

International Technology Transfer to India an Impedimenta & Impetuous

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Abstract

Technology transfer is an important means by which developing countries gain access to technologies that are new to them. Most technology transfer has between developed and developing countries through commercial technology transfers by the private sector. These include transfers through foreign direct investment, foreign licensing, turnkey projects, technical consultancy, capital goods acquisition, international subcontracting and joint ventures. By opening of the Indian economy (LPG policies-1991), several Indian companies are poised for different types of financial, technical and other forms of collaborations. Though they enter with proper technology transfer agreements, some are not successful with different reasons. Government of India's Ministry of Scientific and Industrial Research is playing a vital role through its technology transfer policy in both inward and outwards technology transfers to the Indian companies through automatic route and some are through project approval board (PAB). The ability of the country to use technology transfers to develop their domestic capabilities to reap the social and economic benefits have been very mixed. This paper explores the important issues involved in the technology transfer besides the scope of technology transfer disputes and the promotion and regulation of technology transfer in India.

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International Technology Transfers to India an Impedimenta & Impetuous

I. Introduction

Internationalization of technologies and production is becoming a common phenomenon for attaining and retaining the global competitiveness. Technology is an important ingredient of the development mix and an important aspect of the international economic gap is the technological gap. While technological backwardness and a slow pace of technological progress generally characterize the developing countries, the advanced countries boast a rich stock of technology and fast technological progress. Technology transfer is the term used to describe the processes by which technological knowledge moves within or between organizations. International technology transfer refers to the way in which this occurs between countries. Transfer of technology from the developed to the developing countries, there, is a necessary measure to speed up the pace of the economic development and modernization process in the low developing countries (LDCs).

Indeed, transfer of technology to developing countries is a major area of concern in the discussions on the establishment of a New International Economic Order (NIEO). It is given so much importance that there is a talk of building a New International Technological Order (NITO) as an integral part of the NIEO.

The transferred technological knowledge was in various forms. It can embodied in goods (including physical goods, plant and animal organisms), services and people, and organizational arrangements, or codified in blueprints, designs, technical documents, and the content of innumerable types of training.

All these forms of knowledge may vary in a further important way. At one end of the spectrum, the transfer involved can be concerned with the knowledge for using and operating technology. At the other end, it can be concerned with the knowledge necessary for changing technology and innovating. In between, transferred knowledge may involve the many different kinds of design and engineering knowledge required to replicate and modify technologies.

Technology transfer is an important means by which developing countries gain access to technologies that are new to them. For example, the acquisition of foreign technologies by East Asian newly industrialized countries, coupled with domestic 'technological learning' — efforts to accumulate the capability to change technologies — have been key factors in their rapid technological and economic development. Most countries are important to transfer their technology due to its inherent strengths of huge market, high

middle-income group people, and easily adoptable nature of the consumer besides cheap labour and availability of technically qualified human capital.

II. Channels for Flow of Technology

Most technology transfer has between developed and developing countries through commercial technology transfers by the private sector. These include transfers through foreign direct investment, foreign licensing, turnkey projects, technical consultancy, capital goods acquisition, international subcontracting and joint ventures.

Foreign Direct investment: Commercial transfers — especially those associated with foreign direct investment — are commonly thought to work by first transferring technology to an initial organization, usually a multinational subsidiary, and then further diffusing it to other firms in the local economy through knowledge 'spillovers' — involuntary leaks or intended exchanges of useful technological knowledge. However, the significance of spillovers, and the conditions under which they take place, is still a matter of debate.

Reverse Engineering: Technology transfers can also occur informally through, for example, 'reverse engineering', where learning how to design a product is achieved by taking an existing product to pieces and analyzing its parts. Informal technology transfer also takes place by moving skilled personnel from one country or organization to another, consulting trade journals and technical papers in international journals and participating in seminars, conferences and trade fairs.

The main drivers in these types of technology transfer tend to be acquirers that take an active role in searching, identifying and obtaining available knowledge, without relying on assistance from the sources of that knowledge.

Non-commercial Channels: A third way of transferring technology to developing countries is through non-commercial channels, including initiatives and development projects taken by international organizations, developed-country governments and aid agencies and nongovernmental organizations.

For example, international research centers like the Consultative Group on International Agricultural Research centers transfer technologies to local research institutes, farmers

and firms in developing countries. Development agencies in industrialized nations can also help finance training, equipment purchase etc.

Technology License Agreements and Joint Ventures: Technology transfer has been taking place on a significant scale through licensing agreements and joint ventures. There has been a rapid growth of joint ventures, encouraged by Government restrictions on foreign investment and foreign trade or the perceived advantages of such ventures. When foreign capital participation in joint ventures is below 50 per cent, technological agreements assume considerable significance.

Moreover, international technology transfer can be distinguished between horizontal and vertical transfers. [1] Horizontal technology transfer consists of the movement of an established technology from one operational environment to another (for instance from one company to another).

Vertical technology transfer, in contrast, refers to the transmission of new technologies from their generation during research and development activities in science and technology organizations, for instance, to application in the industrial and agricultural sectors.

III. Technology Transfers in India

Government of India's Technology Transfer policy:

For promoting technological capability and competitiveness of the Indian industry, acquisition of foreign technology is encouraged through foreign technology collaboration agreements. Induction of knowledge through such collaborations has permitted either through automatic route or with prior Government approval.

Scope of Technology Collaboration:

The terms of payment under foreign technology collaboration, which are eligible for approval through the automatic route and by the Government approval route, includes technical know how fees, payment for design and drawing, payment for engineering service and royalty.

Payments for hiring of foreign technicians, deputation of Indian technicians aboard, and testing of indigenous raw material, products, and indigenously developed technology in

foreign countries has governed by separate RBI procedures and rules pertaining to current account transactions and are not covered by the foreign technology collaboration approval.

Automatic Route: Payment for foreign technology coloration by Indian companies are allowed under the automatic route subject to the following limits:

- The lump sum payments not exceeding US\$2 million
- Royalty payable being limited to 5 per cent for domestic sales and 8 per cent for exports, without any restriction on the duration of the royalty payments.

Authorized dealers appointed by the Reserve bank of India (RBI) allow remittances for royalty payment of lump-sum fee and remittance for use of Trademark/Franchise in India within the limits prescribed under the automatic route. RBI's prior approval is required for remittance towards purchase of trade mark/franchise.

Government Approval – Project Approval Board (PAB): Royalty payment in the following cases requires prior Government approval (through PAB when only technical collaboration is proposed and FIPB where both financial & technical collaboration are proposed):

- a) Sectors/activities which are not on the automatic route for FDI, or
- b) Proposals not meeting any of the parameters for automatic approval

Proposals for foreign technology transfer/collaboration not covered under the automatic route shall considered by the PAB in the department of Industrial Policy and Promotion. Application in such cases has submitted in Form FC-IL to the secretary for industrial Assistance.

Growth in Foreign Technology Transfers in India:

Table –I

Details of No. of Cumulative Foreign Technology transfer Approvals from 1991 - 2007

Period	No. of Approvals
No. of Cumulative Foreign Technical collaborations (FTC) approvals (from August 1991 to August 2007)	7,886
No. of FTC approvals during 2006-07 (from April 2006 to March 2007)	81
No. of FTC approvals during 2007-08 (from April to August 2007)	40

Source: Department of Industrial Policy & Promotion, Ministry of Commerce & industry, Government of India.

Basing on the liberalized policies started in the year 1991 the growth in technology transfers are increases year after year. The government of India has simplified the rules and allowed the foreign technology basing on the need and its effect on the society and environment at a large. However, there is some delay in approvals but the Govt. of India has given permission to 7,886 approvals since the last 16 years. Table-I gives the details of these technology transfers since 1991 to August 2007. Table-II elaborates the details of No. of technical collaborations approved from different countries and its percentages in the total technical approvals. USA stands first position in providing technology to India with 1750 approvals since 1991. Table III in the following page explains the sector wise technology transfers out of the total technology transfer approvals. Electrical equipment including computer hardware and software sector made highest technology transfers i.e.1, 253 technology transfer agreements concluded from the rest of the world over a period of 16 years (1991 August –August 2007)

Table II**Details of Country-Wise Technology Transfer Approvals
from 1991 to 2007 (Aug)**

Ranks	Name of the country	No. of Technical Collaborations approved	Percentage with total technical approvals
1	U.S.A	1,750	22.19
2	Germany	1,103	13.99
3	Japan	861	10.92
4	U.K	856	10.85
5	Italy	484	6.14
6	Other Countries	2,832	35.91
Total of all Countries		7,886	100.00

Source: Department of Industrial Policy & Promotion, Ministry of Commerce & industry, Government of India.

Table III**Details of Sector-Wise Technology Transfer Approvals from 1991-2007(Aug)**

Ranks	Sector	No. of Technical Collaborations approved	Percentage with total technical approvals
1.	Electrical Equipments (including computer software & electronics)	1,253	15.89
2	Chemicals (other than fertilizers)	883	11.20
3	Industrial Machinery	869	11.02
4	Transportation Industry	730	9.26
5	Misc. Mechanical Engineering Industry	441	5.59
6	Other sectors	3,710	47.04
Total of all Sectors		7,886	100.00

Source: Department of Industrial Policy & Promotion, Ministry of Commerce & industry, Government of India.

IV. Important Issues Associated with the Transfer of Technology

“The availability of a pool of scientific and technical know-how, tested, tried and perfected in the advanced countries”, has seen as a distinct advantage that LDCs of today enjoy over those of the past. However, there is now a growing view that the transfer of technology from the developed to the developing countries does not sufficiently conform to the real needs and interests of the latter.

Cost, appropriateness, dependence and obsolescence are the four important issues associated with the transfer of technology.

In many cases, the developing countries obtain foreign technology at unreasonably high prices. In a number of cases of foreign direct investment associated with technology transfer, the net outflow of capital by way of dividends, interest, royalties and technical fees are much higher than the corresponding inflow.

The appropriateness of the foreign technology to the physical, economic and social conditions of the developing countries is an important aspect considered in technology transfer. There is a large no. of cases where the foreign technology transferred has been irrelevant or inappropriate to the recipient country’s social-economic priorities and conditions.

Further, heavy reliance on foreign technology may lead to technological dependence. The import of modern sophisticated technology has tended to displace the traditional indigenous technology that has improved under a different set of policies. The steady stream of new products and processes introduced by multinationals into developing countries has been unfavorable to the promotion of domestic technological capacities and has discouraged local scientists and technicians from devoting themselves to practical development problems. It creates an attitude of subservient dependence, which may inhibit the capacity to do even relatively minor adaptive research or to adopt processes, which can develop locally.

It has identified that there is a tendency to transfer outdated technology to the developing countries. Thus, they would not enjoy the advantages of the latest technology and would still technologically lag behind. It is unfortunate that the owners of modern technology

view the developing countries as a means to salvage technology that is obsolescent in the advanced countries, even when they possess technology that is more advanced.

V. Disputes in Technology Transfers

However, initial care has taken in choosing the partner/company; there are various reasons for raising the disputes while implementing the collaboration agreements. Ministry of Science and Industrial research, Govt. of India conducted a study on “Disputes in Technology Transfer Agreements – case studies” and given suggestions to companies while entering technology transfer agreements (Executive summary of the study is in Appendix-1)

The following are some of areas where the general disputes will arise.

- Disputes arise because of differentiation in interpretation of different clauses of the agreement.
- At least one party must unable to operate the some part of the agreement due to any reason.
- Deliberately come out of the agreement by one party (some times it is happen when the license company is taken over by another company, those are not interested and or their philosophy is different – otherwise it is rarely happen)
- Disputes relating payment of royalty and fees
- Delay in completion of the projects
- Passing of unapproved technology
- Technology up gradation and incomplete data and drawings
- Licensor is competing with licensee with the latest models in India
- After sales service and backup
- Intellectual Property Rights (IPR) issues like of trade mark
- Quality and cost of production,
- Delay and supply of inferior raw materials and components

Various studies have given suggestions to take proper steps before entering into the technology transfer agreements. A case study developed by Vijaya kumar & Jyothi S A

Bhat on transfer of technology in SME sector, Biswajit Dhar, C.Niranjan Rao on Indian pharmaceutical industry, Baroni P Guida & G.Mussi on technology transfer in knowledge based systems besides Karel Dakin studies on single time technology transfer has given a great insights and new developments in technology transfer.

VI. Promotion and Regulation of Technology Transfer in India

Despite the problems or shortcomings of foreign technology, it is widely recognized that has properly regulated and promoted it can play a positive role, particularly in the technologically backward countries. The Government of India has taken a number of regulatory and promotional measures to take advantage of foreign technology without sacrificing national interests.

Regulation

A number of regulatory measures have taken by different countries to ensure that the technology chosen is the best available, appropriate to domestic conditions and that indiscriminate and unnecessary import of foreign technology is not undertaken. The following are the aspects of technology commonly regulated.

The extent and terms of Equity Participation: These are in generally determined by the priorities of the technology-using industry in the nation's economy, supply conditions of the technology and its type and nature. The Government of India's policy towards foreign capital and technology broadly classified industries into three categories, namely, industries where both foreign equity and technology has allowed, industries where only foreign technology has allowed and industries where neither foreign equity nor technology has allowed. Foreign equity has normally allowed only in high priority, high technology and export oriented industries. Foreign equity participation was normally limited to 40 percent, though in certain cases like export-oriented industries, a larger participation has permitted. There has been considerable liberalization in the 1990s.

Phasing of Domestic Manufacturing: Government of India, insisted upon indigenization on a phased manner as and when the foreign technology has employed. The Government of India, in the past also insisted that suitable provisions made for training of Indians in the field of production and management. Further, there should be adequate arrangements

for research and development, engineering design, training of technical personnel and other measures for the absorption, adaptation and development of the imported technology.

The Appropriateness of the Technology: Permission to import a particular technology has generally based on considerations such as suitability of the technology to the socio-economic and ecological conditions in the country and the priority of the technology using industry in the national economy. According to the guidelines issued by the Government of India, the entrepreneurs should, to the fullest extent possible, explore alternative sources of technology, evaluate them for a techno-economic point of view and furnish reasons for preferring the particular technology and source of import.

Payment terms and foreign Exchange Outflow: Government take measures to ensure that disproportionately high payments have not paid for any technology. Restrictions were imposed also on dividend payments and pricing. The Government of India's guidelines clearly laid down that there should be no requirement for the payment of minimum guaranteed royalty, regardless of the quantum and value of production. Royalty payments were subject to restrictions in terms of amount and period of payment, besides being subject to Indian tax laws.

Promotional Measures

To take full advantage of the positive role of foreign technology, it is necessary to take certain promotional measures. These include:

- Assessing technological requirements of various sectors and identifying areas where foreign technology is required.
- Dissemination of information in foreign countries regarding foreign investment potentials and scope for technical collaboration in the domestic economy, government policy and regulation in respect of foreign capital and technology, institutional assistance and infrastructural and other facilities for industrial development. The Indian investment centre, established in 1961, has been playing such a role.
- Government has to provide advisory services to Indian entrepreneurs, in respect of foreign technology including the techniques and process of technology transfers.

VII. Conclusion

At the international level, technology transfer has becoming increasingly drawn into political negotiations between developed and developing countries, particularly those involving international agreements on trade and environment-related issues. Provisions on technology transfer, for example, form an important part in several multilateral agreements, such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO) and the United Nations Framework Convention on Climate Change (UNFCCC), as well as in regional and bilateral agreements.

Technology transfer issues at this level are tend to be restricted to defining the rules of the game under which transfers take place, and establishing general agreement to support technology transfer to developing countries. Such agreements tend has to be expressed in provisions in international agreements, and not deal either with implementation issues, or with details about the transfer and mastery of technologies at the level of the company or other organization.

Policies adopted by developed countries for stimulating the transfer of technologies to developing countries are also becoming increasingly relevant. This is because international policies on trade and environment issues often require such countries to create incentives for the transfer of technologies to developing countries. In addition, as indicated above, technology transfer is a key objective of many official development assistance or aid policies.

In this context, several developed countries provide incentives for their companies and organizations to transfer technologies to developing countries. Such incentives include financing and training, as well as the support of partnerships between companies and organizations in developing countries, and potential sources of technologies. However, there is an ongoing discussion about the effectiveness of existing measures. Some analysts, for example, point out that existing incentives are selective and have limited coverage, and that few such programmes are centrally concerned with technology transfers.

With regard to the policies of developing countries themselves, it is widely accepted that their purpose should be to maximize the gains from technology transfer while limiting its shortcomings. However, the new international policies on trade — such as those adopted by the WTO — appear to be ambivalent in this respect.

Some aspects of the WTO regime, such as the Trade Related Investment Measures (TRIMS), can constrain the ability of acquiring countries' governments to act by excluding the use of certain interventions. For example, they do not allow enforcement of performance requirements on multinational corporations.

However, the WTO regime does not rule out all types of interventions. In particular, measures to support training, human resources development and research & development have permitted. For developing countries, therefore, a key question is how to exploit the scope left for pro-active policies that can create the conditions under which technology transfer can be most beneficial. This is particularly relevant in a context of global trade liberalization, and of the new international rules that govern this process.

However the ability of developing countries to use technology transfers to develop their domestic capabilities, allowing such countries to reap the social and economic benefits of existing technologies, have been very mixed. Moreover, there are wide variations not only between countries, but also between sectors within individual countries.

Scope for further study: There are various studies of technology transfer in manufacturing industry including case studies, but very little study on the issues of technology transfers in service industry like software development, I.T and ITES areas.

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UNCTAD has surveyed 41 agencies and programmes in 23 developed countries that offer incentives that directly or indirectly facilitate technology transfer to developing countries. These measures include financing support, training, matching services, partnerships, alliances and support for equipment purchase or licensing. See UNCTAD (2004) *Facilitating Transfer of Technology to Developing Countries: A Survey of Home-Country Measures*, UNCTAD, Geneva. www.unctad.org/en/docs/iteipc20045_en.pdf

Appendix-1 Executive Summary of the Department of Scientific and Industrial Research, Government of India's study on "Disputes in Technology Transfer Agreements – Case Studies"

INTRODUCTION

Technology has played a significant role in all round development of the country since independence. Generally, there are two ways of acquiring technology. It can be developed through own research and development or it can be purchased through indigenous or imported sources. India has opted for a judicious mix of indigenous and imported technology. Purchase of technology is commonly called 'Technology Transfer' and it is generally covered by a technology transfer agreement.

With opening up of Indian economy more and more Indian companies are entering into technical, financial and other forms of collaboration. However, not all the collaborations are successful, even if, they are covered by proper technology transfer agreements. For a variety of reasons disputes arise in implementing the collaboration agreements.

Considering the above, the Department of Scientific & Industrial Research, Government of India, has commissioned a study on "Disputes in Technology Transfer Agreements - Case Studies" This is to cover collaboration agreements between Indian & Foreign Companies.

OBJECTIVES OF THE STUDY

Objectives of the study are as follows:

- i) To analyze the causes of disputes and the manner of settlement in technology import transactions.
- ii) To bring out remedies available to the parties and the best course of action in the event of a dispute.
- iii) To suggest ways and means of avoiding such disputes.

METHODOLOGY

Desk study on the subject was followed up by distribution of questionnaires detailing various issues among different sectors of industry. After the receipt of replies to the questionnaires, personal visits were made to get first hand information on the subject.

Case studies presented before Arbitration Council of India, High Courts of Delhi, Bombay, Calcutta etc. and Supreme Court of India were also studied. In all more than 63 parties who have had foreign technical collaborations were contacted. These included both big and small companies from various sectors of economy. They had signed 375 technical collaborations in the last ten years of which 278 were still active.

CONCLUSIONS AND RECOMMENDATIONS

Dispute is a very sensitive subject involving reputation of a company, hence many respondents were not free in parting with the information. It was also found that during course of implementation of collaboration many of them had a minor or major dispute. However, most of the problems were resolved mutually through discussions at departmental or board level. In a number of cases legal process was initiated but there was out of court settlement. Only in a small number of cases the matter reached Court or Arbitration Council. However, some companies have been able to use litigation / legal notice to successfully bring the opposite side to negotiating table. One major factor for not pursuing the cases in Court or Arbitration Council was the high cost of litigation and difficulty in enforcing the award in a foreign country.

The disputes arise when at least one of the parties is unable to operate some part of the agreement for any reason. Sometimes, disputes arise because of differing interpretations of any particular clause. In rare cases one of the partners does not follow the spirit of collaboration or wants to deliberately back out of the agreement. This sometimes happens when licensor or licensee firm gets taken over by another company whose interest could be different or when business environment changes resulting in lack of interest in collaboration.

The disputes mainly related to payment of Fees / Royalty, passing on of unproved technology, delay in completion of projects, receiving obsolete technology, licensor competing with the licensee with the latest models in India, lack of after sales back up, IPR issues like use of trade mark, quality and cost of products, supply of raw materials and components, technology upgradation, incomplete data / drawings etc.

RECOMMENDATIONS

Main recommendations to avoid the disputes are as follows:

- 1) Joint venture partner should be carefully selected. There should be commonality of interest and both the partners together should be able to provide value to the customers. Transparency in dealings is necessary to achieve mutual trust.
- 2) What is required from the collaborator should be known right from the beginning and it should be stated clearly. Regular interaction is necessary for speedy resolution of problems.
- 3) Joint ventures with equity participation have greater probability of success as compared to pure technology acquisition agreements.
- 4) Royalty payment is the most common cause of disputes. Disputes arise mainly on method of calculation of royalty and on what is to be included and what is

royalty clause should explain in detail the method of calculation of royalty, if necessary by giving a few examples, so that interpretation of the clause becomes clear to both the parties and no ambiguity arises at the time of operation of agreement.

- 5) Companies should have in-house technology development cell to keep track of the latest technologies in the world. In-house R&D capability is required to absorb the technology and attract good licensors.
- 6) Technology selected should be contemporary and amenable to Indian conditions and raw materials.
- 7) Collaborator should be willing to share information and pass on improvements and modification on continuous basis.
- 8) Preferred payment terms could be low down payment and suitable royalty.
- 9) If licensee is technically and financially weak, joint venture with equity participation should be preferred. Otherwise, technology acquisition would be adequate.
- 10) The terms of agreement with the collaborator should be carefully drawn up, taking the help of competent lawyers. The agreement should cover interest of both the parties, keeping in mind the applicable laws in both the countries.
- 11) The scope of technology transfer should be clearly defined covering products, processes, proprietary materials and components, IPR issues, payment terms, marketing rights and after sales service issues, training in India and abroad, etc.
- 12) Period of agreement, residual rights and dispute settlement mechanism should be clearly stated in the agreement.