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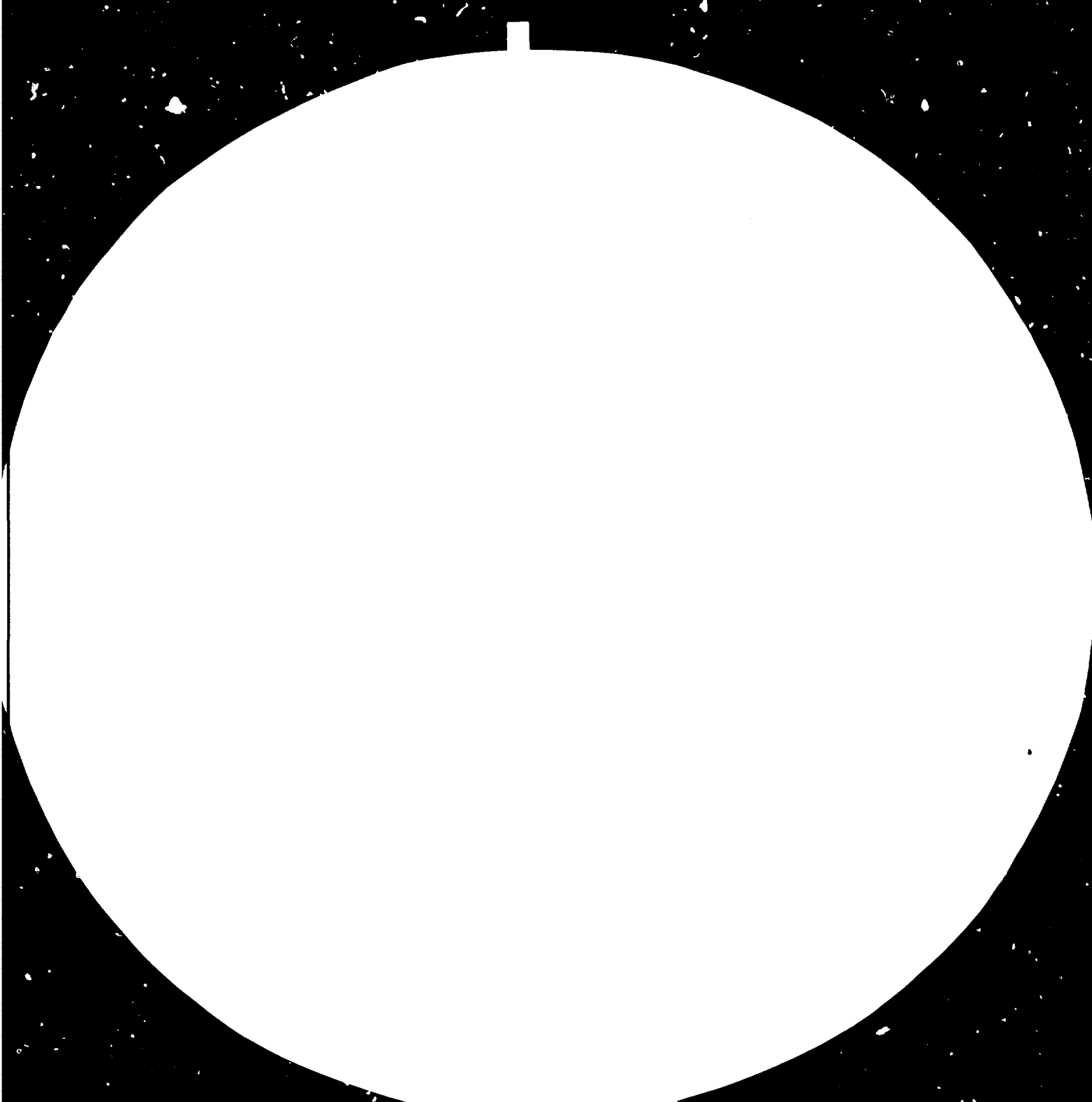

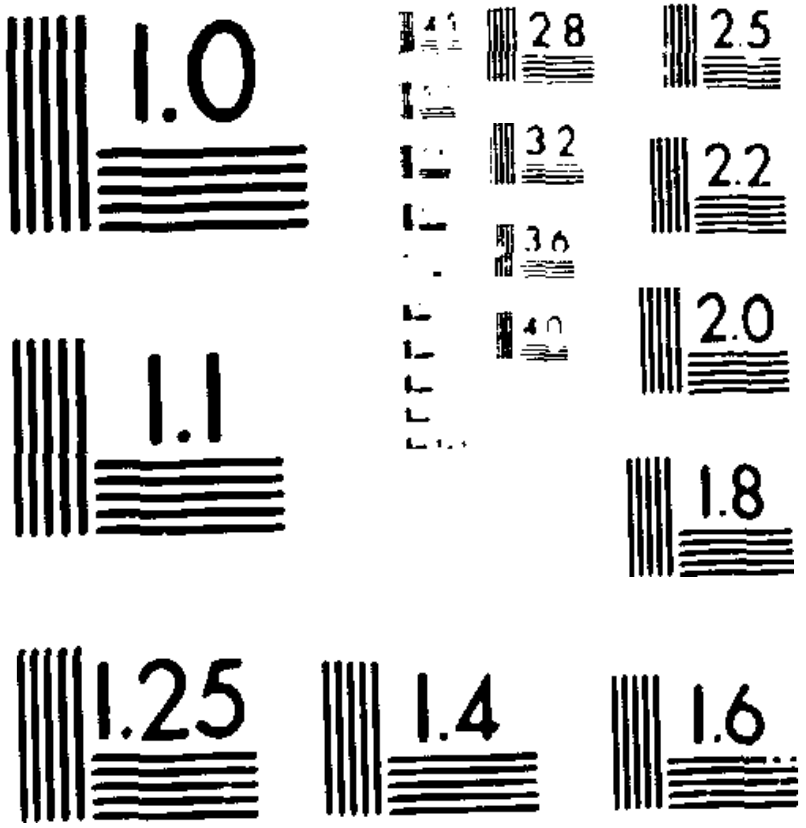

TIES NEWSLETTER

TECHNOLOGICAL INFORMATION EXCHANGE SYSTEM

Issue No. 37

13838

Dear Reader,

Since the industrialization of developing countries depends heavily on the access to imported technology, the Transfer of Technology Programme of UNIDO has naturally given special consideration to the activities aimed at facilitating the technology flows from developed to developing countries as well as at strengthening the capabilities of the developing countries for the acquisition and negotiation of technology.

This objective underscores the role of negotiation for the technology and the importance of the interaction between imported technology and domestic engineering and consultancy services, technological institutions and R&D facilities towards the achievement of a suitable technology base in developing countries. The operation of a programme centered on the issues of technology acquisition and negotiation requires the handling of an integrated and mutually supportive package of elements oriented towards the different levels of decision-making and impacting on different layers of the technology system. Such programme elements which have been the subject of consistent work over the years, include assistance in setting-up and upgrading infrastructure for the transfer of technology evaluation, training programmes for negotiators, studies and publications, and last but not least, Technological Advisory Services to provide ad-hoc support at the various stages of the negotiation process.

The Technological Advisory Services are extremely relevant in the sense that they substantiate in a very visible manner the capabilities of coping with the practical aspects of technology negotiation by providing concrete answers to concrete problems that Governments or entrepreneurs face when dealing with agreements whose outcome may have a very significant impact in the respective economy both at the micro and macro economic level.

The Technological Advisory Services - currently referred to as TAS - are rapidly expanding due to an increased demand from developing countries and at present the portfolio of projects benefiting from TAS activities range from licensing agreements at the level of small and medium enterprises up to major industrial projects worth as much as one billion US dollars.

In this issue we publish an explanatory note intended to elucidate how to gain access to the TAS services. As usual, the inquiries and requests of our readers are welcome and will be given immediate attention.

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COUNTRY NEWS

The following is abstracted from the Annual Report of the Nigerian National Office of Industrial Property for the Year 1985:

1. The role of the National Office in the Nigerian economy

Introduction

The National Office of Industrial Property was established by Decree 70 of 1979 as a corporate body with legal identity and powers to regulate the flow of technology into the country. Prior to the establishment of the Office, the Nigerian economy was enjoying a tremendous boom and this gave room for the indiscriminate signing and execution of agreements which were not in the nation's industrial and technological interest. The main aim for setting up NOIP was therefore to ensure that the interest of the country is taken into consideration during technology transfer negotiations, thereby promoting industrialization while emphasising on the judicious utilization of foreign exchange reserves, the maximisation of local value added and ensuring adequate provisions for the acquisition of the technology by Nigerians. Operating under a set of approved guidelines, the Office regulates and controls technology transfer in Nigeria with its attendant foreign exchange drains, by ensuring that the fees charged as well as the terms and conditions in respect of technology transfer agreements are commensurate with the services rendered and compare favourably with international practice.

Statutory function of the National Office

The National Office of Industrial Property as a regulatory body is aimed at supervising the selection and acquisition of foreign technology, as well as the form in which the acquisition is materialised, while at the same time encouraging the most efficient use of the technology so obtained for the benefit of the national economy. More specifically, the functions of the Office include:

(a) the encouragement of a more efficient process for the identification and selection of foreign technology;

(b) the development of the negotiating skills of Nigerians with a view to ensuring the acquirements of the best contractual terms and conditions by Nigerian partners entering into any contract or agreement for the transfer of foreign technology;

(c) the provision of a more efficient process for the adaptation of imported technology;

(d) the registration of all existing and new contracts or agreements entered into for the transfer of foreign technology to Nigerian partners. Every such contract or agreement is registrable if its purpose or intent is in the opinion of the National Office, wholly or partially for or in connection with any of the following:

(i) the use of trade-marks;

(ii) the right to use patented inventions;

(iii) the supply of technical expertise in the form of the preparation of plans, diagrams, operating manuals or any other forms of technical assistance of any description whatsoever;

(iv) the supply of basic or detailed engineering;

(v) the supply of machinery and plant;

(vi) the provision of operating staff or managerial assistance and the training of personnel.

(e) The monitoring on a continuous basis of the execution of any contract or agreement registered pursuant to this Decree. As provided by Section (7) of the Decree, payments in respect of services covered by these agreements can only be made when the agreements had been evaluated, approved, and registered by the National Office.

Trends in Nigeria's technology imports before Decree No. 70 of 1979

During the pre-independence days up to 1979, Nigeria had no legislative apparatus for the regulation of transfer of technology imports into the country. The main target of development was the building of many factories using all kinds of technology including the out-dated, and obsolete ones at prices determined in the majority of cases by the whims and caprices of the developed world. Monopoly pricing, discriminatory and restrictive business practices were the order of the day and Nigerian companies had to advertise for foreign partners at considerable cost. Contracts were excessively long and sometimes of indefinite duration while materials and components had to be obtained through the supplier of technology, no matter what the cost. The royalty rate was generally calculated on total sales value of turnover of the local company with the technology supplier profiting to the share of about 25 per cent of the total profit of the Nigerian company in most cases. Foreign companies had a free hand in the management of the projects with no responsibilities to the local industrial or environmental infrastructures. Details of technology to be acquired were in most cases not included in the contracts nor were details or specifications for raw materials, components and machinery clearly stipulated. Products quantity, qualities and standards were not clearly stated while guarantees, warranties and infringement penalties were very weakly defined. In most contracts, Research and Development were non-existent while little or no attention was paid to the training of staff except statements of general nature which were never implemented. Foreign suppliers were at liberty to enter into technology transfer agreements with as many as three Nigerian companies since invariably it was the supplier's foreign country's law that governed such contracts.

This was the imperfect situation which characterized the import of foreign technology into Nigeria prior to the promulgation of Decree No. 70 of 1979. There is no question that in an area so much affected by oligopolistic and monopolistic practices, a public screening mechanism of some sort would be useful in redressing such inequitable business practices, if the technological and economic development of Nigeria was not to be compromised. The solution that emerged in this country after several years of exploitation by developed countries perpetuated through their transactional corporations was the intervention of government in the technology field through the establishment of the National Office of Industrial Property Decree No. 70 of 1979.

This was achieved after years of hard work and consultations with such well meaning organisations

as UNIDO, UNCTAD, ECA and other developing countries including India, Mexico, Brasil, that had already established similar offices, to regulate the flow of technology into their countries.

2. Linkages and inter-relationship with other organisations and agencies

National linkages. The National Office is a public establishment under the supervision of the Federal Ministry of Science and Technology. In addition to the National Office, there are other competent authorities that are involved within the institutional framework for controlling technology transfer in the country. These are Federal Ministry of Finance, Federal Ministry of Industries, Federal Ministry of Internal Affairs, the Patent Office and Nigerian Enterprises Promotion Board.

(a) Federal Ministry of Finance. The Ministry processes the payments of technology agreements which had been duly approved and registered by NOIP in the light of exchange control policies and measures, and determines the mode of payment and the size of remittance, having regard to the prevailing level of foreign reserves and in accordance with the Exchange Control Act, 1962.

(b) Federal Ministry of Industries. The Ministry of Industries executes government policy on the establishment of industries, and co-ordinates all activities on industrial development in the country.

It co-ordinates the granting of concessions to private investors in industry and organizes industrial co-operation with African and other countries. The Nigerian Investment Information and Promotion Centre is a Division of the Ministry. It has the responsibility of assisting interested investors in respect of all enquiries about investment opportunities and procedures in Nigeria. The centre also assists in providing contacts for foreign investors with suitable Nigerian entrepreneurs in order to establish businesses in Nigeria. The Industrial Inspectorate Division, which is another arm of the Ministry, inspects plant and machinery imported for use by Nigerian industries in order to ensure that the equipment is in perfect condition, and also that the price is reasonable.

(c) Federal Ministry of Internal Affairs. The specific function of the Ministry related to transfer of technology is the allocation of an expatriate quota to businesses requiring technical know-how or other services from foreign professionals in the implementation and development of investments in Nigeria.

(d) Patent Office. This Office keeps records of all registered patents, trade marks, designs and other industrial property rights. This Office is under the supervision of the Federal Ministry of Trade.

(e) Nigerian Enterprises Promotion Board. The Board is the principal body charged with the responsibility of implementing the Nigerian Enterprises Promotion Act of 1982. The Act classifies business enterprises into three categories, namely, Schedule I, Schedule II and Schedule III. The classification indicates enterprises that are reserved exclusively for Nigerians, those in which a maximum foreign participation of 40 per cent is allowed, and those in which a maximum foreign participation of 60 per cent and minimum indigenous participation of 40 per cent is allowed.

The research institutes. The government policy of import substitution and increased local value added of our finished products have put the activities of the Nigerian research institutes - 23 in number, into focus and limelight. This policy which has forced most of our companies to look-inward, has allowed a greater appreciation of the need to commercialize our locally developed technologies and inventions most of which are at the prototype stage in most of our research institutes. In order to ensure that these indigenous technologies are commercialized under terms and conditions that are equitable to both parties and in accordance with the international practices for similar technologies, the National Office, offers expert advice on lateral transfer of technology arrangements between Nigerian companies and the research institutes in Nigeria.

International linkages. The National Office has a close understanding and working relationship with the United Nations and some of its various agencies, like the United Nations Development Programme (UNDP), United Nations Centre on Transnational Corporations (UNCTC), the United Nations Industrial Development Organization (UNIDO), United Nations Conference on Trade and Development (UNCTAD), World Intellectual Property Organization (WIPO). All these UN bodies have been rendering tremendous financial and technical assistance towards the effective operations of the Office. Association and training arrangements with similar technology transfer offices in other countries, notably the Philippines and Portugal, have also been established by the Office. Similarly, the active participation of the National Office in the meetings of the UNIDO-sponsored Technical Information Exchange System (TIES) has also permitted the Office to establish linkages and co-operative arrangements with Technology Transfer offices in other countries such as Spain, India, Mexico, Argentina, Venezuela, etc.

At the regional level, the African Regional Centre for Technology (ARCT), Industrial Property Organization for English Speaking Africa (ESARIPO) which are the regional organizations of UNIDO and WIPO respectively are also amongst the international agencies which the National Office has a working relationship with in all aspects of technology transfer and acquisitions.

3. Trends in transfer of technology imports in 1985

Efforts have been made to examine the trends in transfer of technology imports in Nigeria in the year 1985 in terms of the following data:

(i) Number of agreements submitted and registered;

(ii) The sources of imported technology by sector and industry;

(iii) Level of payments involved in the agreements;

(iv) Financial savings on approved agreements;

(v) Payment for the acquisition of foreign technology;

(vi) Nature and frequency of restrictive clauses;

(vii) Nature and frequency of other unacceptable provisions;

(viii) National distribution/location of plants and/or industries.

Similarly, a comparative analysis of these trends from 1983 when the Office became operationally effective to date has also been undertaken in this report.

Number of agreements submitted and approved by NOIP since inception. The National Office has received a total number of 624 transfer of technology agreements since inception. The 624 agreements came from the four major industrial sectors, Light/Heavy Engineering Sector, Agro-based Sector, Chemical/Mineral-based Sector and the Services Sector. The Agro-based sector has the largest share of the agreements with a total of 205 applications (33 per cent) followed by Engineering with 198 (32 per cent), Mineral-based with 127 (28 per cent) and Services with 44 (7 per cent) applications.

A total of 205 agreements have been registered since inception. The breakdown shows 62 approvals representing 30 per cent for the Agro-based sector, 59 (29 per cent) for Engineering industries, 65 for Mineral-based (32 per cent) and 19 for the Services sector (9 per cent), while those not registered are undergoing renegotiation by the parties involved.

Number of agreements submitted and approved by NOIP in 1985. In 1985, a total of 227 agreements were received by the Office. The breakdown by industrial sector shows 88 agreements (31.76 per cent) in the Agro-based sector, 78 (28.15 per cent) for Light/Heavy Engineering sector, 98 (35.37 per cent) for Chemical/Mineral-based sector and 13 (4.69 per cent) for the Services sector. In the same year, a total of 91 agreements was approved by this Office. These were made up of 30 approvals in the Agro-based (32.96 per cent), 25 (27.47 per cent) for Light/Heavy Engineering, 31 (34.06 per cent) for Mineral/Chemical-based sector, and 5 approvals representing (5.49 per cent) for the Services sector.

Agreements under renegotiation. A total of 183 agreements were undergoing renegotiation in 1985 while 3 agreements were abandoned. The breakdown shows 58 agreements were undergoing renegotiation in the Agro-allied sector, 67 in the Light/Heavy Engineering, 50 in the Mineral/Chemical sector and 8 in the Services. The renegotiations were found necessary because the agreements contained high payment terms as well as restrictive and discriminatory provisions such as Restriction on Export, Foreign Jurisdiction, Excessively Long Duration, Lack of Guarantees and Warranties, Restrictions on R & D, No Training Programme, etc. It is expected that a large percentage of these agreements will be registered by the Office in the coming year after they have been revised to comply with the acceptable terms and conditions in accordance with the provisions of Decree 70 of 1979.

Sources of imported technology. The pattern of technology flow in relation to the countries of origin which manifested in the first year of operation of the Office has been maintained to date. Western Europe has continued to take the lead with the largest number of foreign collaborations. Of the 624 agreements received by the Office, since inception Western Europe has 436 agreements followed by North and South America with 89, Asia 72 and others 27. The same pattern was maintained in the sectoral flow.

The summation from the aforementioned pattern of flow suggests that 70 per cent of imported technology into Nigeria emanates from Western European sources followed by 14 per cent from North and South America, Asia 12 per cent and 4 per cent from the other sources.

The pattern of technology flow in the year 1985 shows that 186 agreements representing 67.14 per cent emanated from U.K./Western European sources. This is followed by North and South American sources with 51 collaborations (18.41 per cent), Asia with 23 (8.30 per cent) and other sources had 17 agreements representing (6.13 per cent).

Level of payments involved in technology transfer agreements. An examination of the level of payments involved in the 205 registered agreements since inception showed that a total of 100 agreements representing (49 per cent) registered agreements required payments above half a million Naira during the life of the agreement - whereas the balance of 105 representing (51 per cent) of the total required payments below half a million Naira respectively.

With respect to the level of payments involved in the agreements registered in 1985 a review shows that of the 91 agreements registered, 31 representing (34.06 per cent) required payments above half a million Naira during the life of the agreement while 60 representing (65.95 per cent) required payments below half a million Naira respectively.

Financial savings resulting from NOIP intervention. In the year 1985, a total of ₦75.6 million was realized as savings on 91 registered agreements. The breakdown shows a saving of ₦10 million for Agro-based sector, ₦29.02 million for Light/Heavy Engineering sector, ₦35.96 million for the Chemical/Mineral-based sector and ₦.6 million for the Services sector. An examination of the financial savings realised since inception of the Office shows that a total sum of approximately one hundred and sixteen (₦116) million was realized as savings in 205 registered agreements. The breakdown of the financial savings shows the Mineral-based sector taking the lead with ₦58.9 million on savings followed by Engineering-based sector with ₦39 million, Agro-based with ₦16.6 million and Services sector with ₦1.4 million respectively.

Annual comparative analysis

(a) Agreements submitted. In 1983 the total number of agreements submitted to the Office was 231, while that of 1984 was 116 which represents a difference of 50 per cent. Comparatively, in 1985 the total number of agreements received by the Office was 227 which is an increase of 24.5 per cent over that of 1983, 19.5 per cent over that of 1984 and gives a cumulative increase of 20.17 per cent over the 1983 and 1984 combined.

(b) Registered agreements. The number of registered agreements in 1983 was 62 which represents 26.94 per cent of the total number of submitted agreements in that year. In 1984, a total of 52 agreements were approved representing 44.83 per cent of all submitted agreements while in 1985 a total of 91 agreements were registered representing 32.85 per cent of submitted applications during the period.

Payment for acquisition of foreign technology. The total cost implication of the payment for the acquisition of foreign technology is estimated at approximately ₦130,565,964. This is made up of ₦12,239,003 (9.3 per cent) in the Agro-allied sector, ₦35,414,959 (27 per cent) for the Chemical/Mineral-based sector, ₦76,872,940 (58.8 per cent) in the Light/Heavy Engineering sector and ₦6,039,062 (4.6 per cent) for the Services sector.

Technical Assistance/Services contracts has the largest share of the cost of technology with N96,473,037 (73.82 per cent) followed by Management with N74,742,719 (57 per cent), Trade Mark Licensing N20,280,292 (15.5 per cent) and Know-How contracts with N6,008,914 (4.6 per cent) respectively.

4. Other activities of the National Office

Training - The National Office places high premium on staff training. It appreciates and realises the importance of development of human resources and capability which is geared towards an effective operation of its activities for the attainment of its set-objectives. In pursuant of this policy 14 senior officers benefited in a UNIDO sponsored training arrangement at the Technology Transfer Registries of Philippines and Portugal in 1985. The training was to develop the skill and capabilities of the officers in specific areas of Technology Transfer regulations and its other ramifications. Similarly an officer also participated at a training workshop on Technology Acquisition and Project preparation in Poland, Warsaw jointly sponsored by UNIDO. At the local level, five officers in the accounts department attended NIM organized courses in different areas of accounting during the year. Similarly, two senior officers also participated in a course on Tax Administration and Management at the University of Lagos while another group of two officers attended a course in Inventory Management Techniques. At the Junior grade, two officers attended courses of Instruction for Improvement of their duties while two other officers are currently undergoing a 20-month Confidential Secretary Course at Federal Training Centres.

Research studies

An empirical survey of existing technologies in Nigerian manufacturing industry commissioned by the Office in 1983 to expose the stock and flow of technologies available in Nigeria was concluded in 1985. The report of the studies is in five volumes - consisting of four sectoral reports namely - Agro-based; Engineering and Metal-based; Chemical/Mineral-based; Light Consumer based sector and the fifth volume - an aggregated report on all the four sub-sectors.

The highlights of the findings of the survey are as follows:

(a) Agro-based sub-sector. The report of this sector highlights the following:

(i) That the technologies available in the sub-sector are generally simple and acquisition has been concentrated too heavily on the operational elements to the total exclusion of those other elements that make for innovation.

(ii) That many of the entities within each industry use broadly similar technologies, but that the technologies have been acquired in a vertical manner in which case every new entrant goes abroad to acquire the same technology instead of a horizontal transfer from old recipients within the country to new ones.

(iii) The dominant technologies in agro-based manufacturing are based on internationally traded goods which are based on foreign tastes - soft drinks bottling, beer brewing, textiles, wheat flour milling, biscuit making, feed milling; technologies based on local raw materials are constrained by irregular insufficient availability; accordingly all pious admonitions to use local resources can only succeed if the required surpluses can be generated.

(iv) The level of foreign ownership in agro-based manufacturing in Nigeria is rather low; this is partly due to the indigenization Decree, but probably much more due to the relative unattractiveness of agro-based manufacturing in Nigeria.

(v) The conclusions to be drawn from sources, mechanisms of transfer, and intensity of transfer are that a predominant number of the existing technologies come from the U.K. and Western Europe generally; transfers from East European and the less developed countries are growing in number, but are still few. The dominant mechanism of acquiring technology in the sub-sector is by purchase of machinery, equipment, and other artifacts of production; transfer by use of trade-marks and patent licenses are next in that order. Collaborative joint ownership undertakings between recipient and transferors are rather few; intensity of transfer as measured by the extent of the transfer activity, the involvement of the recipient in the transfer process and the number of elements actually transferred seems generally low.

(vi) Technologies generated locally from existing manufacturers and R&D establishment within Nigeria are very few; the commercialization of local invention, new processes and products seems rather small.

(vii) The biggest elements of costs in the acquisition of technologies in Nigeria are not the direct payments in the form of royalties, rents, patent fees and lump-sum payments; the most dominant costs are in the form of payment for artifacts of production, machinery, equipment, spare parts, jigs and fixtures.

(viii) Large differences exist in the payments agreed by different parties in respect of similar technologies; this was more predominant before the advent of NOIP.

(ix) Nigeria is replete with duplication of bottling plants, breweries, bakeries, textile plants, grain millers, etc., who operate on what we can call the periphery of technology; there is no depth to the technology available but the facilities get multiplied in the name of development.

(x) Internationally traded goods predominate in the list of manufactured goods in this sub-sector - soft drinks, beers, tea, coffee, textiles, wheat flour, animal feeds, cornflakes, biscuits, vegetable oils, sweets, sugar, etc.

(xi) The need to go beyond periphery operation to the acquisition of those elements of technology that yield technological capability, machinery and equipment design and fabrication of spare parts, in-house, in an economy with very few linkage industries.

(xii) The need for R&D connected with:

(1) Using local raw materials to produce widely demanded goods especially the staple foods for Nigerians.

(2) Developing new products from indigenous agricultural raw materials - parboiled local rice, bread from a blend of tubers and local grains, malt from sorghum, etc.

(3) Adapting standard machinery to solve important local problems such as peeling of cassava and other tubers in preparation for large scale processing; dehydrating local tubers for preservation and processing into flour.

(4) Changing standard imported machinery to suit local conditions, tastes or needs.

(b) Metal-based sub-sector

(1) Of the metal-based industries considered, 36 per cent are foreign controlled, 42 per cent have majority Nigerian shareholding, while 22 per cent are wholly owned Nigerian enterprises. The Nigerian Enterprises Promotion Decree forbids the establishment of foreign owned subsidiary companies in the country. The wholly owned Nigerian ventures seem to feature mainly in the less capital or technology intensive industries except the public sector ventures which tend to be capital or technology intensive.

(2) The metal-based industrial sub-sector is characterized by metal fabricating processes involving relatively simple technologies. However, a few of these industries such as the steel rolling mill, the motor vehicle assembly, and specifically the integrated iron and steel industry employ more complex technologies.

(3) Many of the establishments in the sub-sector are using old, widely known and widely dispersed production technologies. These technologies are generally non-proprietary and have in most cases been supplied to these establishments by technology suppliers who are themselves not the original owners or licensors.

(4) All the existing technologies in this sub-sector are imported. The main sources are the FRG, Japan and the UK in that order. The developing countries such as India, Korea, Taiwan and Hong Kong are beginning to have significant inputs into the supply of technologies in Nigeria. These are however mainly in the very simple metal fabricating technologies. In such cases, there is growing evidence that the technologies from these sources may indeed be more appropriate to the requirements of the country.

(5) About 40 per cent of the industrial establishments sampled have agreements with foreign companies or process owners. These are mainly technical services agreements. They feature mostly in foreign controlled joint ventures, but do not exist at all in wholly owned Nigerian companies. The services contracted for vary in scope and content from one establishment to another. The usual duration of these agreements is five years with option for renewal. Several other agreements are even of unlimited duration. There is very often no justification for a technical services agreement to exceed three years for the relatively simple technology and five years for the relatively high technology. The example in the Aladja steel mill shows this to be possible and workable.

(6) The other type of agreement identified in this sub-sector is the licensing contract. These agreements featured however in less than 15 per cent of the establishment. Trademark agreements accounted for more than 60 per cent of these license agreements. These featured principally in the motor vehicle industry. In some of its technology agreements, it is prone to the worst effects of transfer pricing of inputs. These agreements need urgent review to enable the motor vehicle companies to make direct purchases of components from the best and cheapest sources. Extensive local parts incorporation will be the eventual answer to this problem. The current plan for local parts incorporation is ambiguous and prone to misinterpretation.

(7) Most of the industries in this sub-sector are oriented towards import substitution, with very few being resource based. Not surprisingly, about 85 per cent of the raw material requirements are imported. The biggest contributors to this import lead are the motor vehicle and motor cycle industries which between them account for 65 per cent of the import requirements. This situation can only be improved with a meaningful and well executed plan for local parts incorporation. Of all the imported raw materials, the most important single raw material is mild steel sheet. This is required in large quantities in practically all the establishments in the sub-sector. This emphasizes the urgent need to execute the flat steel rolling mill project.

(8) None of the establishments surveyed has exported or is in the process of exporting any of its products. Typical of import substitution industries, the metal-based industries have only been able to operate profitably in the domestic market under high protective tariffs. Under these circumstances, it is unlikely that many of the products in this sub-sector can be competitive on the world market.

(9) The degree of self-reliance attained in this sub-sector is generally very poor. Of the 16 industry groups considered, only the metal furniture group has attained level 3 of a 5-level technological ladder. One other group i.e., the integrated iron and steel is currently on level 2 but on the threshold of level 3 and is poised to advance very rapidly on the technological ladder.

(10) The cost of imported technology in this sub-sector is due to license or know-how fees, fees for technical services and salaries of foreign personnel. License fees are not very common except for the very large lump-sum payment in one industry group. The technical services fees and salaries constitute high recurrent costs. These can be substantially reduced without any deleterious effect by curtailing the duration of many of the technical service agreements, and by substantially reducing the quota for foreign personnel in many establishments.

(c) Light Consumer based sub-sector. The sectoral conclusion indicates that:

(1) On the average the level of foreign holding in the sector is about 35 per cent.

(2) The level of sophistication attained by Nigerians in technological acquisition in this sector was found to be very low.

(3) The level of self-reliance by the industries in this sector is also very low.

(4) Notwithstanding the conclusions of (2) and (3) above, the level of assimilation of the necessary operating and maintenance skills in use in industries in this sector is uniformly high.

(5) There is a dire need for machine design and fabrication expertise in this sector, while there is some degree of self-reliance in manpower

capable of installing, maintaining and commissioning the necessary machinery as well as processing technology.

(6) There is very little evidence of meaningful research and development taking place in this sector. The total annual expenditure on research and development is estimated to be about ₦1.16 million compared with an estimated total capital input of about ₦1d0 million in the sector.

(7) Only about 26 per cent of reporting firms have contractual agreements with some foreign partners. These agreements include affiliations, joint ventures and subsidiaries.

(8) The three types of agreements with foreign partners referred to at (7) above appear to be equally popular with the responding firms in the sector.

(9) The estimated labour force employed in the Light Consumer-based Sector is about 13 per cent of the work-force in the manufacturing industries.

(10) There is very little contact between universities and research institutes but the few which established some contacts have reportedly benefited from such contacts.

(11) There is very heavy dependency on imported raw materials in this sector. There is almost 100 per cent dependence on imported raw materials, while the estimated percentage of parts or components of finished products locally is only about 21 per cent.

(d) Mineral and Chemical-based sub-sector

(1) Economic effects. The most significant economic effect of technology transfer in the sub-sector is the evolution of non-competitive price structure for locally produced goods. In most of the industries (notably paints, plastic products, drugs and medicines) the locally produced items were priced higher than the imported substitutes. This was not due to the costs of technology transfers as such. The high cost arose because technology transfer increased the import dependence of local manufacture.

(2) Raw material input. Most industries in the sub-sector are over-dependent on foreign sources of raw materials. Efforts to reduce the dependency rate call for the clear identification and basic processing of crude materials to standards tolerable for local production. A programme of action in this regard has been proposed (sec. 6.13). If implemented, the programme would result in a drastic reduction in the import dependence of the sub-sector for such basic materials as kaolin, feldspar, dolomite, barytes, bentonite, talc, inorganic salts, pigments, starches, gums, solvents, etc.

(3) Equipment maintenance and fabrication. Though routine equipment maintenance is effectively in local hands, the sector still depends on expatriates for full-bodied maintenance and servicing. A related problem is the foreign sourcing of spares and consequently their non-availability. The increasing use of local facilities to fabricate spare parts should therefore be encouraged.

(4) Professional services. Most of the plants (particularly in the chemical-based sub-sector) were set up as highly packaged (turn-key) projects. There is a high level of reliance on expatriates for engineering and professional services which national policy should aim at eliminating.

(5) Formulations. For industries like pharmaceuticals, paints, soaps and cosmetics the formulations constitute the basic component of process technology. Technological self-reliance in such industries cannot be attained with the current level of dependence on formulations of foreign origin. Immediate steps to develop this technology must be considered a priority.

(e) Fiscal measures. The very large industries such as cement and glass are mainly located in remote areas and spend large sums of money on the provision of basic infrastructure. The immediate consequence is high production costs that reduce the competitiveness of the local products relative to imported substitutes.

(e) The aggregated report. The conclusions drawn from this survey exercise covering the four sub-sections show that:

(1) Practically all the existing technologies are imported mainly from Europe and Japan except in the petroleum/refineries industries group that draw part of its technology from USA. The developing countries such as India, Korea, Taiwan have recently also made some significant inputs particularly in the very simple metal fabricating technologies. In such cases, there is growing evidence that their technologies may be more appropriate to the country's requirements.

(2) The dominant mechanism of acquiring technology is by purchase of machinery, equipments and other artifacts of production. The transfer of technology by use of trade marks, patent licenses and collaborating agreements also features prominently.

(3) The collaborative agreements mentioned earlier were concluded in most cases without any inputs from the relevant government regulatory agencies and hence they contained inhibitive clauses that make subsequent adaptation, let alone innovation impossible.

(4) Many of the establishments within the same industry group use broadly similar technologies, but these technologies have been acquired in a vertical manner. Every new entrant goes abroad to acquire the same technology instead of a horizontal transfer from old recipients within the country. This can be attributed again to the restrictive clauses in some of the agreements which prohibit horizontal transfer (where recipients have agreements with technical partners) and the fact that old recipients develop very little capacity to innovate and are as dependent on external sources as the new entrants.

(5) Many of the industrial establishments particularly those in which government has substantial interests were found to be implemented on a turn-key basis. Most of the joint venture companies whether foreign controlled or not, when not utilising turn-key implementation, use foreign contractors almost exclusively for different aspects of project planning and construction. This approach inhibits local learning and puts the country at a great disadvantage.

(6) The bulk of the existing technologies in Nigeria's manufacturing sector were supplied in well tied-up packages. The technologies are invariably embodied in the design, machinery, equipment and CKD components. There are no local capabilities to unpackage these elements, let alone make any innovation.

(7) Local consulting engineering skill is generally available, though remains largely unutilized. Local facilities for fabrication of machines, equipment and spare parts are still in the rudimentary stage. However, the machine tool factory now under construction should on completion galvanize the local capital goods industry.

(8) The training facilities for technical, middle and high level manpower in some of the establishments appear inadequate. As would be expected, practically all of them claim to provide one form of training or the other for their personnel. If there is any effect at all, this is only manifested in the areas of operational and managerial know-how. Very few establishments are committed to local research and development. Less than 20 per cent of the establishments surveyed had budget allocations specifically for research and development activities.

(9) The biggest elements of costs in the acquisition of technology in Nigeria are not the direct payment in form of royalties, rents, patents, trade marks and lump-sum payments. The most dominant costs are in the form of payments for artifacts of production such as: machinery, equipment, spare parts, jigs, fixtures and raw materials imports. For more details of the study the complete set of these reports is available for public consumption at the National Office of Industrial Property, Federal Ministries of Science and Technology, National Planning, Agriculture, Water Resources and Rural Development, Industries and Faculties of Technologies at Universities of Ibadan and Ife Libraries.

Promotional activities

During the year, the National Office with the involvement of UNIDO, held a successful international workshop on "The evaluation of transfer of technology agreements involving equity and non-equity participation". The workshop, held in March, was attended by over 80 participants from the various government organizations who are directly or indirectly involved with the question of technology transfer. The participants were also drawn from other countries such as Ethiopia, Sudan, Portugal, India, etc. The principal objective of the workshop was to introduce the participants to the "packaging" and "unpackaging" of technology and remuneration consideration in technology transfer agreements in which the licensors of technology have elements of technological, financial and other interests arising from equity and non-equity participation. The conclusions and recommendations of the workshop have been submitted to government for consideration.

As part of the efforts of the Office to assist Nigerian enterprises, the guidelines to assist Nigerian enterprises in Negotiating Transfer of Technology Agreements was approved for publication by Government. The Guidelines which is now in print is expected to be made available to the public shortly.

5. Achievements and conclusions

Achievements. It may be recalled that although the Office started full operations in 1983, the effects of the application of the provisions of Decree 70 of 1979 has been tremendous in such areas as payment terms, restrictive clauses, training programme and monitoring of technology agreements. The National Office has succeeded to a large extent in reversing the trend whereby our entrepreneurs had conceded to all forms of excessive payment terms and restrictive provisions while negotiating technology transfer agreements. This has been achieved through a thorough in-depth analysis of the agreements submitted to the Office.

In the implementation of the provisions of Decree 70 of 1979 in 1985, the National Office has been able to achieve the following:

(a) Provide effective support to Nigerian enterprises in their efforts to acquire foreign technology at reasonable terms and conditions thereby boosting rapid industrialization and technological development.

(b) A general improvement on the negotiating skills of Nigerian enterprises entering into technology transfer agreements with foreign partners thereby ensuring that the terms and conditions negotiated are fair and equitable.

(c) A substantial foreign exchange saving of ₦75.4 million in 1985 on 91 registered agreements out of the 227 submitted.

(d) Unquantifiable savings made through the rejection of certain restrictive clauses and the insistence by the Office for the inclusion of training components and R&D in all agreements registered by the Office.

(e) Better awareness and perception of the role and functions of the National Office as a regulatory agency by the Nigerian public.

(f) A successful international workshop on the Evaluation of Technology Transfer Agreements involving equity and non-equity participation which was well commended by United Nations agencies.

(g) The excellent links and relationship between the Office and Technology Transfer Offices in other developing countries such as Portugal, Philippines and Spain.

(h) The recognition of the Office by UNIDO as the focal point for the training of analysts in the technology transfer field on the African continent.

It is gratifying to note that the efforts of the Office in the last two years have yielded positive and commendable effects on the economy, more especially in the year 1985. It is noteworthy that Nigerian enterprises which had earlier on in the formative years, been apprehensive of the role of the Office, have asserted to the positive role of the Office in the acquisition of technology and are now utilizing the services and expertise available therein. With the Office concentrating its efforts on effecting an impact on technology flow, the monitoring of agreements and assisting in the negotiation and selection of appropriate technologists, it is expected that the effect of the Office will become more noticeable in the next few years, more so, as the Office will relate payments to the degree of local value addition in order to ensure the maximum benefit to the Nigerian economy with regard to the in-flow of technology.

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INDIA'S TECHNOLOGY POLICY AND ITS INFLUENCE ON TECHNOLOGY IMPORTS AND TECHNOLOGY DEVELOPMENT

This paper was offered to UNIDO for reprinting in the TIES Newsletter by the author, Dr. Ghayur Alam, Senior Economist at the National Council of Applied Economic Research at New Delhi,

India. For the last seven years the NCAER has had a group of researchers involved in studying technology development and technology import activities in Indian industry, and is presently undertaking two studies for the Indian Department of Scientific and Industrial Research. One is a study of the interrelationship between technology development and technology import activities in a number of Indian industries. The study, which is based on detailed firm-level interviews and published information, attempts to examine the changing nature of this relationship in the 1970s and 1980s. It is the first major effort to study the effect of India's current policy of liberal technology imports on technology development activities and includes an examination of the development and diffusion of new technologies in India. The second study covers liberal trade policies, industrial development and export performance (the case of the Indian engineering industry in the last decade). The Indian economy is currently going through an important experiment, entailing the liberal import of technology, raw materials and components which will hopefully lead to a significant increase in exports of manufactured goods. The study examines the effectiveness of these policies in promoting exports and the effect of liberal imports on local manufacturing capabilities. The study is based on yearly information for the period between 1976 and 1985 from more than 250 firms.

Both studies are expected to be completed by mid-1987 and copies may be requested in writing from the NCAER, New Delhi.

This study brings out the relatively minor influence of government policies on the technology imports and technology development activities of Indian firms. While a minority of the firms either find the policies to be too restrictive or, on the other hand, have benefited from them in their bargaining for a better price, a majority have remained largely unaffected by them. Further, while these policies have been successful in regulating certain quantitative aspects of technology imports (payments, duration, etc.), their success in promoting technological development activities within Indian industry has been limited.

Technological activities of Indian firms, it is argued here, are far more sensitive to government policies pertaining to the nature of the market and the industrial structure than to those which are explicitly aimed at promoting technology development. The latter policies can be successful only if an industrial environment conducive to innovative activity is simultaneously created. On the other hand, modifications in technology policy alone (such as a liberal payment policy, greater R&D incentives, etc.) without necessary changes in industrial policy will fail to infuse technological dynamism into Indian industry.

For the last three decades, the Indian Government has attempted to direct technology related activities through a variety of policy instruments. Very broadly speaking, the policy has been concerned with two goals: (a) control of technology entering the country, (b) promotion and protection of locally available technologies, whether indigenously developed or previously imported. Although, it has gone through a number of important changes in emphasis, the regulatory nature of the policy has continued to the present day.

In the fifties and early sixties, the policy was relatively liberal, and its scope was limited. The mid-sixties saw the beginning of a policy which was more selective and discriminatory against technology imports. This was partly in response to the scarcity of foreign exchange and was partly considered necessary to protect indigenous technological activities. (1) The industries were identified according to the role foreign technology and foreign capital were expected to play in their development and the terms on which technology could be imported were regulated. These measures, in addition to controlling what was considered to be an over-import of technology, were also expected to (a) bring down the price of the technology imports, and (b) reduce restrictions on the use of imported technology (such as those limiting Indian firms' right to sub-license and to export) and thereby maximize its benefits. (2)

The regulatory aspects of the policy, by and large, were effectively implemented and, as a result, the number and nature of foreign collaborations changed significantly after the sixties. Their number saw a sharp decline after 1964 (according to the data available with us, the number of collaborations came down from 471 in 1964 to 296 in 1965) and the terms of collaboration approved after the mid-sixties clearly showed the effect of a restrictive policy. In this sense, the policy can be said to have achieved its immediate goals. On the other hand, it is becoming increasingly clear that its success in promoting technological development in the Indian industry has been limited. In fact, according to some authors, it is the very restrictive nature of the technology policy which is largely responsible for the technological obsolescence of Indian industry. (3) The policy, according to this view, without creating conditions necessary for domestic technology generation activities, has restricted the availability of modern technology to Indian firms. A policy of allowing liberal import of technology and capital is increasingly suggested as a necessary condition for increasing technological competence and efficiency of the Indian industry, and it is important to note that a significant shift in the policy in this direction is already evident.

Although, the technology policy and its implications for technology development and industrial growth have attracted considerable attention, the problem has not been studied sufficiently to generate information and analysis on which the policy, and changes in it, could be based. (4)

This paper, based on research recently completed at the NCAER, is an attempt in this direction. In addition to examining various aspects of technology imports such as the nature of technology demand, the choice of technology, the content and the price of technology import and its effect on local technological activities, the paper evaluates the performance of the technology policy.

The research is mainly based on:
(a) information on foreign collaborations approved during 1977 and the first half of 1983. This information, made available by the Ministry of Finance and the India Investment Centre, has been computerized by the NCAER; (b) information collected through questionnaires from and interviews with 211 technology importing firms;
(c) discussions with government officials involved in the formulation and implementation of these policies.

Demand for technology imports

It is often suggested that technology transfer to developing countries is largely a result of the initiative of the technology suppliers. It is they who, in order to protect or capture markets in developing countries and to increase returns on

their R&D expenditure, look for market for their technologies in developing countries. The technology importers (from developing countries), according to this view, have to choose from the technologies offered to them by the suppliers.

We find that, at least in the case of India, this picture of technology transfer is not borne out by facts and is essentially incorrect. In the collaborations studied by us, a very large proportion of the agreements (93 per cent) were initiated by the Indian firms. Many of the larger firms studied by us were found to be continuously involved in a search for potential technology suppliers. This clearly indicates that there is a large demand for imported technology in Indian industry and that most of this demand is met through the initiative of the Indian firms.

The fact that in most instances a collaboration is the result of Indian initiative would suggest that the Indian firms are likely to make a choice from a number of alternative sources. To do so, they will need to consider and approach more than one technology supplier and the possibility of the choice can be expected to increase with the number of firms approached.

By the criterion of the number of technology suppliers approached, two-thirds of the firms appear to have made some amount of choice (see Table 1). We must however point out that these figures need to be treated with caution. The number of technology suppliers approached does not always indicate the extent of choice exercised by Indian firms. This is particularly true in the case of small firms, who find it harder to attract foreign collaborators. Consequently, the small firms are compelled to approach a number of potential technology suppliers before they are able to find one who is willing to collaborate at a price which these firms are able to afford.

Table 1: Number of technology suppliers approached by Indian firms for technology purchase

No. of firms approached	No. of collaborations
One firm	28 (30)
Two-three firms	31 (34)
More than three firms	33 (36)
Total	92 (100)

Note: Figures in parenthesis are in percentages.

What is this choice based on? We find that technological considerations play the most important role in the Indian firm's choice of a collaborator. In almost half the collaborations, the Indian firm claimed to have preferred a collaborator for technological reasons. This was followed by the prestige of the technology supplier in the Indian and the international market. Interestingly, financial considerations were not often considered important (see Table 2). Our interviews also suggest that except in a few cases where the market and technological considerations required otherwise, the Indian firms prefer to import the most advanced technology they can obtain. Also, in most cases they claim to have imported such technologies. Only rarely we came across instances where the Indian firm felt that the technology imported by it was obsolete at the time of the collaboration.

Table 2: Reasons for choice of collaborator

	Number of cases
Superior technology	112 (45)
Prestige	49 (20)
Financial	30 (12)
Others	57 (23)
Total	248 (100)

Note: Figures in parenthesis are in percentages.

Content of technology imports

An important aim of the Indian technology policy is to discourage import of packaged technology and turn-key plants. In the fifties and early sixties, technology imports to India were often in the form of a package. As a result of the government policies and the increased competence of Indian industry this began to change in the late sixties. Today increasingly technology is found to be unpackaged before it is imported.

As a result of unpackaging, it appears that in recent years plant and machinery has been increasingly procured locally. While before 1970 about 44 per cent of the collaborations included import of plant and machinery, in the post-1970 period this proportion has come down to 29 per cent. Similarly, the incidence of collaborations with provision for raw material imports has declined from 35 per cent before 1970 to 24 per cent after 1970.

Interestingly, this decline has taken place in spite of the collaborator's preference to include supply of plant, equipment and raw material in the collaboration agreement. Our evidence suggests that the Indian firms, in order to reduce the overall cost of technology import, often bargain to bring down the import content of the collaboration. For example, a large engineering firm, negotiating a collaboration with a US multinational was found to have brought down the import content of the project from 60 per cent (as suggested by the US firm) to 40 per cent. Similarly, in another example, an Indian manufacturer of electronic equipment brought down the import content of the project from the collaborator's suggestion of 40 per cent to only 10 per cent.

Technology payments

The control on payments for technology imports is perhaps the single most important and certainly one of the most successfully implemented elements in India's technology policy. This policy, which aims at preventing the technology suppliers charging 'excessive' prices for the technology, regulates both the lump-sum payments and the royalty rates. The latter, which can be more easily regulated, are in most cases fixed at five per cent or less of the value of production. Only in exceptional cases, where the ownership of the technology is restricted and access to it is difficult or where substantial exports are expected, a higher rate of royalty is permitted. In most cases, however, the practice is to allow a royalty rate of around three per cent. Since the mid-sixties, when these regulations were first introduced, the payments have been closely controlled. Only in less than one per cent of the agreements approved during 1977 and 1983, has the

royalty rate been fixed at a rate higher than five per cent. Within the five per cent limit, the tendency, however, is to fix the royalty rates close to the limits: in almost two-thirds of the agreements the royalty rates are above three per cent (see Table 3).

Table 3: Distribution of collaborations according to rate of royalty, (1977-83)

Royalty (per cent)	Number of collaborations	Per cent
1-3	568	38.93
3.1-5	879	60 25
Greater than 5	12	0.82
Total	1 459	100.00

Source: NCAER data.

The low royalty rates, however, do not necessarily indicate that technology payments by Indian firms have come down after the mid-sixties. It is probable that in order to compensate for the loss in royalties, the technology supplier will tend to take part of/or all the payment as a lump-sum. Our data suggest that the proportion of cases involving lump-sum payment has increased from 20-30 per cent in the early fifties to 83 per cent in the 1980s. (5) The substitution of royalties by lump-sum payment continued in the late seventies and the eighties. While the proportion of collaborations with only royalty payments has decreased from 21 per cent in 1977-79 to 17 per cent in 1980-83, the proportion of collaborations with lump-sum only has increased in the corresponding period from 35 per cent to 39 per cent (see Table 4). Along with an increase in the incidence of lump-sum payments, the value of the latter has also seen an increase in the recent years.

Table 4: Distribution of collaborations according to type of payment

Year	Royalty only	Lump-sum only	Royalty and lump-sum	Total
1977-79	169	284	350	803
	(21)	(35)	(44)	(100)
1980-83	260	593	678	1 531
	(17)	(39)	(44)	(100)
		6 666		
	429	877	1 028	2 334

Source: NCAER data.

Notwithstanding the tendency of the technology exporters, in some instances, to substitute lump-sum payments for royalties (and thereby receive higher payments), it has been suggested that the technology payments by the Indian firms are low compared to those by firms from other countries. (6) We do not have figures or payments by other countries and therefore cannot make a comparison. We can only note that while the royalty rates prevalent for technology transfer between developed countries are often high - UNIDO documents mention royalty rates as high as 15 per cent (7) - the royalty limits in many Latin American countries are not higher than those allowed in India. (8) We have no comparable information on lump-sum payments, and it is perhaps here that the difference in payments between India and other countries is significant.

Convinced that the government's restrictions are largely responsible for low technology payments by the Indian firms, some authors believe that in many instances the latter are unable to import sophisticated technology from more innovative firms and often import second rate technologies. (9) They suggest that a liberalization of the policy of restricting payments will ensure that the Indian firms import more efficient and modern technology. The argument, it seems, assumes that, by and large, Indian firms would like to, and would be able to pay for, the import of more advanced sophisticated technologies.

First of all, it is interesting to note that by and large Indian firms claim to have selected and imported technologies of fairly recent vintage. This is also supported by the technology suppliers, most of whom report having transferred technologies which have been developed and commercialized in the recent years (see above). The finding would suggest that the Indian firms are able to import the latest technologies within the limits on payments set by the government.

Smaller technology packages

How can we explain the fact that the Indian firms are able to purchase recent vintage technologies at prices which are lower than those prevalent internationally? While part of the reason could be the attraction of a potentially large Indian market in which many foreign firms like to maintain a presence, even if the short-term returns are low, the main reason is perhaps that the technology suppliers usually adjust their technological package to suit the Indian prices. The price of a technology is generally considered to depend on its vintage. This understanding of the technology price underestimates the importance of the size of the technological package being supplied. We feel that the technology price tends to depend more on the nature and the size of the package transferred and less on the vintage of the technology. In other words, technologies of similar vintages but differing in the size of the packages would differ in their price. The Indian experience, in our view, suggests that the low payments made by the Indian firms for their technology purchases are usually not because the technology is old, but because the technology packages imported by them are often small. Interviews by us and our European collaborators (especially of the UK) (10) lead us to believe that in most instances the technology transferred to India, while it belongs to recent vintage, involves the transfer of a limited range of technological elements. The range of products processes covered by the collaboration and the transfer of skills, particularly those related to the development (as opposed to the operation) of technology, are almost always considerably less compared to what the technology supplier possesses and, in most cases, is willing to supply.

As a result, while Indian firms do import technologies which were recently developed and also get sufficient skills to operate and often adapt them, they rarely acquire the skills and experience required for absorbing the basic knowledge and the process of technical change involved in the technology. While this enables these firms to carry out profitable operations, it rarely prepares them to undertake innovative activities. (11)

Why do Indian firms choose to import smaller technological packages? Is it because of the government limits on payments which restrict the Indian firms' access to larger technological packages or is it because the Indian firms themselves prefer to import smaller (and cheaper) technology packages, which consist of minimum skills necessary for operating, and sometime adapting, the imported technology?

Our study suggests that in most cases it is the Indian firms who prefer to import low cost, small technology packages, and it is this, rather than government restriction, which is largely responsible for the low technology payments by Indian firms. In fact, in many instances the government restrictions have been used by these firms to bargain for a low price for their technology (16 per cent of the firms in our sample reported having used government policy to bargain for a better price). (12) Considering the little effect these controls seem to have on the payments, it is not surprising that only 15 per cent of the firms studied by us felt that a modification in the payment policy was necessary.

The finding has serious implications for the policy. A liberal approach to technology payments, as has been suggested in recent years, may be a necessary condition for import of larger technological packages, but it certainly is not a sufficient condition. Unless the Indian firms consider it necessary to import them, and can afford to pay higher prices for these, a liberal policy will not be very effective in encouraging the import of larger and more comprehensive technology packages.

It may be argued that the recent trends of technology import do not support this view. The 1980s have seen a substantial increase in the number of collaborations involving large payments, and this, it can be argued, has been possible because of the liberal technology import policy. Our figures however show that, in general, the liberal policy of the recent years has not resulted in larger payments. It is only in a few, but well publicized instances, where technology payments have been larger than those in the past. In a very large majority of collaborations, however, the technology payments, in spite of a liberal policy, have seen little change. For example, if we exclude the cases in which the lump-sum payments are more than one crore 10 million rupees, the lump-sum payments have seen very little increase between the late seventies and early eighties. While the average lump-sum payments of 615 collaborations during 1977-79 was Rs 16.3 lakh (100,000), during 1980-83 it had increased to Rs 17.46 lakh rupees. (13)

Thus, we see that while a liberal policy, among other factors, has lead to an increase in the number of collaborations with large payments, most Indian firms have continued to import small technological packages at a low price. It seems clear that unless the Indian firms perceive the need for more comprehensive technological packages, the quality of technology import will remain essentially unchanged.

Duration of collaboration

Technological collaborations, in most cases, are for a limited duration during which a technology supplier is expected to complete the transfer of production and related know-how. While the duration is important for the technology importers as they can expect to receive technological support only during this period, for the technology supplier its significance lies in the fact that he usually receives payments only during this period.

Until the early 1960s, collaborations for 10 years or more were common. However, since the mid-sixties, the government policy restricts the agreement in most instances to a duration of five years. Only rarely are agreements for longer duration permitted. As a result of this policy, a very large majority of the collaborations approved in the 1970s and the 1980s are for a duration of five years or less. The proportion of five-year agreements increased from 16 per cent in 1965 to about 50 per cent in 1966 and 66 per cent in the late seventies. (14) Also, the proportion of agreements with outright purchase of technology and no royalty payment increased from 13 per cent in 1951-67 to 27 per cent in 1977-80. A reduction in the collaboration period was considered necessary both for foreign exchange savings and for reducing the technological dependence of Indian firms on the technology suppliers, and it was hoped that a shorter collaboration would induce the Indian firms to increase their efforts to absorb and adopt the imported technology.

While it is likely that, in the short term, the policy of limiting the duration of collaboration has reduced technology payments and technology dependence of Indian firms, in the long run its effect has perhaps not been beneficial. There are many reasons for considering this possibility. First of all, it can be argued that the policy has restricted Indian firms' access to foreign technology. As the value of royalty payments depends on the duration of the collaboration, the technology supplier may find the sale of certain technologies through short-duration collaborations unprofitable. Also, some of them could be reluctant to transfer their technologies if their involvement in the use and control of the technology is limited only to a short duration.

In addition to its effect on the supply of technology, the rigid approach to the duration could also limit the benefits of a collaboration to the Indian firm. It ignores the important consideration that the period necessary for technology absorption would vary considerably (largely depending upon the technological competence of the Indian firms and the complexity of the technology). The five-year duration could be too short for many firms to absorb the variety of techniques/skills and to begin production of the complete range of products included in the agreement. Obviously, in these instances, the Indian firms' benefits from a collaboration would be considerably less than what would have been possible in a longer collaboration. Many of these firms would either renew their agreements or enter into a new collaboration, and this would clearly increase the financial and other costs of technology import. (15)

What do the Indian firms feel about short duration collaborations? Our study shows that their experience and opinions are varied. While some firms felt that the five-year duration was sufficient and did not pose any problems in attracting technology suppliers, many felt that short duration of agreements do make it difficult to import advanced technology. More importantly, they felt unhappy because the short duration of the agreement reduces the commitment and responsibilities of the technology supplier. We find that of all the aspects of the Indian technology policy, the Indian firms are most critical of the limit on collaboration duration: more than a quarter of the firms felt that the policy required to be changed.

As discussed above, a limit on the collaboration duration can affect the Indian firms in many ways. The most important of these perhaps is the way it can sometimes prevent the Indian firms from taking full advantage of the collaboration. While not very effective in inducing technological activities in the firms, the policy has restricted the possibilities of technology absorption. In view

of this, we suggest that a more flexible policy which permits longer duration collaborations, particularly in cases where a longer association with the foreign collaborator would be necessary for technology absorption, is desirable.

Import of technology and exports

One of the important concerns of India's technology import policy has been the restrictions imposed by the technology suppliers on exports of the products manufactured under collaboration. In pursuance of the policy, agreements with export restriction clauses are discouraged and restrictions (mostly permitting exports only to neighbouring countries and restricting exports to areas where the licensee has another licence or production facilities) are only allowed when complete freedom to export is not acceptable to the technology supplier. Faced with the need to expand exports this concern is understandable. Our research, however, shows that the role of these restrictions (and their absence) on exports is over-emphasized as they do not affect export performance as much as is usually suggested.

We find that restrictions on exports by Indian firms continue to be common. In the collaborations studied by us, almost half were found to have these restrictions. The high incidence of these restrictions may lead one to believe that they are largely responsible for the poor export performance of Indian firms. This, we feel, is incorrect. The experience of the Indian firms suggests that export restrictions in a collaboration are often irrelevant for the actual export performance of these firms.

Most of the firms we studied had not exported in the past and did not foresee exporting in the near future. While in half the cases, the collaborators had restricted their freedom to export, none of them considered this as the main reason for their failure to export. Most felt that their products were costly and their quality was inferior; they were not competitive in the international market. Others, who manufactured products which could be competitive in the international market, found the domestic market to be more attractive and did not consider entering the export markets.

Government's insistence that Indian firms should be free to export is likely to have affected both the supply of technology and its quality, without significantly increasing the possibility of exports. (16) This is specially true in instances where buy-back arrangements are insisted upon by the government. Instances are not uncommon where the foreign collaborator, though interested in importing from the Indian firm, was not willing to accept contractual obligations to do so. (17) Furthermore, it is also likely that those technology suppliers who agree to transfer technology with little or no export restrictions would charge a higher price to compensate for the risk of losing part of their market to the Indian firm. This obviously will increase the cost of technology imports without increasing export possibilities.

If forced to permit the Indian firms to export, the collaborator could also be tempted to withhold crucial aspects of the technology to prevent the Indian firms from becoming competitive in the international market. As the low technological level of Indian firms is one of the main factors responsible for the poor export performance, the incomplete transfer of technology would, obviously, further undermine their export potential. The policy, in these circumstances, would not only fail to encourage exports during the period of the collaboration, but, by restricting the flow of information from the collaborator, would also undermine the technological competence and future exports of the Indian firms. It would be more fruitful if the collaboration is primarily considered as a way of building the technological competence of the Indian firms and policies which could in any way limit the technological benefits of a collaboration be avoided. Once the technology is mastered, the firms would have a greater export potential. Our study also indicates that once the firms are competent to export, they themselves are unwilling to accept these restrictions; some, in fact, would only collaborate if no export restrictions are imposed.

As the policy has not been very successful in encouraging exports, but on the other hand, is likely to have had a negative influence on the Indian firm's technology competence and future exports, a more flexible attitude towards export restrictions is necessary. We believe that a mere removal of restrictions would not lead to increased exports - sufficient technological capability is a far more important condition for that. Policies which help in maximizing the flow of technology and information through a collaboration, even if it means accepting export restrictions (which in any case would not make much difference to the actual export performance of most of the firms), will be more successful in promoting exports in the long run.

Research and development

Although widely debated in recent years, the relationship between technology imports and R&D activities by Indian firms is not clearly understood. Most studies in the past have concentrated on an examination of the nature of governmental research and its utilization in developing countries, and very few studies. The past experience has shown that the extent of government R&D utilized by industry is very small (18) and it is becoming increasingly clear that for any significant improvement in the technological capabilities of the Indian firms, the R&D will need to be mainly done within the firm. In view of its importance, we have paid particular attention to examining and understanding the extent and the nature of R&D by Indian firms and its relationship with the imported technology.

One of the important criticisms of technology imports by developing countries relate to their possible effect on the development of indigenous technological capabilities. It is argued that technology imports discourage local R&D and technology generation activities, and create a situation where technology importers become perpetually dependent on foreign technology. While it is true that technology imports may inhibit innovative R&D in the importing firm, they could, in many cases, initiate limited research activities necessary for the absorption and adaptation of the imported technology. A technology importer requires a certain amount of minimum skills to successfully exploit the imported know-how in production. The skills related to design evaluation and interpretation (often to examine the possibilities of import substitution) plant operation and maintenance and quality control are usually necessary for a successful transfer. Furthermore, in many cases imported technology requires changes and adjustments to suit the needs of the Indian firm. These changes may be necessary due to the need to reduce the production scale, to simplify the production process or to modify the product characteristics to suit the Indian market. The R & D activities to develop the necessary knowledge, skills and experience within the importing firm are necessary as the foreign firms commonly do not assist the Indian firms in the modification and adaptation of the imported technology. (19) The extent of the adaptive R&D can be expected to increase with the complexity of the technology imported. (20)

We find that most Indian technology importing firms undertake some amount of R&D. More than three-fourths of the firms in our sample (157 out of 211) claim that they are engaged in research and development activities. Their research intensity, however, is low; while some firms spend three per cent of their turnover on R&D, most spend less than one per cent of their turnover and, typically, employ less than 10 researchers. Only one firm was found to spend five per cent of its turnover on R&D.

What is the nature of their research activities? Our study suggests that their R&D activities are most commonly aimed at adaptation of imported technology; about three-fourths of the firms engaged in R&D reported adaptation as their main R&D activity. In addition to adaptation, the need to indigenise production and the need to compete are the main factors causing Indian firms to undertake R&D activities (see Table 5).

Table 5: Distribution of firms according to nature of R&D

Nature of R&D	Number of cases	Total
Quality control	77	157 (49)
Customer services	49	157 (31)
Adaptation	101	157 (66)
Basic research	32	157 (20)

Note: Figures in parenthesis are in percentages.

The adaptation is commonly aimed at making the imported process and products more effective in the Indian environment. Firms carrying out such changes are often in the engineering sectors and their customers are other industrial firms. They often have good after-sale services/customer services and the adaptations are based on the feedback received from the market. For example, a manufacturer producing earthmoving machinery reported modifying the tyres of its dumpers to prevent damage due to ore spillage in field operations in coal mines. They also redesigned the air intake system to cope with dust. Interestingly, both the changes, though not major modification, were considered significant improvements by the foreign collaborator who incorporated them in its technology.

Indigenisation of production, mainly due to government policy of import substitution, is found to be the second most important concern of researchers in Indian industry. Most foreign collaborators include a phased programme of indigenisation of both components and raw materials. The firm may be allowed to import a substantial proportion of its inputs during the initial stages of production, but is usually required to bring it down considerably within the period of the collaboration. As indigenisation is not in the interest of the foreign collaborator, the Indian firm has to undertake independent R&D to modify the production process to accept locally available components and raw materials. When not readily available, R&D may be geared towards development of components and raw materials.

In addition to the need to adapt and indegenise, we find that in some instances (not many) the force behind technological development by Indian firms has been the need to reduce the production costs in order to compete. For example, a producer of air brakes who began operation as an engineering consultancy firm and who had substantial technological competence at the time of the collaboration, faced unacceptable rejection rates at the plant. The Indian firm carried out an ambitious plan to improve the production technology to reduce the rejection rate and thereby the cost of production. In this it has been very successful and has achieved better results than its collaborator. The UK collaborator has incorporated the improvements in its production facilities in the UK. In another case a producer of earth-moving equipment reported having changed design specification of the body structure of its machines to reduce the material costs to make them more competitive in the Indian market.

These and other examples show that a large proportion of technology importers are incorporating changes in the imported technology, mainly in order to adapt the technology, to reduce production costs and to meet government requirements of import substitution. However, although these changes are often crucial for the survival and growth of these firms, they seldom involve major technological effort. Very rarely have technological changes been aimed at, or led to, significant technology development. Also, in most cases, the technological activity was short lived. In the beginning of a collaboration, when the designs were to be interpreted for the equipment manufacture, the plant to be set up and commissioned and the production to be streamlined, the extent of learning was usually significant. However soon the learning process slowed down and technological activities became limited to routine production. The technological gap between the technology supplier and the technology recipient, which in many cases had been significantly reduced at the time of the collaboration, became large within a few years of the collaboration.

The technological progress of Indian firms has not been slow only in comparison with their collaborators. Often firms in other countries who imported technology at about the same time as the Indian firms have seen far greater technological development than the latter. For example, a large Indian heavy machinery manufacturer imported technology at about the same time as a Japanese firm in the late 1960s. At the time of its collaboration, the Indian firm was at the forefront of the international technological level in this field. However, it has remained technologically stagnant since then and requires new technical collaborations to update its technology. On the other hand, the Japanese firm, which began with the same technological level as the Indian firm has emerged as one of the three largest manufacturers of these machines in the world. Interestingly, the Indian firm has recently collaborated with the Japanese firm to update its technology.

While our evidence clearly suggests that import of technology has often led to R&D activities and has increased the importing firm's technological capabilities, it does not imply that R&D in India is only carried out along with imports or that imported technology is a necessary condition for the growth of R&D activities by Indian firms. In fact, we find that in many cases, R&D has been undertaken not only in the absence of imported technology but because technology could not be imported. In many of these cases the firms were happy that they were not able to import technology as a result of which they were able to undertake successful development activities within the firm. Some of them felt that they had developed sufficient technological capabilities to render any future collaboration unnecessary. In a typical example, a transformer producing firm had

negotiated an agreement with a Dutch firm which later backed out due to differences over lump-sum payments. The Indian firm decided to develop the range of transformers it had planned to produce in collaboration with the Dutch firm. The efforts were successful and now the firm does not see any need for further collaboration.

In another example, an Indian chemical manufacturer wanted to produce aluminium chloride, a raw material for the firm's production of wet dyes. The firm searched for a collaborator and found the price too high (about Rs 1 crore). It decided to develop the production technology and was successful in undertaking production at a cost of Rs 15 lakh.

Government policies on R&D

What is the role of government's policies of directly promoting research activities by Indian firms? Until the early 1970s, the government's role was restricted to supporting R&D infrastructure and activities in various government laboratories and institutes. These laboratories were expected to generate technologies to meet a large part of the technological needs of Indian industry.

As a result of the realization that the research undertaken at the government laboratories is not sufficiently geared to the needs of industry and that research by the latter needs to be strengthened for technology development, policies which support research by the industry were initiated in the 1970s. Essentially, these policies provide a number of incentives (mostly fiscal) to encourage the Indian firms to undertake R&D and use locally developed technology. As a direct result of those incentives, the number of firms reporting research activities has seen a considerable increase in the last decade. The number of firms with R&D activities and registered with the department of science and technology has increased from 484 at the end of 1977 to about 700 by 1983. (21) The total R&D expenditure by industrial firms as estimated by DST has also seen a sharp increase in the recent years. It increased from about Rs 84 crore in 1976-77 to Rs 285.6 crore in 1982-83. This would suggest that the policy has been successful in inducing a large number of firms to undertake R&D activities. (22) While this may be true, it must be pointed out that these figures (and the increase in them) only illustrate the expenditure on R&D as claimed by the firms. They do not, in any way, reflect the nature and the quality of their R&D activities. Our evidence suggests that the effect of these incentives on the nature and the quality of R&D has been marginal. We also find that a number of technologically dynamic firms with large R&D establishments are not registered with the Department of Science and Technology for these incentives. Our feeling is that, while these incentives may encourage firms to set up R&D departments and to even take up preliminary research activities, they are rarely responsible for making a firm technologically dynamic.

In their present form the incentives have some serious limitations. The most obvious of these is the temptation they offer to the firms to show expenses incurred on other activities as R&D expenditure and to generally inflate their R&D expenditure figures. Even more important is the limitation that the incentives are based on expenditures on and not the achievements of R&D activities. This could easily lead to non-utilisation of resources (especially equipment) or to their diversion into more profitable (non-R&D) activities.

We therefore suggest that it would be more beneficial if the R&D incentives are based not only on the R&D expenditure, but on the results of these activities. Another disadvantage of the present incentive system is that it only takes into account formal R&D activities carried out in an R&D department and does not consider technological activities on the shop-floor. These activities, which are not uncommon in Indian firms, often play a more important role than formal R&D. They are especially important in the adaptation and improvement of imported technology. We feel that the incentive system needs to be devised in such a way that it covers both formal and non-formal technological activities.

Conclusions

We find that there is a large demand for technology in the Indian industry, which is reflected in an active search for potential collaborators by Indian firms. Most Indian firms are keen to import recent technologies and, by and large, have succeeded in doing so.

An important fact highlighted by our study is the relatively minor influence of the government policies on the technology imports and technology development activities of Indian firms. While a minority of the firms either find the policies to be too restrictive, or on the other hand, have benefited from them in their bargaining for a better price a majority have remained largely unaffected by them. Furthermore, while these policies have been remarkably successful in regulating certain quantitative aspects of technology imports (payments, duration, etc.), their success in promoting technological development activities within the Indian industry has been rather limited.

The explanation for the ineffectiveness of the government technology policy, in our view, lies mainly in the nature of the Indian market and industrial structure. The market for most products, as described by Dessi, (23) is characterized by a few dominant large firms and a very large number of small firms. While the latter are too small and lack the necessary resources to undertake R&D and technology development activities, the larger firms, due to the predominance of price competition, remain pre-occupied with cost reduction and adaptive R&D. (24) The small plant size (due to the government policy of splitting capacity) and the compulsion to diversify into unfamiliar fields (often seen in the case of MRTP and FERA companies) further reduce the possibilities of technology development activities in the industry. The combined effect of these factors is strong enough to defeat the aims of policies aimed at technology development. While the policies succeed in their immediate goals (e.g. reduction of collaboration duration, increase in the firms reporting R&D, etc.), by and large, they are not equally successful in achieving their most important aim, namely, a significant increase in technology generation activities by the firms.

The absence of compulsion to innovate domestically also influences the firm's technology import activities. These imports are often limited to those aspects of the technology which are necessary for setting up and operating the plants. On the other hand, aspects which are necessary for technology generation (and which can often be transferred through intensive training, etc., but would involve higher costs) are considered unnecessary and not imported. It is very likely that due to their preference for limited packages of

technology, the technology imports of Indian firms are unaffected by restrictive government policy. At the same time, it is easy to visualise that, if the firms began opting for larger technology packages, their import within restrictive policies would become difficult.

This brings us to our main conclusion. This suggests that the technological activities of the Indian firms are far more sensitive to policies pertaining to the nature of the market and the industrial structure rather than those which are explicitly aimed at promoting technology development. While acknowledging their significance, we feel that the latter policies can only be successful if an industrial environment conducive to innovative activities is simultaneously created. On the other hand, modifications in technology policy alone (such as a liberal payment policy, greater R&D incentives) without necessary changes in the industrial policy would fail to introduce the necessary technological dynamism into Indian industry.

Notes

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(1) See NCAER (1971:56).

(2) Similar measures were taken by a number of LDCs in the 1960s and 1970s. See UNIDO (1977).

(3) For example, see Lall (1982).

(4) For notable exceptions, see Balasubrahmanian (1973), Baranson (1968), NCAER (1971), Subrahmanian (1972).

(5) The data for the early 1950s are taken from NCAER (1971:57).

(6) For example, see Desai (1982a).

(7) See UNIDO (1977).

(8) For information on ceilings on royalty rates in Latin America, see UNCTAD (1983).

(9) See Lall (1982:23).

(10) For details see Bell and Scott-Kemmis (1984) and Hoffman et al (1984).

(11) For details see Alam (1985a).

(12) This, incidentally, refutes the commonly held belief that the Indian firms do not bargain with the technology suppliers. For example see MCST (1973:550).

(13) For details see Alam (1985b:7).

(14) See Desai (1982a:11).

(15) About one fourth of the agreements studied by us had been renewed. See Alam (1985a:42).

(16) See Lall (1980:327).

(17) For a discussion of the disadvantages of the buy-back arrangement, see Gulati and Bansal (1980).

(18) See Desai (1980:91) and Alam (1984).

(19) Balasubrahmanian (1980:63).

(20) See Katrak (1984:16).

(21) For statistical source, see DST (1977, 1984).

(22) See Lall (1982:18).

(23) See Desai (1982b).

(24) See Alam (1985a).

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HUNGARY FOUNDS JOINT VENTURE CLUB

An intention of the Hungarian Chamber of Commerce is to fully safeguard the interests of joint ventures operating in Hungary. The Chamber creates the required circumstances even if the companies - or the contractors - cannot become full members of the body under the regulations. Two years ago the Chamber had the same approach towards small enterprises, economic co-operatives and civic rights companies, when, as a member of a club they were supplied information, exchanged views and discussed problems.

Recently the Joint Venture Club was founded for joint enterprises operating in Hungary. From year to year there is a steady growth in the spheres of production and services. The number of such companies registered has risen to over 50. The Club is not only open for existing joint enterprises, said Tamás Beck, President of the Hungarian Chamber of Commerce at the opening of the Club, but also welcomes companies planning to start relations with Hungarian firms. The services are also available to all members of the Chamber.

Although it has been possible to be partner to joint ventures in Hungary since 1970, capital flow into the country started in 1982. A considerable part of the joint ventures are trade, service and agencies, with less in the production area. Partly because of an initiative on the part of the Chamber, the monetary authorities in Hungary set as an objective the formulation of more than usually favourable terms to encourage the setting up of such ventures. In 1986 a new draft regulation package was outlined aimed at substantially simplifying the restrictions towards founding ventures. One of the committees of the Chamber is now working on how the regulations could be further improved. Surveys were also conducted to examine the possibility of joint ventures appearing on the market of other socialist countries. Ways of satisfying individual demands and requirements at an improved level are continuously sought by foreign partners. The conception of accessibility to all was declared by Dr. Péte Medgyessy, Deputy Minister of Finance when he stated that the government wished to make every effort to promote the integration of joint ventures into the economy. The new ventures are expected to bring about structural, technical and technological changes which facilitate the acceleration of reforms. It was quite possible, the Hungarian Deputy Minister of Finance stated, to found small banks with foreign capital share to assist in establishing the required infrastructure for the joint enterprises in operation. He said it was important for the government that apart from up-to-date technology, modern work organization and improved marketing methods be adopted by the domestic concern through the ventures. It would be most welcome to have more joint ventures in the services but in industry a high preference is given to production companies. For the companies entering into joint ventures in the preferred areas, tax exemption is granted for the first five years of existence and in the following five years tax rates are preferential. The minimum capital share fixed previously was further lowered, and foreign partners may now have shares in the ventures at less than 51 per cent.

The first meeting was considered to be of great importance by both the Hungarian and the foreign directors of the enterprises. The director of the first East-West joint venture, founded in 1974, said that its main company's (Siemens') successful business policy was proven to be working well when they chose the joint venture form. So far Siemens has entered into joint ventures in 139 countries, and the formation is considered the best for the marketing of their products. The capital of the Sicontact company for example was raised to 80 million forints from the initial 5 million, and turnover in 1985 exceeded 60 million forints. The founders are now planning production in a further two sectors.

The director of VAEV Bramac, an Austro-Hungarian joint enterprise launched with a 299 million forints initial capital, said that despite the decline of demand for construction material, they have steadily increased turnover.

Similarly, the general manager of the ATV-Ungaro Ltd., a British-Hungarian joint enterprise, founded almost a year ago, found that demand on the domestic market is satisfactory and added that in his opinion the food industry and chemical industry engineering would be a profitable sector in the long run in Hungary.

Besides the present 50 joint enterprises, the club has acquired several members willing to pay the 30 thousand forints entrance fee in order to obtain information. (Source: Hungarian Exporter, periodical of the Hungarian Chamber of Commerce, Vol. 36, No. 11, November 1986)

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ARGENTINA PLANS TO REGULATE TECHNOLOGY TRANSFER

The Commission for Science and Technology of the Chamber of Deputies of Argentina announced in February that it is examining a bill on the transfer of technology from abroad. The bill was drafted on the basis of proposals from members of the Commission. The Government believes that the transfer of technology must be regulated in an appropriate and co-ordinated manner because of the cost of royalties, copyright fees and licensing and technical fees under patent and trademark laws.

Data furnished by the Central Bank indicate that the outflow of funds for this purpose has increased appreciably over the last few years: from US$54 million in 1977 to almost US$500 million.

A new law is needed since past legislative efforts in this area in Argentina - the Licensing and Technology Transfer Act of 1971 (Law 19.231), which created a National Register for Agreements and Contracts, and the Technology Transfer Act of 1974 (Law 20.974), which reaffirmed the right of the Government to control the transfer of technology - were left in abeyance after 1976 by the previous government in its attempt to liberalize the economy.

The bill under examination would establish procedures by which a physical or legal person, in the public or private sector, who lives or maintains a residence in the country could acquire, from abroad, rights or licences under industrial patent law, technical know-how for the production of goods or services, engineering or consultancy services, or technical assistance.

The bill would create a system of technology transfer certificates, which would be issued through the administration of the national register for licensing and technology transfer agreements. This register would be based at the National Institute of Industrial Technologies. Furthermore, a National Commission for the Transfer of Technology would be created in the Secretariat of Industry and Foreign Trade. This commission would propose appropriate regulatory and policy initiatives to the executive branch, take decisions in cases which would be referred to it through the administration of the National Register or which it would consider pertinent, and fix tariff guidelines for the services which the administration of the National Register would offer in the certification and registration process for the transfers of technology carried out under the terms of the Law.

Government organizations and departments, independent or local government agencies, State-run enterprises, national banks, and State-controlled companies which seek to import technologies or know-how would have to fulfil certain requirements. They would have to carry out technical and economic analyses which list the foreign and domestic technologies available and the criteria used in the final selection - break down planned projects into areas of technology so that domestic goods, services and technologies could be included wherever possible - and, if the design or construction of factories or other building projects is involved, furnish, in the process of opening the projects to bids, detailed specifications of the desired technical products, sample copies of the contracts to be signed, and descriptions of the goods and services which would be acquired locally in whole or in part.

The absorption of the transferred technology would have to be guaranteed by the recipient organization by means of programmes for technological development and the training of personnel. Furthermore, the certification of outlays for the importation of technology for the public sector would be based on the nature, state-of-the-art and complexity of the technology and the benefits, according to the technical and economic analyses carried out, to be realized in the recipient organization and the economic and technological development of the country at large.

In several countries, the governmental regulation of the importation of technology has led to reductions in the direct and indirect costs of the transfer of technology, and, at the same time, improved the capacity of recipient organizations to negotiate attractive contracts and to absorb and adapt the technologies acquired. The bill, besides being designed to achieve these same objectives, would protect domestic industry and safeguard an independent capacity for development, lead to increased awareness of the flow of technology and supply and demand on the world market so that domestic technological development could be more successfully controlled, and avoid the acquisition of technologies which do not further economic and social progress in the country or which may be detrimental to the environment. (Source: IBIPRESS Bulletin, No. 116/2, 18 February 1987)

REGISTRY NEWS

Philippines - trade mark policy

The use of trade marks in association with transfer of technology agreements has been a subject of differing views, depending on the perspectives and objectives of the supplier, the recipient and Government of the host country.

Unquestionably, the trade mark is a crucial element of market dominance and we are investigating how developing countries approach this issue. We are doing this in the form of a questionnaire addressed to selected Transfer of Technology Offices, and we are glad to reprint the answers we received from the Technology Transfer Board of the Philippines.

(1) Do the users of foreign trade marks on products sold on the domestic market require the prior approval of any governmental authority in the country?

Contracts involving the licensing of the use or exploitation of trade marks are required to be registered with the Technology Transfer Board. Thus, to the extent that users of foreign trade marks on products sold in the domestic market have entered into formal licencing agreements, such agreements would need the approval of the Technology Transfer Board.

(2) Can existing companies in the country, with or without foreign equity participation, use foreign trade marks on domestic sales without the prior approval of any governmental authority in the country?

This is possible if the use of the foreign trade mark is done without the benefit of a licencing agreement. Otherwise, all contracts which license the use of foreign trade marks, whether or not the licencee has foreign equity even if it is used by a local licencee free of charge need to have the prior approval of the Technology Transfer Board.

(3) Are there any stipulations regarding the use of foreign trade marks on domestic sales when approving new licencing and other forms of technology agreements?

The following provisions should be included in the contract:

(a) That the law of the Philippines shall govern the interpretation of the contract; and

(b) A fixed term not exceeding five (5) years and no automatic renewal.

Restrictive business clauses shall not be allowed in any agreement; such as:

(a) Those which restrict the use of technology supplied after the expiry of the agreement (without prejudice to the application of the Philippine Patent Law);

(b) Those which require payments for patents and other industrial property rights after their expiration, termination or invalidation;

(c) Those which restrict the technology recipient from access to continued improvement in techniques and processes related to the technology involved during the period of the agreement even if the technology recipient is willing to make additional payments thereon;

(d) Those which provide patentable improvements made by the technology recipient shall be patented in the name of the technology supplier required to be exclusively assigned to the technology supplier; or required to be communicated to the technology supplier for its use, free of charge;

(e) Those which require the technology recipient not to contest the validity of any of the patents of the technology supplier;

(f) Those which restrict a non-exclusive technology recipient from obtaining patented or unpatented technology from other technology suppliers with regard to the sale or manufacture of competing products;

(g) Those which require the technology recipient to purchase its raw materials, components and equipment from the technology supplier or a person designated by him (except where it could be proven that the selling price is based on international market prices or the same price that the supplier charges third parties and there are no cheaper sources of supply);

(h) Those which restrict directly or indirectly the export of the products manufactured by the technology recipient under the agreement;

(i) Those which limit the scope, volume of production or the sale or resale prices of the products manufactured by the technology recipient;

(j) Those which limit the research activities of the technology recipient to improve the technology.

(4) If the use of foreign trade marks on the domestic market require the prior approval of any governmental authority, what are the parameters within which such use is permitted?

Agreements involving purely the use of foreign trade marks may only be allowed if it has proven substantial economic benefits such as: (a) significant contribution to the national export promotion programme "or" foreign exchange earning potential; and (b) employment generation. Royalty fees for the use of trade marks should not exceed 1 per cent of net sales.

(5) Are there any guidelines concerning the use of foreign trade marks on the domestic market?

Except for those which are stipulated in the Rules and Regulations of the Technology Transfer Board and which is also indicated in point number 4, there are no other existing guidelines concerning the use of foreign trade marks on the domestic market.

Re-organization of the Philippine Technology Transfer Board

One of the current thrusts of the Philippine Government is to make public service more accessible and responsive to the needs of the people by streamlining and simplifying existing structures of its various implementing arms.

In line with this thrust, Executive Order 133 Re-organizing the Department of Trade & Industry, and its Attached Agencies was promulgated on 27 February 1987. Under Section 18(h) of the Executive Order, the Technology Transfer Board (TTB) was abolished and its powers and functions were transferred to the Bureau of Patents, Trademarks & Technology Transfer. Under the re-organization scheme, a division to be known as the Technology Transfer Registry and to form part of the Bureau of Patents, Trademarks & Technology Transfer shall perform the functions previously undertaken by the Technology Transfer Board.

TECHNOLOGY ADVISORY SERVICES

Technological Advisory Services - TAS - How to benefit from the TAS programme -

As indicated in previous issues, the Transfer of Technology Programme Branch of UNIDO has for a number of years been operating a special programme designated Technological Advisory Services - TAS, aimed at providing rapid, objective and impartial advice to Governments and entrepreneurs of developing countries in the negotiation of the different types of technology contracts.

These services are designed to cover all relevant issues relating to technology acquisition through contractual arrangements, including the preparation of tender documents, assistance in the evaluation of proposals and selection of suppliers, preparation for negotiation, drafting of agreements and advice during negotiation.

TAS services can be provided from UNIDO Headquarters, as a desk service. This aspect of TAS is more appropriate in situations where the requesting party needs advice on specific contractual issues, for example, assessment of reasonable level of payments or review and advice on draft agreements under negotiation.

When complex negotiations are involved, e.g. in relation with major industrial projects, short-term field missions by appropriate staff members or a specialized consultant may be necessary.

The potential beneficiaries of the TAS programme should officially address their requests to UNIDO through their local UNDP office for the attention of the Transfer of Technology Programme Branch and with a reference to the TAS programme.

The requests, which do not require any special format, should indicate as clearly as possible the kind of problems encountered by the requesting organization as well as the inputs needed.

UNIDO operates the TAS programme in a business-like manner by using a pool of very competent experts or specialized staff, as appropriate. The services are provided in the shortest time possible and compatible with minimal administrative procedures.

In principle, and when field missions are required, the cost of services should be reimbursed to UNIDO. However, and subject to case-by-case

appraisal, UNIDO may cover such costs, totally or in part, through its own resources, e.g. the Special Industrial Services (SIS) fund, provided that the local UNDP office endorses the respective request.

The Transfer of Technology Programme Branch will gladly and promptly answer any additional requests for clarification that our readers may need in this connection.

TECHNOLOGY ACQUISITION

A brief review of transfer of technology in Greece

The following article was offered to the TIES Newsletter for publication by the Greek General Secretariat for Research and Technology (the Applications and Technology Division) which is part of the Ministry of Industry, Energy and Technology.

Transfer of technology - the Greek experience

Within the frame of a national policy for technological development, technology transfer is in a broader sense the basic parameter for this development. Before studying the various aspects of this policy the specific areas and actions which comprise a comprehensive and coherent policy in technology transfer are pointed out as follows:

1. Investments and technological research;
2. The cycle for successful technology transfer: selection/acquisition/absorption/adaptation/diffusion/improvement/development of new technologies;
3. Two forms of transfer:
   - International technology transfer over national borders;
   - Diffusion of technology from the university and research centres to industry.

Based on the above the following topics will be elaborated:

1. Transfer of technology through investment enhancement legislation;
2. Transfer of technology through research institutions - research to industry link;
3. Large-scale contracts;
4. Inventory of Greek know-how;
5. Transfer of technology through international co-operation.

1. Transfer of technology through investment enhancement legislation (special investments for high technology)

At the outset it should be said that for the promotion of investments the Greek Government passed significant legislation at various periods which includes a series of development enhancement laws incorporating investment incentives, such as Laws 289/1979, 1116/1981, 1262/1982 and 1360/1983.

For Laws 1262/1982 and 1360/1983 there is a standing advisory committee at the Ministry of National Economy with members drawn from several ministries and other State institutions (such as the Ministry of Industry-Energy-Technology, the Ministry of Agriculture, the Federation of Greek Industries, etc.).

It should be noted that under Article 16 of Law 1360/1983, special grants are given for high technology investments which may cover up to 30 per cent of the total cost. According to the figures recently gathered by the General Secretariat for Research and Technology, which makes an assessment on these investments based on various criteria such as technology standards, organizational structure of the company and the level of the products' penetration in the domestic and foreign market, the relevant applications for such grants have, in fact, doubled over the last two years.

It would be useful here to open a parenthesis and mention that high technology development in Greece was one of the basic aims set by the General Secretariat for Research and Technology (GSRT) from the outset of its establishment.

In this domain, the activities of the GSRT are multiple and implemented through the development and financing of both research projects and structures (in order to build up the necessary infrastructure).

In the high technology domain, application now essentially takes two directions. Firstly, the introduction of high technology to all levels of the production process and the simultaneous use of new materials that have appeared on the market. An introduction of robotics into the textile industry, a wide use of CAD-CAM, or more generally, the use of information technology at all production levels is nowadays considered to be a prerequisite in Greece.

Regarding the second direction, the development of new high technology products resulting from Greek R&D efforts and activities is regarded as a real need. In closing the parenthesis, it is emphasized that particular effort is made in order to plan corresponding activities, so that ultimately there is a positive balance on a cost/benefit analysis basis.

Although the general planning in this direction has progressed only so far as to pin-pointing areas where conditions for the development of high technology products are favourable in Greece (given the availability of investments, human potential, etc.), there is considerable activity on a case-by-case basis. The development of certain products for which high level specifications were imposed are favoured selectively in order to make them sufficiently competitive with those found on the international market. These products need not necessarily be of the highest possible technology but must have high value added.

As far as foreign investments are concerned and the re-exportation of foreign capital, Laws 4171/1961 and 2687/1953 are operative; for the latter, the investments are examined for royalties by a central committee at the Ministry of National Economy, based on a series of criteria:

- The percentage of duties requested to be exported;
- The percentage of exports from production resulting from the investment;
- The creation of jobs and value added; and
- The nature of the investment and its contribution to the overall industrial development of Greece.

In addition, Law 703/1977 is operative regarding the control of monopolies, oligopolies and the protection of competition in accordance with the EEC Competition Law which is monitored by the Ministry of Commerce, Department of Competition.

Some very general preliminary results are given below of a sample survey study which was conducted by the General Secretariat for Research and Technology concerning the trends, types and means of technology transfer in Greece by firms producing high technology products.

The sample was taken from those firms which had submitted investment proposals to the GSRT with the intention of obtaining the special grant accruing to those companies which produce high technology products under Law 1262/1982.

Of a total number of 86 applications, 29 were approved as producing high technology products.

The way the technology used by these firms was developed or transferred from abroad is shown in the following tables A and B.

Table A

No. of firms	With contract	Without contract	
		Greek know-how	Greek technology
29	13	11	5

Table B

No. of firms	Royalties		Lump-sum		Royalties +lump-sum		Joint venture	
	No.	%	No.	%	No.	%	No.	%
13	3	23	8	61.5	1	7.5	1	7.5

2. Transfer of technology through research institutions - research to industry link

In accordance with Law 1514/1985 "for the Enhancement and Development of Scientific and Technological Research" three new research centres/institutes have been established, all with new structures and organizations given by the new law and under the supervision of the General Secretariat for Research and Technology.

The academic centres are satellite institutions around the various regional universities in Greece (Patras, Thessaloniki, Crete). These are:

- The national research centres such as the National Centre for Physical Sciences "Democritos"; and
- The specialized centres according to industrial sector (metallurgy, textiles, marine technology, refractories/ceramics), and are called Industrial Research and Technology Development Companies.

Concerning the institutions (research centres and institutes) that fall under the supervision of GSRT, those existing before 1975 are very few, perhaps no more than four or five.

Since then, a number of other R&D institutions were set up both within and outside the old research centres, the structure and organization of most having been specified by the new law.

One must note that there is a difference in the goals of the R&D units established inside the universities and the R&D units established in the rest of the research centres. The academic research institutes and centres established in universities have an independent and private legal structure and are oriented towards applied and technological research, making use of the human scientific potential existing in the universities. Basic research is performed at some of the research centres, but generally the trend is to orient R&D activities towards meeting the needs of the country, in close collaboration with producers, units offering services, or users.

In Greece, R&D activity in production units, apart from a few cases, is practically non-existent. On the other hand, the Greek industrial scene is such that one finds small and medium-sized enterprises occupying 93 per cent of the total. These SMEs do not have the possibility to develop R&D activities and it was consequently considered imperative to develop R&D structures with purely applied and technological orientations.

On this basis, it was decided to create a network of technological centres in the form of private law companies. Part of the capital of these companies is owned by the GSRT as well as by other State organizations such as the Hellenic Organisation for Small- and Medium-Sized Enterprises and Handicrafts, part of which is owned by private companies of the technological branch concerned and interested in performing R&D activities and solving technological problems.

The idea is to set up an R&D unit for each technological branch, wherever the need is felt, to give it sufficient funding in order to set up its infrastructure and then to let it find the required operational financing by fulfilling the technolgical requirements of the branch. These technological companies have as their general goal the easing of transfer of technology towards enterprises, while at the same time offering technical/technological support. More particularly, these companies develop activities in:

(a) Undertaking technological research on problems concerning enterprises of the branch;

(b) Performing, in close collaboration with ELOT (the Greek Organisation for Standards), quality control of products and methods;

(c) Giving specialized technical services, information and advice where needed;

(d) Contributing, in close collaboration with ELOT, to standardising and setting up specifications for the products and methods related to the branch;

(e) Organizing and giving special technological training on demand; and

(f) Developing capabilities for the technological evaluation and assessment of R&D activities inside the fields these cover and systematically collecting information on the situation of the branch (existing enterprises, human potential, existing infrastructure and needs).

In addition a new programme was introduced since 1985 by GSRT which aims at the development of industrial research (PAVE). Realizing that the level of industrial research in Greece is very low (in fact the contribution of Greek industry to R&D activities is estimated to be about 15 per cent of the total), it was decided to promote R&D activities within industries and, if possible, in collaboration with Greek R&D units.

Although this programme was launched only a year ago Greece is now faced with an ever-increasing number of proposals leading to a considerable demand for allocation from the budget. As the industry must allocate 50 per cent of the funding of a project, it is felt that the development of such an activity fulfils a real need.

3. Contracts

It is fairly obvious that current Greek legislation on contractual technology transfer is incomplete and could be substantiated by more comprehensive measures and institutional mechanisms. The present weaknesses of the technology transfer cycle are however somewhat alleviated by the various specialized contracts or agreements signed by the large State organizations and institutions either as users of a specific technology or as investing institutions and who are furthermore the sole implementors of national technology transfer policy in Greece. Although the mechanism involved in drawing up and agreeing on the contracts to be signed is activated to a great extent by the interested (contracting) State institution, nevertheless the final word is given by the responsible Minister (be it the Minister of Industry, Energy and Technology or the Minister of National Defence, etc.), and always under the close supervision of the powerful Ministry of National Economy.

Briefly, within the past five years such contracts have been signed or drawn up by:

1. Public Power Corporation (Ministry of Industry, Energy and Technology) with:

(a) Munitions and Cartridges Company (PYRKAL) for the construction of metallic equipment (conveyor belts) with a group of FRG companies. The main objective is the opening of the technology package and its absorption by Greek engineering companies under the main contracting firm PYRKAL;

(b) Hellenic Aerospace Industry (EAB) for the construction of various types of wind generators.

2. Hellenic Industrial and Mining Investment Company S.A. (HIMIC) with:

(a) Foster Wheeler Italiana as the main contractor for the construction of a petrochemical plant and with specialized contracts with the engineering firm of particular units (CIB, Sim-Chem) as well as with the process licensors ICI and Union Carbide;

(b) Outokumpu OY (Finland) as the main contractor and technology licensor for the construction of a ferrochrome plant. A noteworthy point is that the ore processing plant was based on Greek know-how (National Technical University of Athens) and the construction on the expertise of HIMIC.

3. Hellenic Industrial Development Bank (ETVA) with:

(a) TEXHNOPROMEXPORT and the Greek Engineering company METEK S.A. for the construction of alumina production of lignite gas;

(b) Nitrogenous Fertilizers Industry S.a. and Czech firms for investing in the production of lignite gas.

4. Greek Oil Refineries of Aspropyrgos with Foster Wheeler Italiana for the establishment of a joint venture engineering company (Asprofos) for the construction of modernization projects of the refinery.

5. Ministry of National Defence with foreign suppliers of equipment either through specialized commissioning to Greek sub-contractors or through the method of off-setting.

6. Ministry of National Economy either through:

(a) State procurement mechanisms for the commissioning of a large part of construction projects to Greek companies (railway wagons - Hellenic Railways Organisation, transformers - Public Power Corporation); or

(b) Hellenic Organisation of Small- and Medium-Sized Enterprises and Handicrafts by forming joint venture companies (telephones - Hellenic Telecommunication Organisation) or the increased participation of Greek engineers in bilateral agreements for the procurement of equipment (hospital equipment from Greek-Hungarian co-operation).

In summary it may be said that even though efforts are being made to open the technology package and increase Greek added value by contracting steadily more and more to Greek companies, there are various Greek institutions with various mechanisms (direct contracts, public procurement) that overcome the weaknesses and deficiencies of current legislation and do implement transfer of technology.

4. Registry of Greek know-how

The registration of Greek know-how is a completely new effort by the General Secretariat for Research and Technology in order to acquire complete information about the Greek technological infrastructure.

If one can grasp what the Greek technological capabilities are and if one can further proceed to their registration this would greatly contribute towards the formation of a technological policy workable not only at a national level but at the international one as well.

Taking into account the international experience in this field, the pilot phase of the Greek know-how registration has already begun by approaching selected industrial sectors, such as the Greek oil refineries.

The tasks were the following:

(a) The registration of Greek engineering and design firms which have the ability to offer organized technological services in each industrial sector, not only in Greece, but abroad;

(b) The registration of constructors and subconstructors who may be used for the implementation of a new technical change. The co-operation between the General Secretariat for Research and Technology and Industry is necessary for the collection of information on the scope of production primarily regarding a data base of Greek technological capacity and secondarily for the purpose of lists to be widely circulated in order to demonstrate and promote Greek engineering and construction firms, thereby contributing to their further development and the acquisition of experience.

5. Transfer of technology through international co-operation

Transfer of technology through international co-operation is a domain in which Greece has tried to develop an important activity because:

(a) It is an invaluable source of information at all levels;

(b) A great many possibilities and opportunities are opened through mutual contracts, interaction, and working together on joint projects on both the scientific and technological levels;

(c) It is a considerable source of funding for R&D activities in Greece; and

(d) It is, however strange it may seem, a very efficient means of bringing R&D units and industry together.

Greece's participation in EEC research projects has recently increased very rapidly, although not at a level the country considers satisfactory. Efforts have proven fruitful, even within the frame of high-technology programmes such as BRITE, ESPRIT and RACE. Certainly BRITE is the most popular Community programme in Greece.

In spite of the difficulties Greece has encountered with the ESPRIT and EUREKA programmes the country is actively participating in these to the extent possible. Besides the EEC activities, agreements of bilateral collaboration have been signed with 16 countries. While at first Greece had simply sought to establish contacts between national scientists and engineers with corresponding scientific and technical personnel abroad, gradually, through co-operation, the country has become oriented towards the joint development of specific technological projects. Likewise, the bilateral contacts have been oriented towards obtaining support for Greek projects and programmes. Finally, bilateral contacts have proved to be very useful in promoting Greek participation in international research projects.

The lack of infrastructure in several areas has been mentioned earlier. Patents, standardization and quality control have only recently been established and developed in Greece.

In 1986 Greece was accepted as a member of the European Patent Office and already a small department for patents (20 persons) is working in Greece. The law that will set up the legislative framework for patents is now being prepared and will be brought before the Greek Parliament soon.

LEGISLATION

China publishes long-awaited Foreign Economic Contract Law

The following is the text of the contract law that foreign companies have been awaiting for some time.

Foreign Economic Contract Law of the People's Republic of China

(Adopted at the Tenth Session of the Standing Committee of the National People's Congress on March 21, 1985)

Chapter I. General Provisions

Article 1. The Law is enacted with a view to protecting the lawful rights and interests of the concerned parties to foreign economic contracts and promoting the development of China's foreign economic relations.

Article 2. This Law applies to economic or trade contracts (hereinafter referred to as Contracts), but exclusive of international transport contracts, concluded between enterprises or other economic organizations of the People's Republic of China and foreign enterprises and other economic organizations or individuals.

Article 3. Contracts should be made in conformity with the principles of equality and mutual benefit, and of achieving unanimity through consultations.

Article 4. Contracts must be made in accordance with the law of the People's Republic of China and should not be prejudicial to the public interests of society of the People's Republic of China.

Article 5. The parties to a foreign trade contract may choose the law applicable to the settlement of disputes arising over the contract. In the absence of such a choice by the parties concerned, the law of the country which has the closest connection with the contract applies.

The equity or contractual joint venture contracts and the contracts of co-operative exploration and development of natural resources which are performed within the territory of the People's Republic of China must be governed by the law of the People's Republic of China.

In case no relevant provision is stipulated in the law of the People's Republic of China, international practice may apply.

Article 6. When a provision in a certain international treaty, which the People's Republic of China has concluded or participated in, concerning contracts, is different from those stipulated in the law of the People's Republic of China, the provision of the international treaty applies, with the exception of clauses that the People's Republic of China has publicly stated its reservation.

Chapter II. Formation of Contract

Article 7. A contract is established when the terms of the contract are agreed upon in writing and signed by the parties to it. However, where an agreement is reached through correspondence by mail, cable or telex and one party requests that a confirmation letter be signed, the contract is established when the confirmation letter is signed.

Contracts subject to approval by the State as stipulated by the law or administrative regulations of the People's Republic of China shall be established only when the approval is granted.

Article 8. All appendices stipulated in a contract are an integral part of that contract.

Article 9. Contracts that violate the law or the public interests of the People's Republic of China are invalid.

In case where provisions of a contract are found to be inconsistent with the law or the public interests of the People's Republic of China, the validity of the contract is not derogated after the said provisions are nullified or revised through consultations by the parties to the contract.

Article 10. Contracts concluded by means of fraud or under duress are invalid.

Article 11. The party who is responsible for the invalidity of the contract is obligated to pay the other party concerned a sum equal to the loss arising from the invalidation of the contract.

Article 12. In general, the following terms should be included in a contract:

(1) Name and address, nationality, place of business or domicile of the parties;

(2) Date and place where the contract is signed;

(3) Type of contract, and the kind and scope of the subject matter of the contract;

(4) Technical conditions, quality, standard, specifications and quality of the subject matter of the contract;

(5) Time limit, place and method of performance;

(6) Terms on price, amount and way of payment and various incidental expenses;

(7) Whether the contract can be assigned of the terms and conditions for assignment;

(8) Damages and other liabilities for breach of contract;

(9) Ways for settlement of disputes when disputes arise over contract;

(10) Language to be used in the contract and its effectiveness.

Article 13. The limits of risks borne by each party for the subject matter to be performed should be specified in the contract depending on the situation, and the range of insurance for the subject matter should also be specified when necessary.

Article 14. With regard to a contract that needs to be performed continuously over a rather long period, the parties shall set the time limit for the contract, and conditions for extending or terminating the contract before expiration.

Article 15. A guarantee clause may be agreed upon by the parties in the contract. The guarantor assumes the liability within the agreed scope of guarantee.

Chapter III. Performance of Contract and Liabilities for Breach of Contract

Article 16. Once established in accordance with law, a contract is legally binding. The parties should fulfill all obligations stipulated in the contract. No party should arbitrarily alter or terminate the contract.

Article 17. A party may suspend performance of his obligations when it is proved by conclusive evidence that the other party cannot perform his obligations accordingly, but in so doing the other party must be promptly notified. When the other party provides full guarantee for performing his obligations, contract performance shall be resumed. A party who suspends his performance without furnishing conclusive evidence should assume the liability for breach of contract.

Article 18. When a party fails to perform, or his performance does not conform to the agreed contractual obligations, namely, the contract is breached, the other party is entitled to ask the party in default to adopt reasonable remedial measures or claim for damages. If the losses suffered by the other party are not paid in full after the remedial measures are taken, that other party retains the right to claim for damages.

Article 19. Damages for breach of contract by a party consist of a sum equal to the loss suffered by the other party as a consequence of the breach. However, the damages may not exceed the loss which the party in breach ought to have foreseen at the time of the conclusion of the contract as a possible consequence of breach of the contract.

Article 20. The parties may agree upon in a contract that a certain amount of liquidated damages shall be paid to the other party if one party violates the contractual obligations, and may also agree upon a method for calculating the damages arising over such a breach of contract.

The liquidated damages shall be regarded as damages caused by a breach of contract. However, if the fixed amount of the liquidated damages is substantially more or substantially less than the resultant loss, the parties may request a court or arbitration agency to have it appropriately lowered or increased.

Article 21. In case both parties are in breach of the contract, both parties shall bear the relevant losses in accordance with the responsibilities due to them.

Article 22. A party who suffers a loss arising from a breach of contract by the other party should take appropriate measures in time to prevent the loss from aggravating. If he fails to take such measures and consequently aggravation of the loss results, he shall lose the right to claim damages for the aggravated part of the loss.

Article 23. If a party fails to pay at the appointed time the amount agreed upon in the contract or any other amount related to the contract that should have been paid, the other party is entitled to payment of principal plus interest for the delay. The rate of interest and how it should be calculated may be specified in the contract.

Article 24. A party should be exempted from his obligations in whole or in part in case he fails to implement all or part of his obligations as a result of force majeure.

In case a party cannot perform his obligations within the time limit set in the contract due to force majeure, he should be relieved of the liability for late performance for the period during which the consequence of the force majeure is being felt.

Force majeure means an event which the parties cannot foresee at the time of conclusion of the contract and whose occurrence or consequences the parties can neither avoid nor overcome.

The range of force majeure may be specified in the contract by the parties.

Article 25. The party who fails to perform, in whole or in part, the contract due to force majeure should inform the other party promptly so as to mitigate the loss which might possibly arise. The former should also furnish the latter, within a reasonable period of time, some documentation issued by the relevant authorities to that effect.

Chapter IV. Assignment of Contract

Article 26. In case a party assigns, in part or in whole, his contractual rights and obligations to a third party, he should obtain the consent of the other party.

Article 27. As for a contract which, as provided by the law or administrative regulations of the People's Republic of China, should be established only after approval has been obtained from the State, the assignment of the contractual rights and obligations is also subject to the approval of the original approval authorities, unless otherwise stipulated in the approved contract.

Chapter V. Modification, Cancellation and Termination of Contract

Article 28. A contract may be modified after agreement on its modification has been reached through consultations by the parties concerned.

Article 29. A party is entitled to inform the other party to cancel a contract if any of the following situations occurs:

(1) When the expected economic interests are seriously infringed upon for breach of contract by the other party;

(2) When the other party, who fails to perform the contract within the stipulated time limit, again fails to do so within a reasonable period of time allowed to make up for the delay;

(3) When the contract cannot be performed in its entirety due to the occurrence of force majeure;

(4) When the conditions stipulated in a contract for cancellation have occurred.

Article 30. Where a contract is made up of several independent parts and part of which may be cancelled, the other parts shall, according to the stipulations of the previous article, remain effective.

Article 31. A contract is terminated if any of the following situations occurs:

(1) When the contract has been performed in accordance with the conditions stipulated in it;

(2) When the arbitration tribunal or the court decides to terminate the contract;

(3) When termination is agreed upon by both parties through consultations.

Article 32. Notification of or agreement on a contract's modification or termination should be made in writing.

Article 33. As for a contract which, as stipulated by the law or administrative regulations of the People's Republic of China, should be established only after having been approved by the State, no significant modification can be made unless prior approval is obtained from the original approval authorities; its termination should be filed with the original approval authorities.

Article 34. A party to a contract is not deprived of his right to claim damages in case of modification, cancellation or termination of the contract.

Article 35. Any provision for the settlement of disputes stipulated in a contract shall not become invalid because of the termination or cancellation of the contract.

Article 36. Any provision for settlement of accounts or winding up of operations stipulated in a contract shall remain effective in spite of the cancellation or termination of the contract.

Chapter VI. Settlement of Disputes

Article 37. Disputes arising over a contract ought to be settled, if possible, through consultations or mediation by a third party.

In case the parties concerned are not willing to, or fail to, go through consultations or mediation, they may submit to China's arbitration agency or other arbitration agency in accordance with the arbitration agreement reached afterwards.

Article 38. In cases where an arbitration clause has not been stipulated in a contract or an arbitration agreement has not been made afterwards, the parties may take their case to a people's court.

Chapter VII. Supplementary Provisions

Article 39. The prescription allowed for lodging a lawsuit or submitting to arbitration on disputes arising over a contract on sales of goods is of four years, beginning from the day when the party knows or ought to know that his rights have been infringed upon.

The prescription for lodging a lawsuit or submitting to arbitration on disputes arising over other kinds of contracts shall be stipulated separately by law.

Article 40. When new relevant provisions are stipulated by law, the Sino-foreign equity or contractual joint venture contracts and the contract of co-operative exploration and development of natural sources which are approved by the State and performed within the territory of the People's Republic of China may still be performed on the basis of the original contract.

Article 41. This present law may also apply to contracts established before its promulgation, subject to agreement between the parties to the contract concerned through consultations.

Article 42. Rules for the implementation will be formulated by the State Council in accordance with this Law.

Article 43. This Law shall go into force on 1 July 1985. (Source: China Economic News, 1985, No. 12)

MEETINGS

15-18 June	Meeting for the promotion of Joint Venture among Islamic Countries in Selected Less Developed Islamic Countries	Istanbul Turkey

22-24 June	Consultative Meeting on the development of the Industrial Sector of Senegal	Vienna, VIC Conf. Rm. II
22-26 June	UNIDO/UNDP Workshop on the Planning, Design and Construction of Mini Hydro-power Plants	Vienna, VIC Conf. Rms. III, VII, CO727, CO713/15
22-26 June	Workshop on Hazardous Materials/Waste Management, Industrial Safety in Chemical Industry and Emergency Planning: Guidelines for Governments and Industries - A Plan of Action for UNIDO	Vienna Conf. Rm. I
20 July - 14 August	United Nations Commission on International Trade Law, 20th session	Vienna, VIC Board Room
3-7 August	International Symposium on Sucro-based Chemicals Production	Manila Philippines
7-9 Sept.	8?' Workshop for heads of INTIB sub-network members in Africa on the ways and means of co-operation	Dakar Senegal
14-19 Sept.	Second Consultation on the Training of Industrial Manpower	Paris France

RECENT PUBLICATIONS

ID/346
Third Consultation on the Agricultural Machinery Industry. Belgrade, Yugoslavia, 29 September - 3 October 1986. Report

Workshop on the Establishment of a Consultative Group on Solar Energy Research and Applications (COSERA)
Vienna, Austria, 8-10 December 1986

ID/WG.464/1
Establishment of COSERA: issue paper

ID/WG.464/2
State of the art of research and development of solar energy technologies in India

ID/WG.464/3
Solar energy in Latin America

ID/WG.464/4
Report

Third Consultation on the Pharmaceutical Industry
Madrid, Spain, 5-9 October 1987

ID/WG.466/1(SPEC.)
Directory of sources of supply of pharmaceutical chemicals, intermediates, some raw materials and biologicals - based on WHO model list of essential drugs

ID/WG.466/2(SPEC.)
Items which could be included in contractual arrangements for the setting up of a turn-key plant for the production of pharmaceutical dosage forms

ID/WG.466/3(SPEC.)
Items which could be included in contractual arrangements for the setting up of a turn-key plant for the production of bulk drugs (pharmaceutical chemicals) or intermediates included in *UNDIO* list

ID/WG.466/4(SPEC.)
Items which could be included in contractual arrangements for technical assistance for the formulation of pharmaceutical dosage forms

ID/WG.466/5(SPEC.)
Contractual arrangements for the production of pharmaceutical chemicals or intermediates and pharmaceutical formulations

ID/SER.N/4
Small hydropower series No. 4. Guidelines for the application of small hydraulic turbines (ISSN 0256-727X)

First Consultation on the Fisheries Industry
Gdansk, Poland, 1-5 June 1987

ID/WG.467/1
Issue paper 1. Improvement and modernization of boats and fishing equipment to increase productivity and efficiency

ID/WG.467/2
Issue paper No. 2. Improvement of the fish production chain and the increase of added value

ID/WG.467/3
Report of fishery activities in the developing countries of Africa, Asia and Latin America and the Caribbean

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		019	☐	Precision instruments	032	☐	Transfer of technology (licensing)
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