice on, and revision of complex package proposal - for establishment and modernization of automative industry, etc.

The TAS services are provided, in principle, by selected UNIDO staff with proper professional background and from a carefully selected group of outside consultants and experts.

Development Finance Institutions meet on Technological Information Exchange

As mentioned in the TIES Newsletter No. 13, a meeting to discuss the creation of a technological information exchange network (TIEN) among industrial development finance institutions which should assist these institutions in the evaluation of relevant and alternative technology was held in Bridgetown, Barbados 26 - 28 January 1982. Some thirty directors of the financial institutions discussed in detail the proposals prepared by UNIDO for this purpose.

The participants agreed that the technological information needs were evident for the small- and medium-scale industries but also to a considerable extent for the large-scale sector.

After lengthy discussions it was agreed that the scope of an information system like TIEN should cover, among others:

- options available for choice of process and technology;
- choice of suppliers;
- choice of reliable consultants when required;
- terms of transfer of technology;
- modality of transfer;
- information on costs and prices of materials, equipment and services which would make it possible to make an assessment of risks involved in a project and help to minimize the risk by selecting the best option available.

This scope should be interpreted as a long-term objective and close co-operation was stressed with existing networks like UNIDO's Industrial and Technological Information Bank (INTIB) and other institutions like the International Bank for Reconstruction and Development. The need for involving local technological research and development institutions and other relevant organizations was also recognized.

The meeting agreed on a pilot operation of TIEN and information on the following sectors was to be exchanged: agro-industry, including food processing and storage, light manufacturing industry, alternative energy construction and building material industry, intermediate capital goods industry and wood working industry. The method adopted was that individual industrial finance institutions, on a confidential and reciprocal manner, would exchange information in the earlier mentioned sectors on technical and commercial conditions of industrial projects financed by them. The pilot operation is expected to last about 6 months after which a detailed evaluation will be carried out.

Registry news

OECD Workshop on Technology Balance of Payments

In December 1981 a meeting organized by the Organization for Economic Co-operation and Development took place in Paris on technology balance of payments. Two of the TIES members, namely Portugal and Spain were represented at that meeting. Both presented country papers which we are pleased to present in this issue of the TIES Newsletter. Other country papers were prepared by representatives of the United Kingdom, France, Italy, Federal Republic of Germany, Finland and the United States of America. Notable exceptions were countries of interest such as Belgium, Austria and Sweden.

Payment for Technology - Portugal

Portugal, being a net importer of technology, has payments which largely exceed receipts for technology. Even though reliable figures are not available, the excess of payments made is not considered to be larger than 8 per cent.

In some specific sectors Portugal can, and does, export technology and acts as a technological intermediary between the highly developed countries and those that are still developing. For some time now Portugal has been exporting available technologies suitable for developing countries' needs, notably in the area of textiles, chemicals, pharmaceuticals, machinery and equipment (covering heavy machinery, shipbuilding and repair) construction and engineering services. Through its experience in dealing with developing economies and its own stage of development it is possible to continuously improve its competitiveness as a technology exporter.

Concerning the payments for technology, the Foreign Investment Institute collected data on payment authorizations from 1976 to 1980 and despite the short period covered, the available data show interesting features at several levels.

In 1980 Portuguese technological payments amounted to $84 million, as against $57 million in 1979, with an average growth rate of approximately 30 per cent for the three year period.

Five countries (USA, Germany, United Kingdom, Switzerland and France) absorbed 71 per cent of payments for the year 1980, as against 68 per cent and 76 per cent in 1979 and 1978 respectively. The United States, despite its continuous decline in relative terms (from 26 per cent in 1978 to 17 per cent in 1980) received the greatest amount of payments, mainly for metal products, machinery and equipment (38 per cent) and chemicals (27 per cent). Germany follows in second place in 1980 with 16 per cent of total payments, mainly for the chemical industry which represents two-thirds of the payments made by Portugal to that country.

A breakdown into sectors reveals that metal products, machinery and equipment (38 per cent) and chemicals (22 per cent) represented about 60 per cent of total payments with the other 2-digit ISIC sectors lying far behind: food products (8 per cent), metallurgy (5 per cent), pulp and paper (4 per cent). As a whole, manufacturing accounted for 83 per cent of overall payments.

Firms having foreign equity show a higher level of payments for technology transfer contracts than do wholly nationally owned companies - in 1980 about 61 per cent of total payments for technology were made by companies with foreign holdings. If we restrict the analysis to companies having two-thirds or more of foreign ownership then the percentage will remain high, i.e. 44 per cent. The figures confirm estimates made for 1979 which indicates a share of 65 per cent.

In order to further apraise the importance of payments between tied firms an analysis has been carried out and it was found that 52 per cent of payments were for contracts where the supplier had some degree of ownership (or influence) on the recipient. This situation was quite impressive in some sectors, such as restaurants and hotels, the wholesale trade, the food industry, machinery and equipment etc.

Most of the payments concern licence agreements which show total amounts of 62 per cent for 1979 and 64 per cent for 1980. Amongst service agreements, routine technical assistance (i.e. contracts whose main purpose was the supply of management, production or marketing assistance over a given period) had first place, with 13 per cent of total payments, or 37 per cent if just service agreements were considered.

A separate analysis for licence and routine technical assistance contracts, which represent the majority of TIES for the time being, has been carried out and its main findings were the following:

(a) The share of the two largest industrial sectors rose to a total of 70 per cent in 1980;

(b) 73 per cent of payments in 1980 were from companies with foreign holdings and 68 per cent between linked firms. The figures for 1979 are 75 per cent and 69 per cent respectively;

(c) Payments by manufacturing industries with foreign equity generally exceeded those of completely national companies.

In conclusion, it should be pointed out that an analysis of the technological balance of payments though very useful and complementary to contract statistics, is far from being sufficient to apraise the technological development of a country and make sound international comparisons. The figures just presented should be matched with other S and T indicators, namely those based on international trade, in order to improve their usefulness.

Payment of Technology - Spain

In Spain, all foreign payments by Spanish firms are made via the Bank of Spain from any other authorized bank or credit institution, thereby not only enabling an accurate registry of payments to be made for statistical and other purposes, but also in order to compare payments against the forecasted technology payments at a later stage. Technolgy payments are usually made for technical assistance fees and royalties. The Ministry of Industry and Energy acts as a registry for technology transfer contracts and receives information on forecasted technology payments on a regular basis which can later on be compared with the information on payments actually made by the Bank of Spain.

Technology transfers involve contracts of varying kinds and amounts, with the main categories being:

- Contracts for licenses on patents, know-how and trade-marks;
- contracts for technical services on engineering, design and projects, R + D assessment and training of personnel;
- contracts for management, professional or technical assistance and allocated expenses.

The types of technology transfer not included in the technological balance of payments are:

- Royalties on printed matter, sound recording and performing rights;
- mining, quarrying and mineral rights;
- sale or donation of equipment, material or goods.

Between 1973 and 1980, payments by transmission of technology have increased threefold and payments received for technology exports as a result increased by 6.5 per cent. The most substantial increase in payments occurred between the years 1976 and 1980. Figure 1 below represents transactions on royalties and fees and shows that during 1980 Spain purchased four times more technology than it sold. Since 1973 total payments received for technology

exports increased at an average annual rate of 16.6 per cent from 15,201 million Pesetas in 1973 to 44,393 million Pesetas in 1980. Since 1976 the coverage of technology imports by exports has been steadily increasing and a quarter of all Spanish payments in 1980 were covered by payments received for technology exports.

The bulk of payments for royalties and fees between 1976 and 1978 were made to USA, France and the Federal Republic of Germany, as shown in figure 2. If one examines the imports of technology by branch of activity, it is evident that these have been concentrated predominantly in the motor vehicle, chemical, machinery and electrical industries.

Forecasted payments to other countries for royalties in 1979 were 2,391.2 million Pesetas as against 2,079.3 million Pesetas in 1980, whilst those for technical assistance were 4,778.3 million Pesetas and 5,976.6 million Pesetas respectively.

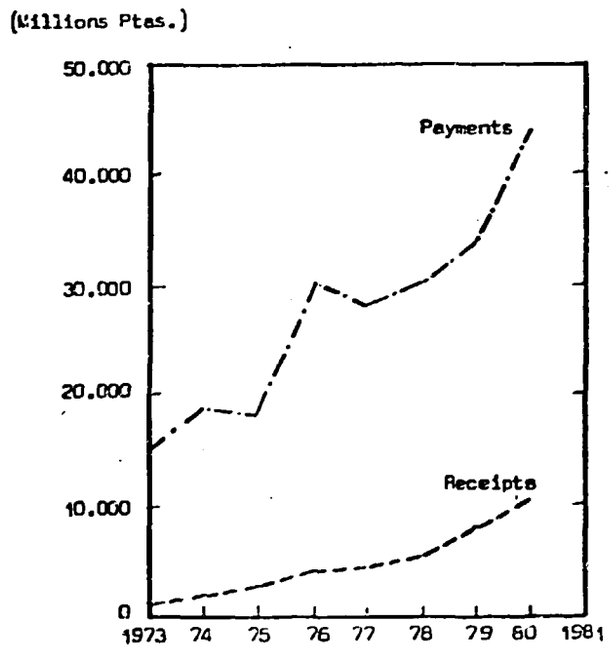

Figure 1

International Transactions in Royalties and Fees

(1976 - 1978)

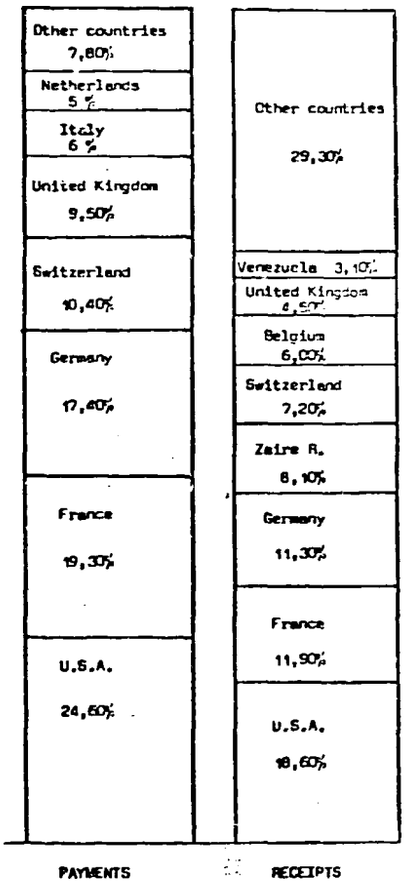

Figure 2

Distribution of Payments and Receipts by Countries

Technology Adaptation in Egypt

The following is an article which appeared in the January issue of Investment Review which is a quarterly journal on investment conditions in Egypt. The article was written by Dr. M. Hilal of the Cairo Academy of Science and Technology.

Until recent years, the transfer and acquisition of technology to a developing country was mainly geared towards optimum utilization of local materials through the incorporation of ready-made advanced technology together with managerial and marketing expertise. Most developing countries have started, however, to recognize that imported technology should rather be adapted to stregthen the domestic scientific and technological capabilities and to promote national indigenous inventions, innovations and technologies so that they would eventually develop the technologies appropriate to their own conditions.

However, the most promising way for strengthening the domestic technological capabilities of a developing country is accomplished by starting to promote research and development (R&D), engineering and design (E&D), consultancy and services plus, the additional services beyond the normal scope of both R&D and E&D. But one of the major impediments to the speedy utilization of the research results is the absence or inadequacy of appropriate institutional arrangements and of the E&D inputs required to develop the process. Therefore, it is essential that the various links in the innovation chain be established and strengthened, to ensure that the research results are in accordance with the industrial needs and that they are successfully transferred to industry. Among the several benefits of the active linkage and co-operation between R&D and E&D is the continuous building of domestic technical competence, thus reducing the country's dependence on foreign technology and accelerating the process of national technological self reliance.

Thus, the linkage effect between E&D organizations and R&D institutions is reflected in dynamic technology adaptation in the case of imported technology and the domestic generation of technology. This includes the unpackaging of imported technology and the matching of domestic and imported technology, continuous innovation, improvement and modernization, pilot plant investigations and prototype development, production scale plant, evaluation of performance during operation, innovation and improvements ... etc. This represents the transition from local dependence on imported technology to a level of technological maturity commensurate with the developmental requirements.

There is no doubt that the establishment of a domestic system for the adaptation and generation of technology, in its wide aspects, will give rise to major changes in education and training systems.

Moreover, one of the pre-requisites for the creation and adaptation of technology is the ready availability of support services such as documentation and information, standardisation and computer services, technical publications and manuals, etc.

On the international level, it may be worth noting that the present work towards an international code of conduct for transfer of technology has considered, besides other issues - the issue of technology adaptation and the strengthening of the national scientific and technological capabilities for the creation and development of the local technologies.

Again, on the national level, it is worth noting also, that an Egyptian Committee was formed representing the Investment Authority, the General Organization for Industrialization, the Academy of Scientific Research and Technology and the Council of State. The Committee is working on drafting an Egyptian code on technology transfer, adaptation and development regulations, taking into consideration the following:

- the fundamental role of science and technology in the socioeconomic development of Egypt as the key to progress and improving the standard of living;

- the need for an adequate, appropriate transfer and development of technology;

- the urgent need for regulatory actions for the mobilization of national institutions and the Egyptian society to an effective participation in technology activities.

Dr. M. Hilal, Academy of Science and Technology

Technology acquisition and TAS

News from the Philippines:

The following article appeared in a new periodical brought out by the Philippine Trade and Industrial Information Centre of the Ministry of Trade and Industry and called Trade and Industrial Development Digest. The periodical came about through the merging of the Ministries of Trade and Industry into one Ministry, and contains a wealth of information on policy matters, trade missions, conferences held and to be held, contracting news, features on people occupying key positions at the Ministry, trade promotion and fairs. We wish this periodical every success, and congratulate the staff on their first issue. We look forward to reading future issues.

Philphos Fertilizer Contract Awarded

The Philippine Phosphate Fertilizer Corporation has awarded to the Coppee Rust Consortium the multi-million dollar contract for the construction of the phosphate fertilizer plant, one of the planned eleven major industrial projects of the country to be set up in Isabel, Leyte. The contract amount is $336 million.

Minister Roberto V. Ongpin of the Ministry of Trade and Industry and Mr. Miguel M. Zosa, President and General Manager of Philphos, signed the contract with key executives of Coppee Rust of Belgium, Dragados y Construcciones of Spain, Mitsubishi Heavy Industries of Japan, and Construction and Development Corporation of the Philippines.

It is estimated that this project will yield a net foreign exchange benefit of approximately US$ 3,63 billion in 14 years or about US$ 250 million per annum for the country, not to mention ancillary projects arising from this undertaking such as pyrites extraction and possibly developing indigenous Philippine phosphate rock sources.

The fertilizer plant will start operations doing the first quarter of 1984. Site grading has been undertaken since January this year.

At full capacity, the phosphate fertilizer plant will produce 350,000 metric tons of phosphate and 153,000 metric tons of ammonium sulfate.

The consortium of contractors chosen by Philphos for this project are the largest contractors in their respective countries.

Coppee Rust, an experienced international contractor since 1866, has completed in the last ten years more than 100 projects in 23 countries in Western Europe, Eastern Europe, the Middle East and Asia. Coppee Rust has worked with the fertilizer industry since the early 1960's on the basis of process know-how of major European chemical companies. Its orders have included 26 area units and 14 phosphoric acid plants in 13 different countries.

Dragados y Construcciones, S.A. is a large organization experienced in both engineering and construction services developed from years of collaboration with Spanish and foreign engineering companies. Their production record of an average of 28,000 metric tons in the field of steel structures per year serves as a symbol of their extensive experience.

Mitsubishi Heavy Industries, Ltd. is one of the well-known leading manufacturers of industrial machinery and equipment in Japan for chemical, petrochemical and fertilizer industries.

CDCP is considered the largest construction company in the Philippines, and one of the construction leaders in ASEAN and the Middle East.

Other organizations involved in the project are: Davy McKee (Oils and Chemicals) Limited, as the technical consultant in the preparation and evaluation of the bid proposals; and Amex Bank Limited, as the project and financial adviser since the inception of the project.

The Phosphate Fertilizer Plant with a capitalization of $US 100 million, is a joint venture between the National Development Company (60%) and the Government of Nauru (40%). The project will be fully supported with export and supplier's credits from Belgium, Spain and Japan.

Philphos has entered into several agreements for the long-term supply of its raw materials such as: phosphate rock from Nauru, Jordan and Morocco; anhydrous ammonia from Indonesia; and sulfuric acid from the adjacent PASAR Copper Smelter Project. Such advantageous raw materials supply and the proximity of Philphos to the ASEAN and Far East markets will place Philphos in a very competitive position.

Calendar of meetings

1. First Regional Consultation on the Agricultural Machinery Industry, 5 - 9 April 1982, Addis Ababa, Ethiopia.

2. Interregional Cement Technology Forum, 13 - 20 April 1982, Benghazi, Libya.

3. Workshop on Selected Building Materials for Housing and other Low-Rise Buildings, 19 - 30 April 1982, Sydney, Australia.

4. Expert Group Meeting on Licensing Agreements in the Petrochemical Industry, 27 - 30 April 1982, Vienna, VIC.

5. Expert Group Meeting on Technology Advances: Application and Use of Micro Processors (in co-operation with ECLA), April 1982, Mexico City, Mexico.

6. Fifth Workshop on Fertilizer Plant Maintenance, April/June 1982 (7 weeks), Linz, Austria.

7. Workshop on Production, Planning and Energy Management in Petroleum Refineries, 3 - 19 May 1982, Vienna, VIC and ÖMV.

8. Expert Group Meeting on Long-term Arrangements for the Development of a Petrochemical Industry in Developing Countries, 3 - 5 June 1982, Vienna, VIC.

9. 19th Meeting of UNIDO/FAO/World Bank Working Group on Fertilizers, 15 - 18 June 1982, Vienna, VIC.

10. Investment Promotion Meeting for China, June 1982, Beijing, China.

11. Investment Promotion Meeting for the Caribbean, 18 - 21 October 1982, Barbados.

12. First Consultation on the Training of Industrial Manpower, 15 - 19 November 1982, place to be determined.

Recent publications

UNIDO/IS.273 The potential of genetic manipulation for the improvement of vaccines against animal diseases in developing countries.

UNIDO/IS.263 Water use and treatment practices and other environmental considerations in the iron and steel industry.

ID/WG.350/9 Technology services delivery system (TSDS), for PRIDECOM experience. Expert group meeting for exchange of experiences on technology services delivery system (TSDS). Manila, Philippines, 2 - 6 November 1981.

ID/WG.350/10 The metal industry research and development center (MIRDC) program for the promotion of small- and medium-scale industry.

ID/WG.354/2/Rev.1 Report. Global preparatory meeting for the first consultation on the training of industrial manpower. Innsbruck, Austria, 25 - 27 January 1982.

ID/WG.361/18 Report. Workshop on regional project for co-operative research among metallurgical research and development centres in Asia and the Pacific. Jamshedpur, India, 7 - 11 December 1981.

ID/WG.363/4 Report. Second working group meeting on scenarios of the iron and steel industry's development. Estoril, Portugal, 3 - 5 February 1982.

ID/WG.364/7 Future trends in ammonia technology. Technical conference on ammonia fertilizer technology for promotion of economic co-operation among developing countries. Beijing, People's Republic of China, 13 to 28 March 1982.

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