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From the Director's Desk



Prabir Sengupta

IN a knowledge based economy, the importance of technology is well recognized all over the world. As technology is being increasingly perceived as a key driver of economic development, developing countries have shown deep concerns towards its access. These concerns were translated into action when Doha Ministerial in 2001 set up a Working Group on Trade and Technology Transfer (WGTTT).

Several discussions thereafter in WGTTT and various studies connected with the issue have brought out the increasing dependence of developing and Least Developed Countries (LDCs) on these front-end technologies, whose ownerships lie with large corporations.

As access to these technologies holds paramount importance for improving productivity, promoting export growth and attaining development aspirations of these countries, entering into appropriate technology transfer agreements becomes crucial. However, in view of the pattern of ownership of such technologies, developing countries face enormous problems in assessing, accessing and adapting such technologies. In the technology driven world today, this handicap clearly acts as a constraint to speedy economic development.

To narrow down these technological gaps, to make technology transactions and the climate of operations more user friendly, several proposals have been discussed in WGTTT. One such latest proposal has been submitted jointly by India, Pakistan and Philippines to WGTTT.

The first recommendation of the proposal aims at helping developing countries to improve or implement competition policies capable of monitoring and discouraging use of restrictive practices by technology owners and by ensuring adoption of similar or better practices at home and abroad. Second area of concern relates to the inability of developing and LDCs to afford the cost of technology, because WTO agreements lack provisions on financing, implementation, monitoring and technical assistance. In such cases, development of clear implementation and monitoring process, including fiscal support, may be important to facilitate technology transfer. It is suggested that mechanisms such as those in multilateral environmental agreements could serve as models. Thirdly, members may seek ways of expanding and encouraging the mobility of trained personnel under GATS by promotion of international scientific and industrial R&D collaboration projects and by greater use of young talents from developing countries.

Such measures, if implemented, could prove useful for developing countries.

Issues in Technology Transfer

*Biswajit Dhar**

The issue of technology transfer in today's globalized world has assumed critical dimensions. It has gained immense importance since it has been widely recognized that its impact on economic growth and development is enormous. As knowledge is increasingly becoming a key strategic resource for national economic development, and sharing of international trade there is a need to identify the ways and means for facilitating the technology transfer to the developing and least developed countries. This national economic development and sharing of international trade require today's front-end technologies and, they feel with the access of these front-end technologies they would be able to compete in today knowledge based economy. The present paper makes an attempt to understand and emphasize the issues that are involved in technology transfer in WTO and highlight how developing countries can access this technology for their own good.

TECHNOLOGY transfer has been one of the key issues that have prominently figured in the discussions centring on the shaping of the economic relations between developing and the developed countries over the past few decades. The issue gained importance, since it was widely acknowledged that access of developing countries to front-end technologies is a *sine qua non* of enhancing their trade flows, in particular and that of their development, in general. It was in this context that a number of developing countries, including India, had sought to discuss the relationship between trade and technology transfer in several multilateral forums, including the United Nations Conference on Trade and Development (UNCTAD), in order that the multilaterally accepted framework facilitating flows of technology between developed and developing countries can be evolved.

Since the establishment of the WTO, developing countries have been emphasizing that the issue of technology transfer needs to be considered for improving the trade potential of the lesser players in the global economy. It was in the Fourth Ministerial Conference of the WTO held in Doha in 2001 that the issue on trade and technology transfer was finally taken on board, with the

Ministerial Declaration stating thus:

“We agree to an examination, in a Working Group under the auspices of the General Council, of the relationship between trade and transfer of technology, and of any possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries. The General Council shall report to the Fifth Session of the Ministerial Conference on progress in the examination.”

The Working Group on Trade and Technology Transfer (WGTTT), which has been established following the mandate given by the Doha Ministerial Conference, is currently delineating the issues that need to be taken up in order that an agreed solution to the task laid before it can be found in an expeditious manner. In view of the above, it is important to undertake a thorough examination of the various aspects of trade and technology transfer using evidence thrown up by select industries with a view to providing inputs in the process that has been initiated by the WGTTT.

The dependence of developing countries on modern

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industrial technology the ownership of which rests largely with the large corporations had led to focused attention being paid in several studies for a proper understanding of the implications of such dependence. Most of these studies have attempted to make assessment of the technology transfer arrangements adopted by the owners of frontier technologies and the impact these have had on the recipient countries.

In owning critical technologies, large corporations are seen to be in the possession of "intangible assets" that provide these entities with superior market power with which they can enter into a bargain over technology with the recipients. This advantage that the corporations can derive through their ownership of technology arises from several imperfections in the technology market which, in turn, is caused by the peculiar nature of technology itself. In a typical bargaining model, the licensor has a floor price which is made up by the costs of effecting technology transfer and also the opportunity costs for doing so (the owner of technology may lose a part of the market for exports which he might have carried on using the facilities of his home protection base if the technology transfer did not take place and the recipient did not start local production). The licensee, on the other hand, has a ceiling price which he is willing to pay. The actual price would generally be between the two prices. The result of this would largely be indeterminate, depending essentially on the relative bargaining strengths of the corporations and the host governments.

The relative bargaining power in these transactions is affected by yet another apparent imperfection in the market for technology which is the so-called "information paradox". In order to bargain effectively, the buyer needs information regarding the characteristics of the technology involved in the bargaining process. But this "information" may pertain to the technology itself. In other words, if the buyer had all the relevant information related to the technology in question he would not need to buy the technology and instead become a free-rider. The differential access to information, as alluded to above, puts the sellers of the technology, who are usually the corporations in an advantageous position.

Technology transfer agreements in more recent years have by and large displayed the same asymmetry as between the buyers and sellers of technology that has been typical of such agreements. This has been corroborated by some limited evidence about royalty rates and payments for technology services which indicate that these may have gone up of late. The increase in payments has been noticeable particularly in cases where transfer of new technologies like biotechnology and telecommunications are involved. Costs of technology imports have also found to have risen in such contractual agreements like turn-key projects when the buyer has insisted upon extensive guarantees in the contracts for the operation and installation of plants from the technology supplier. The buyer's insistence

on guarantees has often been responded by the supplier by raising the price of technology, "over-designing" of the plant, installing capital-intensive plant and reducing the use of local personnel, to mention only a few.

The increasing recognition that technology is one of the critical factors in determining competitiveness of production systems has led to an increasing tendency on the part of owners of technology to seek higher economic rents through enhanced protection for their products of R&D. The higher standards of intellectual property protection that has come to be accepted after the Uruguay Round negotiations in the form of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), is but an attempt in this direction. The distinguishing feature of the new regime of intellectual property protection is that apart from the strengthening of the more conventional forms of intellectual property rights like patents and copyrights in order to give the owner of intellectual property enhanced rights, the importance of trade secrets has also been emphasized. This implies that contrary to facilitating a process disclosure and hence a greater dissemination of technology which has been the cornerstone of hitherto existing regime of intellectual property protection, the new regime forecloses the option of a better access to technologies. And, this has happened despite the fact that in its stated objectives, the TRIPS Agreement unambiguously mentions that the protection extended to the various forms of

intellectual property rights must balance the interests of the owners and users of technologies through effective transfer of technologies, among others.

Possibly the most flagrant violation of the above-mentioned objective of the Agreement on TRIPS appears in the framework of patent protection as laid down in the Agreement. This appears more so since the patent regime has historically provided the surest mechanism for securing technology transfers, which has now been considerably diluted. The Paris Convention for the Protection of Industrial Property, which was adopted in 1883 as the first multilateral treaty on intellectual property rights, included the compulsory licensing system that allowed the patent granting authorities to issue a licence to anyone seeking to utilize a given patent for commercial purposes in the event of the patent holder not "working" the patent within a stipulated period of time. The term "working of the patent" implied setting up of production facilities and therefore the compulsory licensing system remained as an important instrument that could be used by countries to gain access to frontier technologies. More importantly, non-working of the patent was considered to be an abuse and therefore countries were within their rights to revoke the patents in the event that the patents were not "worked" in the country of grant. As is quite obvious, the compulsory licensing system was particularly significant for developing countries that own very few patents but provide patent protection to foreign

patentees (most of the large corporations) in their territories.

The patent system introduced by the TRIPS Agreement considerably dilutes the compulsory licensing system. Two specific provisions have contributed in this regard. First, the patent owners have to be paid "*adequate remuneration* based on the *economic value* of the licence" (emphasis added). And, secondly, the issuance of the compulsory licences can be challenged in the courts.

The former provision clearly swings the balance in favour of the patent owners, who can use their superior bargaining strength to demand unreasonable remuneration from the potential users of the technologies in the developing world. As was mentioned earlier, the costs of technology imports have gone up in the recent decades thus making most technologies unaffordable for most developing countries. The latter provision is equally important for it introduces an element of uncertainty for the potential users. Very few, if any, would be willing to seek compulsory licences for patented technologies since a successful challenge by the patent owner would threaten the future of the production facilities that are set up.

The above-mentioned issues have been alluded to by a number of developing countries in the ongoing discussion in the WGTTC. Besides pointing to the asymmetries in the Agreement on TRIPS that could adversely affect the ability of these countries to seek transfer of technologies on

terms that they would find affordable, developing countries have indicated that many amongst them do not have the required absorptive capacity for efficient and effective transfer of technology.

Cuba has emphasized that it is necessary to encourage different modes of transfer of technology to the developing countries, in particular to the least developed countries, so as to enable them to establish a sound technological base that would enable these countries to participate harmoniously in the exchange of goods, services, information and knowledge.¹ It was further insisted that the developing and the least developed countries would require capacity building efforts which would ensure proper assimilation of the technologies transferred. And finally, Cuba argued that it is also necessary to eliminate discriminatory practices unilaterally applied against some Third World countries to prevent them from acquiring technologies for the free flow of trade that are essential for their economic growth.

¹ WTO, Working Group on Trade and Transfer of Technology, Proposed Recommendations of the Working Group in the lead-up to the Sixth Ministerial Conference: Communication from Cuba (WT/WGTTT/W/9), July 2005

² WTO, Working Group on Trade and Transfer of Technology, Steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries: Submission to the Working Group on Trade and Transfer of Technology by India, Pakistan and the Philippines (WT/WGTTT/W/10), October 2005.

India, along with Pakistan and the Philippines, has suggested a number of concrete measures which would help fulfil the mandate given to the WGTTT.² The measures suggested by these countries reflect on the problems that developing countries have faced in securing the area of transfer of technology alluded to above.

The first recommendation that these countries have made is that it was necessary to help developing countries improve or implement competition policies capable of monitoring and discouraging use of restrictive business practices by technology owners and by ensuring firms adopt similar or better practices at home and abroad. Alternatively, it was suggested that developed country competition authorities could consider assuming a commitment to examine business practices in the realm of technology whose effect is felt only outside their own jurisdictions, for instance, in developing countries. Besides, developed countries could encourage licensing and subcontracting, and support firms in developing countries to access technological information and drafting of contracts.

The second area of concern raised by India *et al.* is related to the inability of the developing countries to afford the cost of technology, and this has been the case because most of the provisions in WTO Agreements lack financing, implementation, monitoring and technical assistance mechanisms in this area. In view of these countries, development of clear implementation and monitoring processes, including fiscal support, may be important to facilitate technology transfer. It was suggested that mechanisms such as those in multilateral environmental agreements (e.g. the Montreal Protocol which mentions transfer of technologies needed to phase out the use of ozone depleting industrial substance) could serve as models.

India *et al.* also faces the bottlenecks created by the patent in respect of technology transfer. In this context, it was recommended that technical assistance under the TRIPS Agreement should be expanded by linking Article 67 of the Agreement to Articles 66.2 and 7. As is, Article 67 does not deal with measures or incentives needed to

facilitating technology transfer. The support built into Article 67 could then be targeted at facilitating technology transfer to institutions and firms in developing countries, especially LDCs.

Another recommendation made by these countries is that Members should seek ways of expanding or encouraging the mobility of scientists, technologists and technicians under GATS, develop science and technology agreements to promote international scientific and industrial R&D collaboration, and encourage their firms and public institutions to employ, at least temporarily, fresh graduates and offer consultancy services or contracts and attachment to experts from developing countries to facilitate transfer of knowledge.

Measures that have been suggested by developing countries in their submissions to the WGTTT would certainly go a long way in contributing to an effective and efficient transfer of technology. However, given the record of the past decades, do these proposals have a realistic chance of moving forward?



Working Group on Trade and Transfer of Technology

THE Working Group on Transfer of Technology was established by the Ministers in Doha and aims to examine the relationship between trade and the transfer of technology from developed to developing countries, and ways to increase the flow of technology to developing countries.

A number of provisions in the WTO agreements mention the need for a transfer of technology to take place between developed and developing countries. However, it is not clear how such a transfer takes place in practice and if specific measures might be taken within the WTO to encourage such flows of technology.

WTO ministers decided in Doha to establish a working group to examine the issue. The working group will report to the General Council which itself will report to the next Ministerial Conference.

Developing countries, in particular, see technology transfer as part of the bargain in which they have agreed to protect intellectual property rights. The TRIPS Agreement includes a number of provisions on this. For example, it requires developed countries' governments to provide incentives for their companies to transfer technology to least-developed countries (Article 66.2).

Least-developed countries want this requirement to be made more effective. In Doha, ministers agreed that the TRIPS Council would "put in place a mechanism for ensuring the monitoring and full implementation of the obligations". At the same time, the question of technology transfer continues to be raised under various TRIPS headings such as TRIPS and Public Health.

(www.wto.org)

Chinese Biotech Industry Eyes Indian Tie-ups

IT could be the technology equivalent of taking a holy dip in the Ganges. The Chinese biotech industry, often accused of stealing and copying western technology, is looking for Indian collaboration in order to dress up its image and obtain approval from the regulators in the US.

But Indian biotech and pharmaceutical companies are more than eager to offer themselves as reformatories for the delinquents. India's strong point is that it has several research sites approved by the Food and Drug Administration of the US. The Chinese want to use these sites to gain credibility for their products.

"India offers a good platform for Chinese companies to obtain FDA approval for their technologies," Yuk Lam Lo, chairman of the Hong Kong Biotechnology Association said. "It's a good opportunity for Indians. They should grab as much of the huge resources that China possesses as they can," he said.

Krishna M. Ella, head of an Indian biotech industry delegation, feels that Indian and Chinese companies can take on the world markets if they join hands in the research, process and certification areas. Both sides have their own strengths and it makes sense to merge them.

"India and China can do amazing things if they come together. This is what governments on both sides should realize and encourage," said Shri Ella. It is easier to obtain regulatory approval for products that are researched and developed in India.

"The Chinese industry has huge infrastructure and skilled personnel. Both sides could sign up for multi-site R&D and support each other," he said.

Mr. Lo was even more forthright. "I do not see Chinese companies getting FDA approval in the next

5-10 years. They cannot sell their products overseas, not even in Asian countries. They are overloaded with off-patent technologies, and Indians should make the best use of it," he said.

Few western firms are feeling that a lot of technology with Chinese companies have been obtained by violating intellectual property rights which should not matter as the Indians have abilities in processing and documentation. "The two sides can come up with suitable products that would be acceptable by FDA standards" he added.

(The Times of India, 17 September 2005)

Pharma Co. Eisai to Source Research from India

JAPAN's fourth largest pharmaceutical firm Eisai has plans to source manufacturing and research activities from India in a big way.

Soichi Matsuno, Managing Director, global pharmaceutical business, Eisai said, "In Eisai, we look at India as much more than just a consuming market. We look at this country as a huge resource for our global market. We are aware of India's strong talent pool and capabilities in synthetic chemistry, manufacturing and clinical traits. We are actively evaluating the feasibility of carrying out these activities in India."

Eisai is the first Japanese pharmaceutical company to set up a wholly-owned subsidiary, Eisai Pharma India, in the country. Eisai is the nineteenth largest pharma firm in the world with a turnover of \$5 billion. The company focuses its research in three therapeutic areas, central nervous system, gastrointestinal disorders and oncology.

Mr. Matsuno said that the company has already started doing global clinical trials in India in three centres. "We are here for the long haul," he added. Eisai Pharma has already drawn up its marketing plans for India. The company has signed a co-promotion agreement with Glaxo-SmithKline Pharmaceuticals India to market its blockbuster gastric disorder drug Parit (rebeprazole sodium). Globally, Parit has clocked revenues of \$1.2 billion. Eisai has also launched its leading Dementia (memory disorder) drug Aricep in the country.

The Japanese firm has signed a marketing and manufacturing agreement with Wockhardt for the

production and sale of the drug in the Indian market. Deepak A. Naik, Managing Director Eisai Pharma India said, "the company has set up a specialized fieldforce to generate awareness in the community, offer up-to-date information and screening tools to doctors for treating memory related diseases.

(The Economic Times, 14 September 2005)

More Comfort for Foreign Investors Govt. Mulls Extending Pre-establishment National Treatment

THE Finance and Commerce Ministries are considering a proposal to give all foreign investors under the 40-odd Bilateral Investment Protection Agreements (BIPAs) national treatment prior to their establishment in India. If the proposal materialises, then the FDI and portfolio investments in sectors which are delicensed, and wherein 100% FDI is allowed through the automatic route, would be treated at par with domestic investors for all regulatory purposes.

At present, the investors from countries with which India has signed BIPAs are eligible for only post-establishment national treatment. Singapore-based investors (juridical persons), however, are given pre-establishment national treatment in India under the recently ratified Comprehensive Economic Cooperation Agreement (CECA).

Officials said, Prime Minister Dr. Manmohan Singh has already asked the Finance and Commerce Ministries to weigh the pros and cons of extending the benefit given to Singapore-based investors to the investors from the European Union (EU). The EU has demanded such treatment under the proposed trade and investment agreement with India.

Once the proposal is approved, the relevant investors would not be required to "establish" themselves in India (through actual investment) to be treated at par with domestic investors for all regulatory purposes. Even in pre-operative stages, feasibility studies, project reports or even purchase of land, they would be eligible for national treatment. Apart from such establishment-related ventures, even post-entry acquisition, expansion proposals by foreign investors are currently reckoned as pre-establishment activities. Currently, in sectors

wherein 100% FDI *via* automatic route is allowed, even BIPA investors require to route the proposals through the FIPB for subsequent investments in *capex ad* acquisition.

(*The Financial Express*, 10 September 2005)

Rs 212-cr Research Centre JV of C-DOT, Alcatel Goes on Stream

THE Rs 212 crore C-DOT Alcatel Research Centre, a joint venture between Alcatel, global telecom major and the Centre for the Development of Telematics (C-DOT), was inaugurated in Chennai.

The centre will focus on developing broadband wireless products including consumer premises equipment like modems and radio access network technology based on Alcatel's Wi-max 802.16e platform. "This is the first research centre of Alcatel exclusively for developing Wi-max technology. Wi-max is one of the latest technologies in telecommunication. We chose India because it is a large market for telecom given the high growth rate in the telecom sector and for its abundance of skilled manpower," said Serge Tchuruk, Chairman and Chief Executive Officer, Alcatel.

The first technology developed will be released in a year's time. The joint venture in which Alcatel owns 51 per cent and C-DOT has 49 per cent is expected to be profitable from the fifth year of operation, Mr. Tchuruk, said.

Shri Dayanidhi Maran, Minister of Communications and Information Technology, said, "Wi-max is an emerging technology which will complement mobile phones. The research centre will develop Wi-max technology and the IPR will be sold to any telecom service provider - public or private - for a royalty," he said, adding that the technology would be available even for global telecom players. Shri Maran said, Alcatel, which had a tie-up with Indian Telephone Industries Ltd. (ITI) for manufacturing fixed telephone line exchange equipment, will now manufacture switching equipment for GSM phones. "This will help revive ITI, which had stopped production due to a shortage in demand for fixed line exchange equipment," he said.

(*The Financial Express*, 10 September 2005)

Ten Questions on TRIPS, Technology Transfer and Biodiversity

1. What is TRIPS about?

THE WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) was negotiated during the Uruguay Round, under strong pressure from major industrialized countries. This Agreement has nothing to do with trade, but is all about the protection of intellectual property rights (IPRs). Initial objections by a large number of countries to the inclusion of this topic during the Uruguay Round led to a compromise to only deal with "trade-related" aspects of IPRs. However, in the course of negotiating the entire package of agreements, all issues related to IPRs, including the standards of protection, were accepted.

The TRIPS Agreement imposes minimum standards for countries to adopt in almost all areas of IPRs. However, these standards are derived from the legislation of developed countries, thus the TRIPS Agreement imposes the form and level of protection of the industrial world to all WTO members, which are far tighter than existing legislation in most of the developing countries. This means that such countries will have to create or amend national laws to comply with the TRIPS obligations. It is also the first international instrument to require IPRs protection for life forms.

Developed countries had until 1 January 1996 to implement the TRIPS obligations. Developing countries have an additional period of 4 years for implementation (i.e., until 1 January 2000). Least developed countries will not be required to apply TRIPS provisions on intellectual property rights until 2006; i.e., 10 years from the date of application for developed countries. These time-frames do not include obligations concerning national treatment and most-favoured-nation treatment, which became applicable in 1996.

2. What are IPRs?

Perhaps the best-known form of IPRs is the patent. Other IPRs include copyrights, trademarks and trade secrets. Patents vest exclusive, monopoly ownership rights over the patented subject matter. This means the patent holder has the right to exclude

anyone else from using, making, and selling the patented subject matter, for a certain period of time. Under the TRIPS Agreement, the minimum period of patent protection is 20 years.

3. Why is there concern about IPRs and TRIPS?

The concept of IPRs and patents, in particular, must be seen in the context of the corporate concentration and consolidation of the multinational corporations (MNCs). In the 1990s, there has been a trend of "mega-mergers" of MNCs in the life sciences industry, that is, transnational enterprises involved in the commercial sale of seeds, pesticides, food and pharmaceuticals. As a result of these mergers, a small number of the MNCs dominate and control the life sciences industry.

For example: UNDP's *Human Development Report 1999* states that in 1998, the top ten corporations in the commercial seed industry controlled 32 per cent of the US\$23 billion industry; in pharmaceuticals, 35 per cent of the US\$297 billion industry; in veterinary medicine, 60 per cent of the US\$17 billion industry; and in pesticides 85 per cent of the US\$31 billion industry. Such monopoly means that the MNCs are able to control the supply of the products. By controlling the supply, they also have the means of controlling the prices of such products. To increase their profits, they can increase the prices. More than just a pricing issue, the control of essential resources such as seeds, drugs and food translates into the MNCs having control over fundamental rights of access to food, health and nutrition.

4. Where does TRIPS come in?

The above scenario of corporate concentration is a key reason for the MNC initiation and support of the TRIPS Agreement. For the MNCs, global outreach of their business requires global protection. The TRIPS Agreement imposes obligations on WTO member countries to make, in many cases, substantial changes to their national laws to afford protection for the inventions and technologies generated by the MNCs. There are also elaborate enforcement procedures in the Agreement, backed by a right for a "victim" country to apply cross-retaliations against a "non-complying" country. For example, failure to meet a TRIPS standard could result in a reduction of the export quota of the non-complying country. This means the effective

protection of MNC interests, and the maintenance of MNC dominance in the international market.

5. Does TRIPS Promote Technology Transfer?

The TRIPS Agreement will have important implications for developing countries regarding the conditions for their access to and use of technology, and their economic and social development. The concern is that TRIPS will not facilitate technology transfer - the strengthening and expansion of IPRs are likely to have adverse effects on the conditions for technology transfer. The concept of patenting itself makes technology transfer difficult and certainly more costly. Strengthened IPRs may lead to increased royalty payments required by technology-holders. In fact, technology-holders may simply refuse to transfer the technology and block industrial initiatives by other parties. These factors will restrict the prospects for economic and industrial development in developing countries.

What is likely to happen is transfer of the production of some goods, the production of which employs the protected technologies. This is the situation where MNCs locate their production facilities within developing countries, in order to take advantage of the cheap labour or natural resources. In many such cases, the protected technology itself is not transferred, only the production facility. The developing countries do not acquire the protected technology. They would only be involved in producing the goods using the patented technology.

6. What does TRIPS have to do with Biodiversity?

The provision of TRIPS which relates to biodiversity is Article 27.3(b), one of the most controversial parts of the Agreement, which has major implications for biodiversity and the ownership of life itself. This provision is so controversial that it was agreed during the Uruguay Round negotiations that a review of the provision would be built into the agreement. The mandated review of Article 27.3(b) was to take place in 1999.

7. What does Article 27.3(b) say?

Members may also exclude from patentability...

(b) plants and animals other than microorganisms, and essentially biological processes for the production of plants and animals other than

non-biological and microbiological processes. However, members shall provide for the protection of plant varieties either by patents or an effective *sui generis* system or by any combination thereof. The provisions of this paragraph shall be reviewed four years after the date of entry into force of the WTO Agreement.

There are two key issues involved here: (1) issue of patenting of life forms; and (2) the protection of plant varieties.

8. What does patenting of life forms mean?

The first relates to the process of "biopiracy", that is the theft of biological resources and traditional knowledge from the developing countries. Examples of biopiracy abound - the case of the US patent on the use of turmeric for healing wounds is a well-known one. The second aspect is the advent of biotechnology. The ability to identify, isolate and move genetic materials across species types has aroused great commercial interest and investment in biotechnology. Genetically engineered crops and foods are being produced with the global market as their target; thus the need to obtain IPR protection for such "new" products.

In relation to the patenting of life forms, Article 27.3(b) provides that countries may exclude from patenting: plants, animals and essentially biological processes, but countries must patent: microorganisms, microbiological and non-biological processes.

What is the rationale for the distinction made between the different types of life forms, and of natural processes? There is no scientific or legal rationale for the distinction. Such distinction goes against the basic principle of patent laws in many countries; i.e., that "discoveries" are not patentable. The artificial distinction, which has been drawn, is motivated by the corporate interests that are involved in biopiracy and biotechnology, so that these corporations are able to obtain protection for their products and processes.

9. What about protection of plant varieties?

The second aspect of Article 27.3(b) is the protection of plant varieties. Countries must protect plant varieties through the patent system, or through the establishment of an effective *sui generis* (i.e., unique or of its own kind) system or any combination of the two.

As with issue of patenting of life, there is no clear distinction, which can be drawn between plants and plant varieties from the scientific or legal perspectives. However, there is a history of protection for plant varieties, in order to protect the interests of commercial plant breeders, which sought protection for their crop varieties but found it difficult to meet the requirements of the patent system. The International Union for the Protection of New Varieties of Plants (UPOV), adopted its first convention in 1961 between European states to promote the protection of breeders' rights over new plant varieties (Plant Breeders' Rights).

The original UPOV convention has gone through several revisions, the last of which took place in 1991. The successive revisions have strengthened the protection offered to plant breeders. In fact, the 1991 revision was intended to grant rights for plant breeders, almost akin to rights granted by the patent system. Under UPOV 1991, breeders who register rights over varieties can claim full commercial control over the seed or propagating material of their protected variety. This means that farmers are prohibited from selling the seeds they harvest from the crop, and indeed from saving and exchanging the seeds on a non-commercial basis, without first paying royalties to the breeder. Even when the farmer had saved the seed from his previous harvest - royalties have to be paid each time the seed is used. In this way, plant breeders obtain exclusive and private ownership rights over biodiversity. And also in this way, the rights of farmers to use, save and exchange seeds are negated.

The WTO, WIPO and UPOV have joined together to convince developing countries that the *sui generis* system required by Article 27.3(b) can only be provided by UPOV 1991. The three organizations have been organizing a "road show" to developing countries to persuade them to sign on to UPOV 1991.

Another new development is the creation of the "Terminator Technology", where biotechnology is used as a means of exerting control and ownership rights over biodiversity. Terminator technology is a set of new genetic engineering techniques used to create sterile plants with infertile seeds that cannot be replanted. It is thus able to protect the interests of the corporation or plant breeder by killing the seed after one generation. This means farmers will be forced to purchase seed every growing season. In this

scenario, patents are no longer needed to protect the MNC interests. The technology has in-built protection. However, patents are still being used not against the farmers, but against the rival corporations to ensure corporate dominance in the market.

10(a) What can be done?

The deadline for implementation of the TRIPS Agreement obligations for most developing countries was 1 January 2000. However, the mandated review of Article 27.3(b) is still on-going, without a clear resolution in terms of the nature and scope of the review. Some developed countries in the WTO, particularly US, argue that the review of Article 27.3(b) should only be of the implementation of the provisions therein, whilst developing countries say that the review must address the substance of the Article itself. It must be clarified by Members that the review mandated to be carried out refers to a review of the provisions of Article 27.3(b) and not merely to the implementation process.

10(b) What has been done?

An important development in this respect is the proposal of the African Group of WTO members as part of the preparatory process for the Seattle WTO Ministerial Conference. The proposal of the African Group is significant, as it questions the TRIPS Agreement's requirement for mandatory patenting of some life forms and some natural processes. It calls for a clarification that plants, animals and microorganisms should not be patentable, and that natural processes that produce plants, animals and other living organisms should also not be patentable.

The paper also puts forward the view that by stipulating compulsory patenting of microorganisms (which are natural living things) and microbiological processes (which are natural processes), Article 27.3(b) contravenes the basic tenets of patent laws: that substances and processes that exist in nature are a discovery and not an invention and thus are not patentable. It adds: "Moreover by giving Members the option whether or not to exclude patentability of plants and animals, Article 27.3(b) allows for life forms to be patented."

The paper calls for the review process to clarify why Article 27.3(b) does not allow Members to exclude microorganisms and microbiological

processes from patentability. It says an artificial distinction was made between what can be excluded from patents (plants and animals; biological processes) and what must be patented (microorganisms and microbiological processes).

The above points made by the Africa Group are very significant and crucial, and correspond to the concerns raised by many citizen groups, farmers' organizations, environmental groups and development groups around the world. These groups have been campaigning against the patenting of life forms and biological materials because such patents would allow the private monopolization of life and of biological resources, and would cause serious adverse effects on development, food security, the livelihoods of millions of farmers, on the environment. Such patents are also facing objections from the public on ethical, religious and moral grounds.

The Africa Group paper also gives a clear direction to the review of another part of Article 27.3(b), which specifies that Members shall provide for the protection of plant varieties either through patents or an effective *sui generis* system.

The paper says that the review must:

- clarify that developing countries can opt for a national *sui generis* law that protects innovations of indigenous and local farming communities (consistent with the Biodiversity Convention and the FAO's International Undertaking);
- allow the continuation of traditional farming practices, including the right to save and exchange seeds and sell their harvests; and
- prevent anti-competitive rights or practices that threatens food sovereignty of people in developing countries.

It adds that the review should harmonize Article 27.3(b) with the provisions of the CBD and the FAO's International Undertaking, which take into account the conservation and sustainable use of biological diversity, the protection of the rights and knowledge of indigenous and local communities, and the promotion of farmers rights.

These points made by the Africa Group are very important in recognizing the rights of people in developing countries (as well as in developed countries) to protect the traditional knowledge and

biological resources of indigenous, farming and local communities.

These points also correspond to the demands of civil society and farmers groups around the world, that patenting of plant varieties should not be allowed, and that there should be a proper system of protection of knowledge of indigenous peoples and local communities on the use of biological resources. This system should prevent biopiracy that is now prevalent as more and more multinational companies are being granted patents on plants and other biological resources as well as for their traditionally-known uses and functions.

Countries must have the option of a national system of plant varieties protection that protects the rights of indigenous, farming and local communities and their knowledge. The review process must clarify this so there is no mistake in interpretation on what constitutes an effective *sui generis* system. WTO members must be allowed to introduce systems of their choice, including those that adhere to the principles of recognizing the rights of these communities, in order to ensure food security, livelihoods and the development of sustainable agriculture.

The essential parts of the Africa Group position have been endorsed by the Like-Minded Group of developing countries that has been formed to consolidate common positions on a range of issues relating to the Seattle WTO Ministerial Conference. These countries are Cuba, Dominican Republic, Egypt, El Salvador, Honduras, India, Indonesia, Malaysia, Pakistan and Uganda.

Therefore, action can be taken in the following manner:

- (1) Endorse the positions taken by the Africa Group on both aspects of the review of Article 27.3(b) of TRIPS, i.e. the patenting of life, and the *sui generis* systems for plant varieties protection.
- (2) Call on all other Member States of the WTO to support the positions of the Africa Group on the review of Article 27.3(b), major parts of which have been endorsed by the Like-Minded Group of developing countries.
- (3) Call on the WTO Members to amend the TRIPS Agreement as soon as possible to remove its present ambiguities and objectionable provisions that now oblige Members to change their

national laws to enable patenting of life forms, effectively promoting biopiracy or the private appropriation of traditional knowledge and community resources.

- (4) Call on WTO Members to extend the deadline for implementing Article 27.3(b) of TRIPS from the present date of January 2000 to five years after the completion of the review of this Article (as has been proposed by the African Group and the Like-Minded Group).

(www.twinside.org.)

Technology Transfer, Intellectual Property Rights and the Environment

1. Technology Transfer in UNCED

ALTHOUGH the Rio Earth Summit recognized that the transfer of environmentally sound technology (EST) was essential to enable the South, there has since been little or no progress on this issue. The fact that the patents for such technologies are mainly held by TNCs in the North has also frustrated the South to develop such technologies independently. The main obstacle is the stringent intellectual property regime imposed by the TRIPS Agreement under the WTO.

UNCED recognized that technology transfer was essential for developing countries. Indeed, it was one of the two critical cross-cutting issues in the North-South compact, the other being financial resources. In the UNCED process, the key issue in technology transfer was intellectual property rights (IPRs). The South argued that IPRs had to be relaxed in the case of environmentally sound technology (EST), for otherwise IPRs would hinder the South's access to such technology.

The Northern delegations were very sensitive on this point and refused to concede. Whilst agreeing that concessional terms should be encouraged for the transfer of ESTs, the Northern governments insisted that IPRs (such as patents) be applied and that an exception should not be made in IPR regimes on such technologies.

Finally, the Agenda 21 chapter on technology called for action to promote and finance the access to and transfer of environmentally sound technologies to developing countries on favourable

(including concessional and preferential) terms. But it also says these terms must be "mutually agreed" upon and also take into account the need to protect intellectual property rights.

The full application of such rights would of course be a major barrier to technology transfer, and deprive the commitment to transfer technology of much of its content. There is thus a fundamental tension within the agreement on technology, and room for more discussion on how to operationalize the Agenda 21 proposals on technology cooperation, transfer and capacity building. The Southern countries consider this to be an area where assistance from the North is critically needed.

2. IPRs as Obstacles to Transfer of Environmental Technology

Since Rio, there has also been little or no progress on facilitating the transfer of environmentally sound technology to the South. Instead, the international IPR regime has become much stricter, especially through the TRIPS Agreement in the WTO, which will have to be translated to policies and laws at national level. Evidence is also emerging that the IPR regime can prevent developing countries from having effective access to environmentally sound technologies (ESTs).

Holders of the patents to these technologies, which are usually Northern-centred TNCs, can refuse to grant permission to companies in the South to use the technologies, even if they are willing to pay market prices; or else the technologies may be made available at high prices (due to the monopoly enjoyed by the patent holders). Companies in the South may not afford to pay at such prices, and if they do their competitiveness could be affected. As a result, developing countries may find difficulties in meeting their commitments to phase out the use of polluting substances under international environment agreements.

Third World firms find it difficult or impossible to have access to substitutes for chlorofluorocarbons (CFCs), chemicals used in industrial processes as a coolant, that damage the atmosphere's ozone layer. This hinders the South's ability to meet commitments under the Montreal Protocol, which obliges countries to phase out the use of CFCs and other ozone-damaging substances by certain target dates.

Under the Protocol, developed countries originally agreed to eliminate production and use of CFCs by the year 2000, whilst developing countries were given a 10-year grace period to do the same. A fund was set up to help developing countries meet the costs of implementing their phase-out, and the protocol includes articles on technology transfer to the South on fair and favourable terms.

According to the Indian Commerce Ministry, developing countries like India that manufacture products (such as refrigerators) with CFCs are finding it very difficult to phase out the use of these substances because of the lack of access to environmentally acceptable substitutes controlled by Northern multinationals.

There are five Indian companies that are major manufacturers of products that depend on the use of CFCs and must phase these out by 2010. However, the pledged technology transfer on fair and most favourable terms has not materialized. Three of the Indian companies formed a consortium to commission a local institute of technology to produce a substitute for CFCs. The research is at an advanced stage and India now has a real possibility of locally producing the substitute substance, HFC 134A.

However, the implementation of this plan faces a major obstacle because patent rights to the substitute are held by a few multinational companies. Some of the Indian companies are willing to pay the market price or even higher for the technology. But a multinational holding the patent has refused to license it unless it can take a majority stake in the companies' equity.

This example shows how much the developing countries have been put on the spot. By joining international environmental agreements they commit themselves to change their economic policies or production methods. Financial aid and technology transfer on fair and most favourable terms are promised during the hard negotiations, to persuade the South countries to sign. Then, when the agreements come into force, the funds are far from the promised level, and technology transfer fails to materialize. Meanwhile in another forum like the WTO, other treaties such as TRIPS are negotiated which produce an opposite effect, i.e. to block the South's access to environmental technology. Yet, when the time comes, the South can be expected to be pressured or coerced

to meet their full obligations. There is thus an unfair imbalance. The North does not follow its obligation to help the South, but the South has to meet its commitments, which because of the lack of aid and technology, will cause economic dislocation.

One remedy being proposed by some public interest groups and developing countries is to change the international laws on patents so that the full weight of IPRs is not applied to environmentally sound technology.

The Indian government has made out a strong case for amending the TRIPS accord in the WTO in order to recognize developing countries' need for transfer of ESTs on "preferential and non-commercial terms". It tabled a paper on the issue of TRIPs and the transfer of ESTs at the WTO in 1996.

3. TRIPS and the Environment at the WTO

In the WTO's Committee on Trade and Environment (CTE), the "TRIPs and environment" is being discussed, under two issues: (a) the relationship of TRIPS Agreement to access to and transfer of technology and the development of environmentally sound technology; and (b) the relationship between the TRIPS Agreement and MEAs which contain IPR-related obligations.

A key issue, as defined by NGOs and some Southern governments, is an important clause in the TRIPS Agreement relating to patentability and non-patentability of biological materials, i.e. the issue of "patenting of life forms".

At the March 1996 meeting, India presented a paper, a brief outline of which is as follows.

The paper states that the five types of intellectual protection (IP) covered in TRIPS are relevant in this context: patents, plant variety protection, layout designs of integrated circuits and undisclosed information. Two types of technologies incorporating IP are distinguished: those that harm and that benefit the environment. The use of the first should be discouraged, the second encouraged, by the international community.

On patents, for technologies harmful to the environment, measures needed to discourage their global use may include exclusion from patentability (so that incentives are not given to generate such technologies) and ban of their use or commercial

exploitation. The TRIPS Agreement recognizes this reasoning in Article 27.2 which allows exclusion from patentability "inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect public or morality, including to protect human, animal or plant life or health or to avoid prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law".

For environmentally beneficial technologies, to encourage their global use, and in cases where other measures for technology transfer are not possible, India proposes three points:

- (a) Members may have to exclude from patentability to allow free production and use of such technologies as are essential to safeguard or improve the environment. Such an exclusion is not incompatible with TRIPS and may have to be incorporated through a suitable amendment;
- (b) For currently patented technologies, Members may revoke patents already granted, if this is done in consonance with the Paris Convention and must be subject to judicial review;
- (c) To encourage the use of environmentally beneficial technology, Members should be allowed to reduce the term of patent protection from the present minimum of 20 years to say 10 years, "so as to allow free access to environmentally-beneficial technologies within a shorter period".

The paper also deals with layout designs of integrated circuits and protection of undisclosed information, and with plant variety protection. It suggests that amendments to the TRIPS Agreement may be required in Section 5 (Articles 27, 31, 32, 33), Section 6 (Articles 36,37, 38), Section 7 (Art 39), and an understanding on plant variety protection (Art 27), dispute settlement (Art 64) and undisclosed information (Art 39).

4. TRIPS and Biological Materials

Another key aspect of technology transfer and IPRs is the TRIPS provision in relation to biological materials. It requires governments to afford patent protection for microorganisms and biological processes involving them, which include genetic engineering processes and genetically engineered animals and plants. It also requires that intellectual

rights on plant varieties be protected either through patenting or an "effective *sui generis* system of protection". This raises concerns that the knowledge of Third World farmers and indigenous communities that has mainly contributed to the development of crops and the use of plants will not be legally recognized, whilst the corporations which genetically engineer biological resources will be unfairly rewarded. Countries of the South would then have to purchase biotechnology products at high prices (which are facilitated by the patent protection) even though they are the origin of the biological resources (and of the knowledge on their utilization) used in biotechnology. This is likely to lead to higher cost of seeds and food products in developing countries. There is widespread opposition, including from farmers' organizations in India and the Philippines, against the TRIPS Agreement. This provision was for review in 1999, and in that process a change or reinterpretation could be proposed.

In its 1996 paper to the WTO, India has stated that on plant variety protection, under TRIPS, IP protection can be provided either by patents or by an effective *sui generis* law. This and other provisions of Article 27.3(b) was subject to review by 1 January 1999. The India paper states: "As it now stands, Members are free to incorporate in their *sui generis* laws any measures for exclusion, revocation, use without the authorization of the right holder, reduction in the term of protection and even for sharing of benefits with traditional communities, in the context of discouraging the production and use of plant varieties which are injurious to the environment and encouraging the production and use of those that safeguard or are beneficial to the environment, provided that these provisions are otherwise consistent with the TRIPS Agreement". It urged the CTE to accept this interpretation. These and other related issues in the context of biotechnological inventions and biodiversity should be borne in mind during the review in 1999.

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Intellectual Property and Technology Transfer

ARTICLE 66.2 of the TRIPS Agreement provides that developed countries should provide incentives to their institutions and enterprises to encourage the

transfer of technology to least developed countries. This will enable least developed countries to build up their technological base. At the November 2001 Doha Ministerial Conference, ministers agreed that the TRIPS Council should "put in place a mechanism for ensuring the monitoring and full implementation of the obligations in question". Developed countries must report to the TRIPS Council on what they are doing to implement Article 66.2 by December 2002. The TRIPS Council will then be able to review the actions of developed countries, and developed countries will be required to submit updated reports annually.

The Working Group on Trade and Transfer of Technology was also established in Doha, with a mandate to examine the relationship between trade and transfer of technology and any possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries.

On 12 February 2003, the Permanent Delegation of the European Commission communicated a Reflection Paper on the Transfer of Technology to Developing and Least Developed Countries to be circulated to the Council and the Fifth Session of the Working Group. The Paper is conceived as both a complement to the recent notification made by the EC on the implementation of TRIPS Article 66.2 and a preliminary contribution to the discussion on its monitoring. It primarily aims at clarifying how technology transfer takes place and at identifying the problems faced by least developed countries although it does not intend to draw any operational conclusions at this stage.

On 19 February 2003, the Council reached a decision with a view to putting in place a mechanism for ensuring the monitoring and full implementation of the obligations in Article 66.2. It decided that developed country members shall submit annual reports on actions taken or planned in pursuance of their commitments under Article 66.2 and shall submit the reports prior to the last Council meeting of the year. The submissions shall provide members an opportunity to pose questions in relation to the information submitted and request additional information, discuss the effectiveness of the incentives provided in promoting and encouraging technology transfer to least developed country

members and consider any points relating to the operation of the reporting procedure. The reports shall include the following information: an overview of the incentives regime put in place to fulfil the obligations of Article 66.2; identification of the type of incentive and government agency or other entity making it available; eligible enterprises and other institutions in the territory of the Member providing incentives; information on the function of other incentive practices such as mode of technology transfer.

At the Sixth Session of the Working Group held on 13 and 26 May 2003, the delegations of Cuba, India, Indonesia, Jamaica, Kenya, Nigeria, Pakistan, Tanzania, Venezuela and Zimbabwe made a joint submission on "Possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries". The paper highlighted a number of areas where the proponents felt that recommendations could be made by the Working Group on concrete and practical steps that might be taken to facilitate transfer of technology to developing countries in the context of the mandate contained in paragraph 37 of the Doha Ministerial Declaration. The recommendations made in that submission included an examination of:

- The different provisions contained in various WTO Agreements relating to technology transfer;
- The restrictive practices adopted by multinational enterprises in the area of transfer of technology;
- The impact of tariff peaks and tariff escalation in developed countries on technology transfer;
- The difficulties faced by developing countries in meeting the standards set by the WTO agreements due to the lack of required technology; and
- The need for and desirability of internationally agreed disciplines on transfer of technology.

The Swiss delegation also made a submission titled "Creating Incentives for the Transfer of Technology of Environmentally Sound Technologies" at the sixth session. The submission examined the Swiss experience with transfer of technology to developing countries based on hands-on experience with centres working in the field of transfer of Environmentally Sound Technologies (EST). The submission noted the beneficial effects of a stable, transparent and enforceable enabling environment on the transfer of EST.

The Working Group on Trade and Transfer of Technology reported to the General Council in a document dated 14 July 2003. The paper outlined the submissions by members and presentations of country experiences as well as presentations by intergovernmental organizations. The report also describes inputs of work in other WTO bodies on trade and transfer of technology and the background papers disseminated by the Secretariat. Finally, the paper summarizes the broad themes discussed in the Working Groups sessions:

- Definition of transfer of technology;
- Transfer of technology and enabling environment;
- Transfer of technology and role of home and host countries;
- Transfer of technology and IP rights;
- Transfer of technology and foreign direct investment (FDI);
- Transfer of technology and WTO Agreements; and
- Transfer of technology and technical assistance.

Transfer of Technology

At the Doha Ministerial it was agreed that the WTO would set up a working group to examine the relationship between Trade and Transfer of Technology and to report findings to the Fifth Session of the Ministerial Conference.

Technology transfer has been an issue in some parts of the WTO (such as TRIPS), and before that in the GATT and in a great many other international negotiations (especially environmental negotiations) for many years. The key issue is essentially the difference of approach to technology transfer taken by developed and developing countries. Some see technology transfer as taking place implicitly through routine trade relations, and especially through foreign direct investment (FDI) - countries should therefore create the conditions in which FDI can take place (stable regulatory environment, intellectual property protection, etc.) and technology will follow trade. Others would prefer a more explicit approach with companies being pushed into transferring technology (rather than pulled to a suitable location for FDI) on concessional terms. How we bridge this gap is the key to a positive outcome.

(Continued on page 40)



BOOKS/ARTICLES NOTES

BOOKS

International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime edited by Deith E. Maskus and Jerome H. Reichman, Cambridge University Press, (USA), 2005.

THE publication has been presented in four parts. Part I entitled "International Provision of Public Goods under A Globalized Intellectual Property Regime" provides a detailed account of public goods in the expanding knowledge economy. Further, it deals with issues related to science, access to information, and agricultural technologies. Part II entitled "Innovation and Technology Transfer in a Protectionist Environment" focuses on obstacles to transfer of technology under international intellectual property standards. Further, it studies the implications for moving technology into the public domain. Part III, entitled "Sectoral Issues: Essential Medicines and Traditional Knowledge" discusses the critical problem of ensuring that access to the medicines is not worsened by the international intellectual property system via the exercise of patents and protection of clinical test data. Further, it offers both positive and negative assessments of the potential for the new regime to improve innovation and distribution of medicines and to meet the needs of poor countries.

The concluding part looks into balancing of public and private interests as laid down under the intellectual property regimes.

Technology Transfer: Strategic Management in Developing Countries by Goel Cohen, Sage Publications, New Delhi, 2004.

THE book makes an attempt to analyze the process of technology transfer to developing countries, on

the one hand, and provides a basis for the quantifiable modeling of technology assessment, on the other.

It has been presented in six chapters. Chapter I focuses on the process of technological change and its relationship with the innovation process in industrialized nations and compares this with the present situation in developing countries. The chapter also presents a conceptual analysis of the nature of technological change both in industrialized and developing countries. Chapter II critically reviews the concept of technology as a paradigm. Chapter III explains a comprehensive theoretical approach, keeping in view the economic perspectives. Chapter IV discusses the pyramid of technology transfer along with the major stages in the process of transfer and the different types of technological capability required to cope up with the initial domination of imported technology. Chapter V addresses the concept of appropriateness and identifies key factors responsible for the effectiveness of any technology transfer project. The concluding chapter studies effects of the globalization process and the WTO's policies relating to technology transfer to developing countries.

Compendium of International Arrangements on Transfer of Technology: Selected Instruments—Relevant Provisions in Selected International Arrangements Pertaining to Transfer of Technology, UNCTAD/ITE/IPC/Misc.5, United Nations, Geneva, 2001.

IN its opening remarks, the publication states that the need for technology transfer, especially to developing countries, has been debated in various international fora. Over 80 international instruments and numerous sub-regional and bilateral agreements contain measures related to transfer of technology and capacity building. The technology-related

provisions contained in these instruments follow different approaches depending on their objectives.

The book contains a set of transfer of technology-related provisions drawn from various international instruments at the multilateral, regional, inter-regional and bilateral levels. Each of these categories contains both legally binding and non-legally binding instruments. However, instruments at the multilateral level are grouped as legally binding instruments.

The publication broadly focuses on two types of instruments in the context of transfer of technology and capacity building. The *first* category deals with standard setting to protect proprietary technology. For instance, the basic principles of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) refer to criteria and objectives regarding the contribution that the protection and enforcement of intellectual property rights (IPRs) should be focused on "the promotion of technological innovation and to the transfer and dissemination of technology". These instruments are essentially concerned with the availability, scope and use of IPRs. This category also includes standard setting instruments concluded at the regional level, for example, NAFTA, European Union, Andean Group and ASEAN.

The *second* category of instruments focuses more on direct measures for transfer of technology and capacity building in developing countries, particularly in the least developed countries (LDCs). They deal mainly with the transfer of specific technologies, e.g. technologies for the protection of human health and environment, technologies for the conservation of biodiversity and technologies for the exploration and exploitation of marine resources. While the first category of instruments essentially relies on national measures for their implementation, the second category has generally in-built mechanisms including provisions for financing.

In its concluding remarks, the publication says that transfer of technology is a fundamental goal of many international instruments. However, in the agreements involving developing countries, one of the main challenges is how to ensure that "transfer and diffusion" provisions are given effect and translated into practice. The *Compendium* focuses on

the provisions of those international arrangements which can promote and facilitate transfer of technology to developing countries.

Study to Identify the Potential for Technology Transfer to Bangladesh in Jute & Jute Diversified Sector, Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India, New Delhi, September 2001.

THE publication is a Study Report based on extensive desk research and field survey in India. It discusses various aspects such as: country profile of Bangladesh including its economy, infrastructure and Government's plans & policies, status of jute industry both in India and Bangladesh, prospects for development of JDPs (Jute Diversified Products) sector in Bangladesh, technology development in JDPs sector in India, potential areas in JDPs sector for technology transfer, etc. It also includes strategies and recommendations for promotion of joint ventures, exports of project/consultancy services in JDPs sector to Bangladesh.

The Report makes a number of recommendations for enhancing India's trade and investment prospects with Bangladesh in jute and JDPs sector. These include (i) promotion of India's technical strength through dissemination of a compendium on Indian technologies amongst prospective entrepreneurs in Bangladesh, (ii) promotion of consultancy services in Bangladesh with CDC, DSIR, Govt. of India acting as the nodal agency, (iii) productivity improvement, quality control and cost reduction with services offered by Indian R&D Institutions like IJIRA, NIRJAFT, ER&DCI, SITRA, etc, (iv) Human Resource Development (HRD) in mills sector for necessary reorientation for absorption of new technology and processes, quality improvement, cost reduction, etc. with necessary support services from IIT, Calcutta, IIT, Kharagpur and IJIRA, Kolkata, (v) HRD in JDP sector through extensive Skill Development Training Programme along with other necessary infrastructure support with pivotal role played by NCJD in association with JSCs, (vi) setting up of Jute Service Centres (JSCs) for providing a package of services for promotion of JDPs with NCJD from India acting as the nodal agency, (vii) providing market assistance for promotion of JDPs in the domestic and

export market by JMDC and/other reputed consultancy/marketing agencies in India, and (viii) updating of this Report periodically at an interval of 2/3 years for the benefit of Indian stakeholders.

Technology Transfer and Joint Ventures

Abroad by R.R. Azad, Deep & Deep Publications Pvt. Ltd, New Delhi, 2000.

THE publication says that the bold economic reforms, globalization and liberalization policies have laid great emphasis on increasing the country's foreign trade by accelerating its export growth through technology transfer. Technology Transfer (TT), it says, has long been recognized as one of the key factors in accelerating economic development. In the 21st century, TT is set to play an important role in the future growth of firms and economic development of the countries, especially in the context of growing international competitive pressures.

The publication examines in detail a series of issues relating to technology transfer. These include: policy procedures and practices, technologies from India, profiles of Indian joint ventures abroad, and the major constraints in the way of technology transfer.

International Technology Transfer: Contracts, Learning and Alliances, *Occasional Paper No. 56*, Export-Import Bank of India, 1997.

THE publication studies the organizational structure of technology transfer by multinationals. Further, it studies factors relating to formation of joint ventures, subsidiaries and licensing as alternate forms of technology transfer.

It has been presented in two sections. Section I discusses the main conclusions and findings. Section II makes an indepth study of multinational operations and international technology transfer issues. Further, it makes an attempts to identify gaps in understanding these issues. It also discusses other related issues such as transaction cost literature on multinationals and dynamic theories of the multinational enterprises especially those deriving from 'The Product Life Cycle Hypothesis'.

Technology Transfer in the Developing Countries edited by Manas Chatterji, Macmillan Press Ltd., London (UK), 1990.

IN its opening remarks, the publication says that technology transfer is a dynamic field with many facets. It is intimately related to economic, social, and political developments. Considerable opportunity, it says, exists to integrate it with development theory and production economics. It has also linkages with information system and marketing, particularly with reference to multinational corporations.

The publication presents the problems and opportunities accruing from transferring technology from the developed to the developing countries. Further, it addresses the conceptual issues, legal ramifications, empirical testing of mathematical models and case studies of different industries in several countries.

The book contains a set of research papers which were presented at an International Conference on Technology in the Developing Countries held at the Asian Institute of Technology, Bangkok (Thailand) in January 1988.

It has been presented in four parts. Part I discusses about conceptual issues. Part II focuses on the strategic dimensions of the problems associated with technology transfer and the ways in which these problems can be addressed. Part III deals with the subject of computer technology. This sector, it says, has an immense usefulness in production, service industries, education, health and welfare. The concluding part presents findings of a few case studies of some countries/regions relating to technology transfer.

Technology Transfer to Small and Medium Industries in India by J.S. Juneja, National Small Industries Corporation Limited, New Delhi, September 1989.

THE publication which is a comprehensive Paper makes an attempt to discuss the various issues concerning transfer of technology to SMEs in India. The Paper starts with the present scenario of SMEs and provides an overview of technologies applicable in this sector. Further, it focuses on the import of technology by SMEs in India followed by an analysis

of the strategies for technology acquisition and the Government's role in this respect. Finally, the publication draws conclusions, perspectives and makes recommendations for technology transfer in India.

The Paper was presented at the Expert Group Meeting on Transfer of Technology for SMEs in developing countries held during 10-15 November 1988 at Bangkok. The Meet was organized by the Economic and Social Commission for Asia and the Pacific. During the deliberations, a critical evaluation of the Paper was done and many valuable suggestions emerged. Some of the major ones are as under:

- (i) Technology must be efficient, and appropriate on the economy where it is to be deployed. This is a fact and holds good for Indian industry. In selecting, adopting and adapting a technique, extra care needs to be taken.
- (ii) It is usual to hear that the developed countries export to the developing nations technologies that have become obsolete, or are second rate. Proper attention needs to be given to scrutinize them.

Technology Transfer and Change in the Arab World by A.B. Zahlan, United Nations, Pergamon Press, New York, 1978.

THE book contains proceedings of a seminar organized by the United Nations Economic Commission for Western Asia Natural Resources, Science and Technology Division at Beirut from 9-14 October 1977. The Seminar was attended by participants from the Arab world, Europe, USA, Canada and UN agencies. They reflected different professional and occupational backgrounds, a factor that enriched the meetings and discussions. About thirty papers were presented at the Seminar. These papers illustrate the fact that technology involves subjective and controversial factors to a considerable degree. This is often forgotten in Third World countries where technology is conceived as an extension of stable and definitive science. The challenge of developing countries, it says, is not to eliminate these intrinsic features of technology but rather to consciously utilize and shape them to comply with social and cultural needs.

The Papers further emphasize on the technological and non-technological aspect, of

technological changes in the areas of agriculture and water systems.

In its concluding remarks, the Papers say that in a developing society, choice is always difficult. It is between investing in hospitals to cure the sick or investing in agricultural development to feed the children; between expanding capital intensive heavy industrial base or expanding secondary manufacturing to meet consumer needs.

ARTICLES

Technology Transfer and Regional Economic Growth Issues by Robert Premus and Ravi Jain, *International Journal of Technology Transfer and Commercialization*, Vol. 4, No. 3, 2005, Geneva (Switzerland).

THE article makes a study of "technology transfer" as a mechanism of regional economic development. Further, it examines implications of the recent growth theories relating to technology transfer and technology transfer policy. It opines that unless local communities offer a hospitable business climate for technological innovation and undertake complementary policies to encourage entrepreneurship, technology transfer from government and university laboratories is not going to be a major tool of regional economic development.

The article comes out with various suggestions relating to technology transfer. These include: (i) Creating formal and informal networking mechanisms to improve communications between government laboratories, universities and industry; (ii) Funding several technology transfer demonstration projects in the region; (iii) Establishing a regional technology transfer clearing house to keep area business abreast of trends and opportunities in federal research throughout the federal laboratory system; (iv) Establishing a regional cooperative research programme to stimulate major cooperative research efforts involving government laboratories, private industry and universities; and (v) Encouraging communities in the regions for developing long-term programmes and strategies to stimulate technology transfer.

Wind Power Technology Development, Transfer and Commercialization Alongwith Construction of A Wind Turbine Test Site in Korea by S.H.

Kim, *International Journal of Technology Transfer and Commercialization*, Vol. 4, No. 3, 2005, Geneva (Switzerland).

THE article examines the current status of wind power generation industry in Korea and its renewable wind energy policies. It further discusses the overall status of the wind power generation in Korea, thereby covering various issues such as: technologies related with wind power performance test projects; administrative problems that emerged while carrying out the project; issues in technology transfer during the introduction of a foreign-made wind turbine; wind turbine performance monitoring system; and the problems faced during operation.

International Technology Transfer and Collaborative New Product Development: Evidence and a Case from the Machine Tool Industry by David Bennet and Kirit Vaidya,

International Journal of Technology Transfer and Commercialization, Vol. 1, Nos. 1-2, 2005, Geneva (Switzerland).

AT the outset, the article says that it has become increasingly common for companies to improve their competitiveness and find new markets by extending their operations through international new product development collaborations involving technology transfer.

The article particularly discusses about the case of technology transfer through collaborative new product development relating to the machine tool sector. Further, it discusses about links between the operational aspects of collaborations and their strategic objectives.

In its concluding remarks, the article says that technology transfer and collaborative new product development provide an opportunity to learn, absorb and develop transferred technology. The operational arrangement for such ventures, it says, is a key mechanism for successful collaboration. Cost reduction practice and the technology transfer and learning process, it says, need to be closely studied. The operational arrangement, it says, is the key to maximizing the scope for cost reduction practice

while maintaining product quality. Cost and transfer targets should be set up in parallel on a phased basis.

Technology Transfer for SMEs: Challenges and Barriers by Melanie Jones and Ravi Jain, *International Journal of Technology Transfer and Commercialization*, Vol. 4, No. 3, 2005, Geneva (Switzerland).

IN its introductory remarks, the article says that research has shown that small and medium-sized enterprises (SMEs) play an important role in the economic development of countries worldwide. Further, it says that because of limited resources at their disposal and their relative inability to absorb the costs and risks associated with in-house technology development, SMEs must utilize the process of technology transfer to take advantage of the benefits gained by technology and innovation.

The article also makes an attempt to identify primary challenges faced by SMEs with regard to technology development and acquisition.

Finally, it emphasizes the need to conduct research studies focusing on identifying challenges faced by SMEs with regard to technology development issues, on the one hand, and identifying strategies formulated by government to assist SMEs with technology acquisition and development, on the other.

Success in Technology Transfer to China Resource-based Factors by Jorge Niosi and Claude Marcotte, *International Journal of Technology Transfer and Commercialization*, Vol. 3, No. 4, 2005, Geneva (Switzerland).

THE article reveals that small and medium-sized enterprises have more difficulties in operating in China due to their limited resources and experience. Further, it says that technological complexity may compound the difficulties of the smaller firms. Giving a note of caution, it says that smaller enterprises operating in sophisticated industries should think twice before transferring technology and/or investing in China. The lack of technical skills of their partners may impose high costs such as supporting technical training of the local host manpower, etc. The Chinese operation could thus become non-performing and impose heavy losses on the smaller transferor of technology.

Synthesis of Research Issues in Technology Acquisition by Arvind Bhardwaj, Sushil and S.K. Sharma, *International Journal of Technology Transfer and Commercialization*, Vol. 4, No. 2, 2005, Geneva (Switzerland).

THE article focuses on specific issues relating to transfer of technology from firms in industrialized countries to enterprises in developing countries through joint ventures or license agreements (technical collaborations). These relate to hurdles/barriers during technology acquisition, vendor-customer relationship for effective technology transfer, suitability of acquired technology, characteristics of the donor company, and training of employees for effective transfer of technology.

Issues on Technological Forecasting and Technology Transfer in India by S.N. Mishra, S.G. Deshmukh and Prem Vrat, *International Journal of Technology Transfer and Commercialization*, Vol. 4, No. 2, 2005, Geneva (Switzerland).

IN its opening remarks, the article says that technological forecasting (TF) has been acknowledged as an effective tool in formulating technology strategies. Several techniques have been evolved for technology transfer. The article says that in India, the Government has set up an organization: Technology Information Forecasting and Assessment Council (TIFAC) for the purpose of technological forecasting. The TIFAC in one of its studies entitled "India 2000" has made many forecasts relating to technology transfer.

Finally, it stresses the need to learn from the experience of forecasting around the world. Forecasters, it says, have to be aware of the gaps and chalk out appropriate methodologies to suit the environment.

Networking for Technology Acquisition and Transfer by Masayuki Kondo, *International Journal of Technology Management*, Vol. 32, Nos. 1-2, 2005, Inderscience, Geneva (Switzerland).

THE article says that technology acquisition and transfer from overseas has been crucial for development. These days, the change of technology and the changes caused by technology, compel

governments and companies to change their strategies for technology acquisition and transfer from overseas.

Technology transfer, it says, is largely influenced by the technology development and changes taking place in the technology. Access to the information about technologies thus has become easier, due to information and communication technology worldwide.

In its concluding remarks, the article says that we live in the global age and we can exchange information of goods worldwide easily.

Technology Transfer and Implementation Processes in Developing Countries, by Mohamed Mamdouh Awany, *International Journal of Technology Management*, Vol. 32, Nos. 1-2, 2005, Inderscience, Geneva, (Switzerland).

AT the outset, the article says that in their struggle to survive, enterprises in developing countries are keeping abreast with the technological advancements. As the indigenous technological capabilities of developing countries are weak, they intend to import technology internationally. Experience shows that, in doing so, a number of obstacles render the technology acquisition process less effective, or even sometimes, a failure economically and/or technically. Cases in developing countries further show that the technological capabilities of the technology recipient country are a decisive factor in successfully transferring and absorbing of the particular technology. Many other factors affect the process, such as education, culture, legislations, enabling environment, etc. Building the indigenous technological capabilities, it says, should be the ultimate goal of the developing countries in order to coping with the aggressive competing world. Governments of developing countries, should review their strategic plans in order to consider the fast moving technology advancements.

Technology transfer, it further points out, is a proven means for gaining competitive advantages in world of aggressive competition competitiveness. That is equally true for large corporate companies that already possess high level of technology capabilities. For companies in developing countries,

the issue is more critical and the technology transfer process becomes a must for their continuous development, sustainability and survival especially as the world is moving fast towards the globalization era.

In its concluding remarks, the article says that as developing countries are rushing towards technology acquisition, they sometimes forget some important concept, and issues when buying and implementing the technologies. Experience show that the technological gap between developing and developed countries is widening and could be serious in the couple of decades to come.

Technology Transfer in the Doha Round

by Nagesh Kumar, *The Financial Express*, 13 September 2005, p. 6.

IN its opening remarks, the article says that in the context of bringing symmetry in the roles played by the developed and developing countries in multilateral trade negotiations, it is often contended that the latter generally confine themselves to reacting to the agenda set by the former. Developing countries, it argues, need to be more proactive. In the Doha Round, developing countries did raise a couple of issues for the first time. One of these related to transfer of technology for which a Working Group was set up under the auspices of the General Council to examine the relationship between trade and transfer of technology, and to make recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries.

Developing countries, it says, should use the window of opportunity provided by the Doha Mandate on Trade and Transfer of Technology.

In its concluding remarks, the article says that developing countries have done well to seek a WTO framework on transfer of technology in the Doha Round. However, unless they bring to the negotiating table credible proposals for facilitating transfer of technology, it will end up without any concrete outcome. Developing countries thus need to document the problems arising from TRIMS and TRIPS commitments and seek an operational and effective framework that provides them policy space to build local technological capabilities that are so critical for their industrial development.

International Technology Transfer: Efforts by UNIDO and Other Agencies by T. Miyake, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

IN its introductory remarks, the article says that in the age of economic globalization, technology transfer has assumed international dimensions. It has played a crucial role not only in the industrial growth of developing countries, but also in enhancing the competitiveness of their enterprises in the international market. Technology trade between countries takes place through different mechanisms such as: foreign direct investment (FDI), joint ventures, licensing, subcontracting, and so on.

The article presents an overview of technology trade of Japan and also discusses the technology transfer activities of UNIDO.

Further, it says that technology transfer plays a similar role in enhancing the economic development of developing countries and in improving the competitiveness of their firms in international markets if it is used as a learning device and if it interacts effectively with domestic technology efforts. Technology transfer may have a wide ranging impact on the countries that receive the technology. Generally speaking, technology imports increase the available stock of technological and managerial knowledge, and may help to increase people's living standards and the country's competitiveness.

Obstacles to Technology Transfer

by Kil-Choo Moon, Jong-Bok Park Chi-Ho Choi and Soo-Hong Chase, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

THE article identifies problems of the national R&D programme guidelines and gives suggestions for its improvement. Further, it highlights findings of a survey which was conducted to study how practitioners actually implement technology transfer, and how the policy and regulations (including the R&D programme guidelines) influence the practices of technology transfer in public R&D sectors.

In its concluding remarks, the article says that research institutes are not willing to register their technology information to the database developed

by National Technology Bank. These institutions want to manage their technologies for commercialization by themselves. Finally, it says that providing a legal base for mandatory registration of technology information is required for the purpose of integrated information management.

Technology Transfer Trends: The Indian Experience by S.P. Agarwal, Ashwani Gupta and G.P. Gandhi, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

IN its opening remarks, the article says that the objectives and modes of technology transfer have undergone significant changes over the years, particularly after the birth of the WTO in 1995. The Republic of Korea, Taiwan, Singapore and Hong Kong were among the earlier countries that started opening up their economies and adopted market driven policies. Later, China, Malaysia and many other countries followed.

In 1990, India, it says, announced its liberalized, new industrial policy and other policy measures, including the Foreign Direct Investment (FDI) policy, which broadly aimed at enhancing international competitiveness and exports, and perceived FDI as an additional source of investment.

The article examines the emerging technological needs and technology transfer policies and practices in developing countries of the Asia-Pacific, with special reference to India. It also discusses trends in technology-intensive exports over a period of eight years (1994-2002).

In its concluding remarks, the article says that new technology transfer policies in various developing countries in the Asia-Pacific region reflect the need to globalize production facilities and internationalize R&D, and to give easier access to foreign technologies.

Integration for Technology Transfer by Liu Youlin, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

THE article presents the concept of integrating services to facilitate technology transfer development

in China. It describes how China's Northern Technology Exchange Market (NTEM) has learnt valuable lessons from the experience of developed countries. It also illustrates through three actual cases, how NTEM has used the integration concept to disseminate effective technology transfer in the country.

The article further says that the concept of "integration" has achieved great success in such disciplines as: information, manufacturing and management. Examples are the computer integrated system in manufacturing and the LAF (lean-agile-flexible) production system in management. Integration aims to fulfil holistic, multi-dimensional optimization of the various resource elements so as to improve the overall effect and efficiency.

In its concluding remarks, the article says that technology transfer service is highly sophisticated and systematic and thus needs multi-sided cooperation and support. NTEM has over the years established cooperation with more than 280 leading research institutions such as Qinghua University, Xian Jiaotong University, Nankai University, China Carrier Rocket Institute, and China Ship Institute. This technology network enables NTEM to attain sufficient and reliable technology and intellectual resources, and provides tech transfer services in an endless stream. It has set up nearly 100 liaison offices over 22 provinces in the country.

Tools of the Technology Transfer Trade by Behfar Bastani, Evelyn Mintarno and Dennis Fernandez, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

IN its opening remarks, the article says that universities produce a large number of inventions every year and are considered as the best sources of intellectual property (IP). The growing portfolio of companies that have successfully utilized university technology calls for an insight into the nature and process of university technology transfer.

The article discusses current issues and approaches of the university technology transfer process. Technology transfer, it says, is the process of transferring discoveries and innovations resulting from university research to the commercial sector.

In its concluding remarks, the article says that university technology transfer offers substantial benefit for companies seeking a greater competitive advantage. The acquisition, negotiation and management of such intangible assets represent a critical capability for companies expecting higher return opportunities. Finally, it says that an understanding of the basic tech transfer process, different licensing terms and potential pitfalls will help company management secure an agreement that is aligned with the business model and strategic vision at hand.

Technology Transfer Agreements: World Intellectual Property Organization, *Tech Monitor*, May-June 2004, Asia Pacific Centre for Technology Transfer (APCTT), New Delhi.

IN its introductory remarks, the article says that technology transfer is a complex process and employs different methods and approaches. Depending on the nature of technology, and the capacity of the recipient, the process could be relatively simple and straightforward or could be fairly complex in nature. Technology transfer agreements facilitate transfer of technology and know-how between parties. These are basically legal contracts and are of different types.

The article deals with issues such as how technology is transferred; what are the main types of legal contracts for the transfer of technology and what will determine the type of agreement that is entered into by two parties involved in the technology transfer.

In its concluding remarks, the article says that there are various types of contractual relationships through which technology may be transferred. Businesses and institutions will need to evaluate on a case by case basis, i.e. which type of relationship will be more suitable, and negotiate the specific terms to be included in the agreement. A number of market factors, as well as factors that are internal to the recipient or specific to the technology in question, will influence what type of agreement is reached between the two parties. In terms of intellectual property, it is important to bear in mind that intellectual property rights represent a pro-competitive monopoly and their owner should not

exercise his right by abusing his monopoly, or by imposing anti-competitive obligations on the licensee. The negotiation of a technology transfer contract may be a complex process and thus requires parties to be flexible and willing to search for an agreement that will be beneficial to both sides.

Technology Transfer Results Achieved by Hungarian SMEs and Academic Institutions

by George L. Kovacs, *Technology Transfer in Developing Countries – Automation in Infrastructures Creation*, IFAC, 2001, Pretoria (South Africa).

THE article deals with some issues relating to technology transfer (TT) during the past 10-15 years in Hungary. Further, it says that managers of the successful SMEs need to learn how to use the professional engineering and IT knowledge they accumulated during their academic and/or industrial years. On the other, some business knowledge has to be picked up. Several SMEs, it says, failed and fail from day to day, as the managers are unable to adapt to the market economy. They do not understand what to sell, how to sell, whom to sell, how to meet the real technological needs. To survive, a perfect knowledge not only of professional things, but of the customers' needs are equally important. One can compete only if one's local knowledge and expertise is used appropriately.

Technology Transfer to A Developing Country: The Road to Industrialization by Alexander Bloch, *Technology Transfer in Developing Countries – Automation in Infrastructures Creation*, IFAC, 2001, Pretoria (South Africa).

THE article describes the transition of a developing country from an initial agrarian state, with no vestige of technology, to a point of industrial take-off. A period of 50 years, from 1917 to 1967, is reviewed in the development of Palestine/Israel. Those were the years in which the foundation for rapid industrialization was laid and in which a basic infrastructure was created that was the basis for subsequent developments.

The article further describes different channels which were used for technology transfer in these countries. The most important was the movement

of people to the country. A second important avenue was the purchase of know-how agreements. Other channels used to obtain technology comprised extensive use of foreign literature. Technical information was also gathered by means of sending students abroad to acquire advanced degrees. Factory tours abroad were also a common way as was the copying of foreign weapons and system. Alternative approaches to technology transfer were recognized principally through attempts at in-house development and manufacture of military systems and products as well as through outright purchase from foreign sources.

Proposals on Intellectual Property Rights Issues, WT/GC/W/147, WT/GC/W/147, World Trade Organization, Geneva.

THE article deals with a set of proposals submitted by India on 18 February 1999 relating to intellectual property rights issues as laid down under in TRIPS Agreement. Some of the major ones are as under:

- (i) It is important to build disciplines for effective transfer of technology at fair and reasonable costs to developing countries so as to harmonize the objectives of the WTO Agreement and the TRIPS Agreement.
- (ii) Facilitating the access of technologies to developing countries constitutes one of the key elements in accelerating the pace of their economic and social development. Such access is generally the result of licences and technology transfer agreements.
- (iii) The high cost of technology makes it difficult for the smaller, poorer developing countries to acquire appropriate technology on commercial terms. Such countries may be able to acquire appropriate technology critically needed for their development only through government to government negotiations and with the financial assistance provided by government and other

institutions in developed countries or inter-governmental organizations.

- (iv) The denial of dual-use technologies, even on a commercial basis, to developing countries is another aspect that leads to widening of the technology gap between developed and developing countries. Under this guise, a variety of technologies and products are being denied to developing countries which could otherwise have helped to accelerate their growth process. This issue needs to be carefully examined and seriously dealt.
- (v) The TRIPS Agreement needs to be reviewed to consider ways and means to operationalize the objective and principles in respect of technology transfer to developing countries, particularly the least developed amongst them.

Technology Transfer with Commitment by Arijit Mukherjee, Faculteit Technologie Management, The Netherlands, 2001.

THE article discusses technology transfer in a duopoly where the firms have two types of commitment strategies: incentive delegation and capacity installation. It turns out that the possibility of technology transfer significantly differs under these two types of commitment. Under strategic incentive delegation, the possibility of technology transfer is minimal where both firms use the incentive delegation strategy and the costs of incentive delegation are negligible. If both firms choose the incentive delegation strategy and the costs of incentive delegation are significant, then the possibility of technology transfer rises compared to a situation with no pre-commitment. In case of commitment to a capacity level before production, the possibility of technology transfer does not change when both firms simultaneously commit to their capacity levels.



DOCUMENTS

Working Group on Trade and Transfer of Technology Eleventh Session

Note on the Meeting of 11 April 2005

Analysis of the Relationship Between Trade and Transfer of Technology

1. Members continued their consideration of the relationship between trade and transfer of technology and engaged constructively in discussions on the study titled "Facilitating Transfer of Technology to Developing Countries: A Survey of Home-Country Measures", introduced earlier by UNCTAD at the 10th Session of the Working Group. Members agreed that the study highlighted the important role the home-country measures played in encouraging flows of technology to developing countries. Underpinning the significance of a holistic approach to a better understanding of the interface between trade and transfer of technology, a number of Members said that further studies on "host-country measures" and "domestic research and development programmes" that have been successful in generating "industrial development and economic growth" could be useful in furthering the work of the Working Group. Some Members stated that investment in research and development and the facilitation of transfer of technologies to developing countries was a powerful tool for development and in that context, discussions in the Working Group had a continuing relevance and importance to developing countries. One Member expressed the view that the private sector, as an important partner in the global economy, had a responsibility to share technology with the less developed countries. Another Member suggested that a recent document (IIM/1/4, dated 6 April 2005), which related to IPR

and technology transfer, and was being discussed in the ongoing inter-governmental meeting in WIPO, could also provide useful issues for further consideration in the Working Group.

2. Some Members held the view that though technology transfer was an important means to promote economic development, it was not an end in itself. Although these Members recognized that the study provided a useful compilation of home-country measures, they felt that it only underscored one aspect of an otherwise complex issue. They added that because production factors in the innovation process were overwhelmingly generated by the private sector, there were limits to the role that governments could play in the transfer of technology. However, Members broadly acknowledged that both the private and public sectors had an important role to play in technology transfer through cohesive partnerships. In that context, it was suggested that further work should be done in relation to the elements of "corporate responsibility" that fostered development. With respect to document IIM/1/4, a Member stated that the scope of discussions in the Working Group was much broader than just on the role which IPRs played in encouraging transfer of technology. The TRIPS Council was therefore the appropriate forum for any discussions on the relationship between TRIPS and development.

3. Responding to the Members' comments on the study, the representative of UNCTAD said that in order to make technology transfer and its diffusion

successful it was important that home-country measures were complemented by host-country measures. He agreed that another area of increasing relevance was corporate responsibility which needed to be considered more carefully in the context of the relationship between trade and transfer of technology.

Any Possible Recommendations on Steps that Might be Taken Within the Mandate of the WTO to Increase Flows of Technology to Developing Countries

4. Members had a very brief discussion on the first two recommendations contained in document WT/WGTTT/W/6, namely (i) an examination of the different provisions contained in various WTO Agreements relating to technology transfer; and (ii) the provisions contained in various WTO Agreements which may have the effect of hindering transfer of technology to developing countries. A number of developing country Members reiterated their interest in continuing discussing these recommendations at the next meeting.

5. At the 10th Session of the Working Group, one Member had suggested that the Working Group request the Council for Trade in Services to inform the Working Group on the work carried out in the context of Articles IV and XXV of the GATS. Accordingly, the Secretariat briefed the Working Group and informed Members that the architecture of GATS tended to place many of the actual commitments undertaken by Members in the sphere of negotiated bilateral commitments. However, the Special Session of the Services Council had had discussions on operationalizing Article IV mainly through the examination of Category II S&D proposals referred to it by the General Council, in 2003. The issue of transfer of technology had come up in those discussions, in particular in the context of Article IV:1 which related to increasing the participation of developing countries through negotiated specific commitments by strengthening their domestic service capacity, efficiency and competitiveness, through, *inter alia*, access to technology on a commercial basis.

Other Business

6. The representative of UNCTAD introduced "A Case Study on the Electronic Industry in Thailand".

The study highlighted the contribution of the manufacturing sector of Thailand to the country's rapid export growth in recent years. Thailand was among the top five exporters of computer-related products and the share of manufactured exports in its total exports had increased from 5 per cent in 1970 to 74 per cent in 2001. The electronics industry accounted for about 30 per cent of total exports. Foreign Direct Investment (FDI) had played an important role in the development of the electronics industry in Thailand. The FDI stock in the industry has increased from about \$250 million in 1987 to above \$4 billion by 2001, facilitating the transfer of technology, assembly of high-tech products, enhanced managerial skills as well as the development of local suppliers.

7. The study underlined the role of host-country measures in technology transfer by throwing light on some of the pro-active policies pursued by the Government of Thailand. These policies played a crucial role in creating a favourable environment for export-oriented FDI, promotion of technology transfer, its diffusion, innovation in the industry and an enabling framework for the emergence of domestic support industries. This had helped make the country attractive for foreign investors. Some of these policies, through the Unit for Industrial Linkages Development (BUILD) programme under the Thailand Board of Investment, among others, included tax exemption; provision of facilities in industrial parks at reduced cost; facilitating partnerships between local and foreign technical consultants through the establishment of Industrial Consultancy Services; encouraging the development of support industries; strengthening linkages between FDI and local industry; and assisting small and medium cooperation between foreign and domestic firms. In 2004, the programme received the World Association for Investment Promotion Agencies (WAIPA) Award for best practice in promoting linkages that facilitate technology transfer and innovation. These initiatives had played an important role in integrating domestic contract manufacturers into the global production networks of transnational corporations (TNCs) and in acquiring assembly process capabilities, enhancing export competitiveness, and building up domestic supplier networks in the electronics industry.

8. Members felt that the study was a valuable contribution to the deliberations of the Working Group. Making preliminary comments on the study, one Member thought that certain types of activities by the Board of Investment to draw in FDI seemed to constitute subsidies which needed to be carefully looked at. Members, however, requested more time to go through the study and provide more substantive comments. Accordingly, it was agreed that the Members could, if they so wished, address the UNCTAD study at the next meeting.

9. The Chairman informed Members that the Secretariat had received a communication from the Association of International Network for Small and Medium Enterprises (INSME), a non-profit organization based in Italy. Its members included

governmental bodies, international organizations, international NGOs and its work was aimed at stimulating transnational cooperation and public private partnership in the field of innovation and technology transfer to small and medium enterprises. In its communication to the Secretariat, the INSME had expressed an interest in informing the Working Group on its activities and making a presentation at a future meeting of the Working Group. Members agreed to invite INSME to make a presentation at the next meeting of the Working Group.

10. The Chairman informed Members that the next meeting of the Working Group had been tentatively scheduled for Wednesday, 6 July 2005.

(WTO, WT/WGTTT/M11, 9 June 2005)

Working Group on Trade and Transfer of Technology Tenth Session

Note on the Meeting of 10 November 2004

Analysis of the Relationship Between Trade and Transfer of Technology

1. In continuing the analysis of the relationship between trade and transfer of technology, Members recalled that at the last formal meeting, they had discussed some of the elements contained in earlier submissions, in particular on the identification of various channels of transfer of technology and the conditions under which those channels could be operationalized. In view of the complexity and multifaceted nature of technology transfer, Members reiterated the importance of continuing work in a more focused and intensive manner to better understand the relationship between trade and transfer of technology. Some Members expressed the view that a better understanding of the linkage between trade and technology transfer might be possible if the Working Group undertook an examination of provisions relating to technology transfer in the various WTO Agreements. They made references to some of the provisions relating to technology transfer in the TRIPS, TRIMs, GATS, SPS and TBT Agreements and the need to assess and analyze whether these agreements had fulfilled

the objective of promoting transfer of technology. However, other Members felt that the Working Group needed to be cautious in its presumption that WTO Agreements were not fulfilling their objectives. They felt that ideally a discussion on the implications of the various provisions relating to the transfer of technology, should take place in the relevant WTO bodies. Other Members did not agree and said that in their view discussions on these provisions fell within the mandate of the Working Group and that the intention was not to duplicate work being done in other WTO bodies, but rather to build on it.

2. In the context of the inter-linkage between trade and technology transfer, one Member underlined the multifaceted nature and complexity of the issue and therefore stressed the importance of considering the definitional issues of technology transfer; the various channels by which technology is transferred; host country measures; the enabling environment, for example, IPRs, investment regime, regulatory structure, good governance, building infrastructure; and human resource/capacity building. Those were the areas that the Working Group needed to focus on in order to get a better

understanding of the issue. Members agreed to continue discussions on these issues at the next formal meeting of the Working Group.

3. The representative from UNCTAD introduced a study on "Facilitating Transfer of Technology to Developing Countries: A Survey of Home Country Measures", copies of which were made available to Members. The study surveyed 41 agencies and programmes in 23 developed countries offering home country measures to facilitate technology transfer. The study, comprising four parts, identified existing home country measures which encouraged transfer of technology in various modes to developing countries, in particular to the least-developed countries (LDCs). The first part of the study contained seven major types of home country measures; the second part attempted to analyze the measures, highlighting where these measures had been most predominant and where there might be gaps with respect to the typology; the third part identified further efforts that could be considered in the future to facilitate technology transfer through additional home country measures; and the fourth part of the study highlighted the importance of South-South Cooperation in the transfer of technology.

4. The representative of UNCTAD said that the study showed that home country measures were often provided as part of international cooperation programmes and as strategic trade and investment initiatives. The most common measures included support for training, foreign investment, matching services, venture capital support, financing of technology transfer and encouraging partnerships with local firms. Some of the home country measures identified in the study provided examples of best practices in facilitating technology transfer. Programmes that directly supported developing country firms to acquire technologies through partnership or financing seemed particularly effective. In that regard the study highlighted the US Leyland Initiative, the Canadian Technology Transfer Fund and the Private Sector Development Programmes of Denmark as good examples of home country measures. The representative of UNCTAD further said that the study also highlighted the need for efforts to ensure that the good intentions of home country measures were realized. These efforts

could include extensive dissemination of information on the expansion of the current home country measures, assistance to developing countries to improve technical standards and certification systems, increased mobilization of venture capital funds, allocation of a technical assistance budget for developing countries to support measures facilitating technology transfer to small businesses especially in the LDCs, encouraging enterprises to adopt practices that may facilitate transfer of technology, rapid diffusion of technologies and related development work in host countries and, where possible, participation in research and development with local firms and institutions. The need for home country measures to complement and reinforce host country measures to facilitate technology transfer and innovation in developing countries was also highlighted.

5. Members felt that the study was a valuable contribution as it provided a summary of home country measures and highlighted the important role these measures could play in facilitating technology transfer. Some Members stated that although the coverage of the study was limited, it highlighted the role which appropriate home country measures could play in facilitating transfer of technology to developing countries. While acknowledging that a regulatory framework in the host country was crucial to attract technology, the role of the home country was equally important. Home country measures could complement and reinforce host country efforts to acquire technology by including, among others, policies which provide financing for transfer of technology through special programmes, incentives to stimulate foreign direct investment (FDI) with a technology transfer component to developing countries, incentives for small and medium size enterprises to seek partners in developing countries, match-making activities as a means of assisting developing countries in acquiring technological options that suited their needs, preferential market access in transfer of technology, simplification of rules of origin and the establishment of a database to ensure the flow of all relevant information on technology so as to facilitate match-making.

6. One Member mentioned the possible linkage between "home country measures" and "corporate

developmental responsibility'' since both home country governments and the private sector had a shared responsibility to facilitate technology transfer. A number of Members also stressed that the difference in levels of development among developing countries highlighted the need for South-South cooperation in the context of technology transfer in areas of common interest. These Members believed that the study clearly demonstrated the need for home country measures to be further enhanced. They believed that financing for technology transfer especially through special programmes in certain economic sectors, could be instrumental in encouraging the private sector to share its expertise and technology with partners in developing countries. Equally important was the need to provide incentives to stimulate FDI flows to developing countries. That could include providing incentives in support of small and medium size enterprises in developed countries obtaining partners in developing countries and incentives to stimulate backward linkages with domestic firms. It was, however, felt that the study was limited in not addressing the legal and regulatory basis of these measures.

7. Without denying the importance of home country measures in facilitating transfer of technology, some Members felt that the study addressed only one component of the debate, while in fact a number of factors operated together to influence the nexus between trade and transfer of technology. They highlighted that host country measures were equally significant if technology transfer was to be a win-win situation for both home and host countries. It was generally felt that in order for the Working Group to take a holistic view of technology transfer

it would be necessary to consider all the elements which included among others, channels of technology transfer; the role of the government, which was very often limited; the role of the private sector, whose decisions were driven by commercial considerations; host country measures; the enabling environment; and the absorptive capacity of the host country.

8. Members, however, requested more time to study the survey and provide more substantive comments. Accordingly, it was decided to continue discussions on the UNCTAD study at the next meeting.

Any Possible Recommendations on Steps that Might be Taken Within the Mandate of the WTO to Increase Flows of Technology to Developing Countries

9. Members continued their consideration of the first two recommendations contained in document WT/WGTTT/W/6, namely (i) an examination of the different provisions contained in various WTO Agreements relating to technology transfer; and (ii) the provisions contained in various WTO Agreements which may have the effect of hindering transfer of technology to developing countries. Members held the view that an examination of provisions in the various WTO Agreements would enable the Working Group to build on and benefit from the work in other WTO bodies on provisions relating to technology transfer. In that context, one Member suggested that the Working Group request the Council for Trade in Services to inform the Group on the work carried out in the context of Article IV and XXV of the GATS.

(WTO, WT/WGTTT/M10, 10 February 2005)

Report (2004) of the Working Group on Trade and Transfer of Technology to the General Council

I. Introduction

1. The Working Group on Trade and Transfer of Technology was established at the Fourth Ministerial Conference in Doha in November 2001, with the following mandate:¹

“We agree to an examination, in a Working Group under the auspices of the General Council, of the relationship between trade and transfer of technology, and of any possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries. The General Council shall report to the Fifth Session of the Ministerial Conference on progress in the examination.”

2. Since its report to the General Council in 2003,² the Working Group has held three formal sessions on 3 May 2004, 19 July 2004 and 10 November 2004. The Minutes of these meetings are contained in documents WT/WGTTT/M/8, WT/WGTTT/M/9 and WT/WGTTT/M/10³ respectively. A number of informal meetings were also held during this period to discuss the way forward and the structure of future work in the Working Group. Members agreed that they would pursue the work by continuing the analysis of the relationship between trade and transfer of technology as well as discussing any possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries.

II. Relationship Between Trade and Transfer of Technology

3. During discussions on the relationship between trade and transfer of technology, Members agreed that a number of pertinent issues had been raised during the course of the Working Group's analysis of this issue. However, they felt that these discussions had not been exhaustive and that further work was needed to elaborate and develop a better

understanding of the issues. They agreed on the need for a more focused discussion and reiterated the importance of taking a holistic view on the relationship between trade and transfer of technology. In that context, Members agreed that revisiting earlier submissions tabled in the Working Group would provide useful contributions to continuing this work. Reference was also made to the Secretariat note “A Taxonomy on Country Experiences on International Technology Transfers”⁴ which had identified some of the barriers to transfer of technology and the policies and strategies that would facilitate technology transfer. Some Members felt that the note focused more on the host country perspective in identifying policy options and instruments that would facilitate technology transfer and suggested that Members share their experiences and ideas on the types of policy measures and incentives which, if adopted, would facilitate technology transfer.

4. At the Eighth Session, UNCTAD also introduced its publication “Transfer of Technology for Successful Integration into the Global Economy”. The publication provided (i) a general overview of the main findings and conclusions of three case studies and the significance of those findings in the wider context of technological upgrading; (ii) details of the case studies; and (iii) an analysis of the case studies in the light of multilateral rules in order to identify policy efforts related to technology transfer and capacity building. At the Ninth Session, Members requested UNCTAD to inform the Working Group on its work on home country measures and corporate responsibility in the field of technology transfer.

5. At the Tenth Session, while acknowledging that the relationship between trade and transfer of technology was a multifaceted and complex issue, Members underlined the importance of the definitional issues, various channels of technology transfer, host country measures, enabling environment (e.g., IPRs, investment regime, regulatory structure, good governance, building infrastructure), and human resource/capacity building, etc. and said that these were the areas that the Working Group

⁴ WT/WGTTT/W/3

¹ Paragraph 37 of WT/MIN/(01)/DEC/W/1

² WT/WGTTT/5

³ To be issued.

needed to focus upon for a better understanding of the issue. Some Members expressed the view that a better understanding of the linkage could be possible if the Working Group undertook a thorough examination of provisions relating to transfer of technology in the various WTO Agreements. In this regard they alluded to the TRIPS Agreement, TRIMs Agreement and GATS, and to Article 10.1 of the SPS Agreement and to Article 12.3 of the TBT Agreement.

6. UNCTAD also made its study on "A Survey of Home Country Measures" available for discussion at the Tenth Session of the Working Group. The study highlighted the role of home country measures in technology transfer, including incentives, the role of the home country government and the private sector, and what other efforts could be made to facilitate transfer of technology. Members highlighted the importance of partnership in technology transfer and for it to be a win-win situation for both home and host countries. It was generally felt that in order for the Working Group to take a holistic view of the issue it would be necessary to look at all the elements including channels of technology transfer; the role of the government; the role of the private sector; host country measures; the enabling environment and the absorptive capacity of the host country, etc. While acknowledging that a regulatory framework in the host country to attract technology was crucial, some Members reiterated that home country measures could complement and reinforce host country efforts to acquire technology. Such measures could include policies which provide financing for transfer of technology, incentives to stimulate FDI with a technology transfer component, incentives for Small and Medium Enterprises seeking partners in developing countries, simplification of rules of origin and the establishment of a database to ensure the flow of all relevant information on technology. Possible linkages between "Home Country Measures" and "Corporate Developmental Responsibility" were also underscored.

III. Any Possible Recommendations on Steps that Might be Taken Within the Mandate of the WTO to Increase Flows of Technology to Developing Countries

7. Members agreed to base their discussions on the joint submission on "Possible Recommendations on

Steps that Might be Taken Within the Mandate of the WTO to Increase Flows of Technology to Developing Countries"⁵ tabled by a group of developing countries. The submission indicates a number of areas where the proponents felt that recommendations could be made by the Working Group on steps that could be taken to facilitate transfer of technology to developing countries. It was agreed that at the Ninth Session, Members would address the first two recommendations contained in the submission, namely to undertake an examination of the different provisions in the WTO Agreements which relate to technology transfer and to consider provisions which may have the effect of hindering technology transfer to developing countries.

8. At the Ninth Session some Members highlighted a number of provisions in the TRIPS Agreement relating to technology transfer which they felt should be made more effective and operational. Other Members felt that the Working Group was not a negotiating body and therefore not the appropriate forum in which to amend existing provisions relating to transfer of technology. These Members felt that a discussion on the implications of the different provisions on the transfer of technology should be taken up in the relevant WTO bodies. Some Members, however, felt that Members should not limit the scope of the discussions in the Working Group. Members also reiterated the need for any proposed recommendations to flow from the discussions and the need for an organic link between any possible recommendations and the analytical work of the Working Group. Members continued their discussions of the first two recommendations at the Tenth Session. While some Members felt that work in the Working Group should not duplicate the work being done in the relevant WTO bodies, others reiterated that the intention was to build upon the work being done elsewhere. In this context it was agreed that the Working Group would seek inputs from the Council for Trade in Services about the implementation of Articles IV and XXV of GATS.

(WTO, WT/WGTTT/6, 1 December 2004)

⁵ WT/WGTTT/W/6 and Add.1

The Working Group on Trade and Transfer of Technology

Communication from Cuba, India, Indonesia, Kenya, Pakistan, Tanzania and Zimbabwe

The following communication, dated 5 May 2003, has been received from the above delegations with the request that it be circulated.

Possible Recommendations on Steps That Might be Taken Within the Mandate of the WTO to Increase Flows of Technology to Developing Countries

1. Transfer of Technology has been a long-standing and recurrent issue in international development agenda. Considering the growing importance of knowledge and technology as a production factor determining costs, price, marketability and competitiveness in general, it would be useful to examine the impact of these on international trade and how they affect opportunities for development. Since technology is the most critical determinant of competitiveness, there is widespread acknowledgement that mastering technology is critical for development. However, the process of generation, access, transfer and dissemination of technology is not a simple or a costless process. It requires, among others, appropriate skills, institutions, policies, a friendly international environment and international rules that facilitate transfer of technology. It is against this backdrop that a group of developing countries submitted a proposal (WT/GC/W/443), in September 2001, for the establishment of a Working Group for the study of the inter-relationship between trade and transfer of technology. Based on this proposal, Ministers decided at Doha to establish a Working Group with a mandate to examine the relationship between trade and transfer of technology and of any possible recommendations on steps that might be taken within the mandate of the WTO to increase the flow of technology to developing countries.

2. So far, the analytical work in the Working Group on the relationship between trade and transfer of technology included an examination of patterns and channels of transfer of technology, conditions for effective use of those channels, identification of provisions related to transfer of technology in the

WTO Agreements, and other issues related to transfer of technology from the perspective of both host and home countries. Several international organizations briefed the Working Group on their work in areas of transfer and development of technology.

3. A number of important issues have emerged from the presentations made by the representatives of international organizations and some members (reflected in documents WT/WGTTT/M/1-5), which will need to be kept in mind by the Working Group. While the discussion in the Working Group has helped delegations to gain some understanding of the subject, it has to be recognized that there is a need to focus attention on concrete and practical steps that might be taken within the broad mandate of the WTO, to facilitate transfer of technology to developing countries.

Possible Recommendations That Might be Considered at the Present Stage of the Deliberations

(i) A paper was submitted by a group of developing countries in October 2002 highlighting provisions relating to transfer of technology in WTO Agreements (WT/WGTT/3/Rev.1). In most cases, these provisions contain only "best endeavour" commitments and are not mandatory rules. Experience also shows that because of the non-operational and non-mandatory nature of almost all the provisions relating to transfer of technology contained in different WTO Agreements, the developing countries have not derived any meaningful benefit from these provisions. The reports received in response to a request by the Working Group from various WTO bodies on the work they may have done or that they plan to carry out in relation to trade and transfer of technology have not been encouraging.

Therefore, the *first* recommendation could be that there should be a detailed examination of different provisions contained in various WTO Agreements relating to technology transfer with a view to making these provisions operational and meaningful from the point of view of developing countries including least developed countries (LDCs).

(ii) There is a widespread feeling that provisions contained in some of the WTO Agreements hinder rather than help transfer of technology to developing countries. One example is the TRIPS Agreement. Though one of the objectives of the Agreement is that protection and enforcement of intellectual property rights (IPRs) should contribute to the technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge, there is widespread recognition now, that the developing countries are facing more hardships than benefits because of the TRIPS Agreement and that the balance between private profits and public policy objectives has not been properly reached in this Agreement. In the light of this, it is necessary to examine carefully those provisions in different WTO Agreements including the provisions in the TRIPS Agreement, which hinder rather than facilitate transfer of technology. For example, the stringent provisions relating to compulsory licensing in the TRIPS Agreement as well as the provision relating to the term of protection (20 years from the date of filing of patent applications), are generally believed not to be particularly conducive for easy or quick transfer of technology. The initial identification of such provisions can be made in two ways: (a) the WTO Secretariat can prepare a paper on the basis of reports/studies by international organizations like World Bank, WHO, UNCTAD, UNDP as well as the Commission on Intellectual Property Rights set up by the UK Government, and list out provisions in different WTO Agreements which are being referred to in these or other reports as being controversial or as causing concern; and (b) interested Members can indicate provisions in different

WTO Agreements, which in their experience or assessment hinder transfer of technology.

In light of this, the *second* recommendation could be to look at those provisions of various WTO Agreements, which may have the effect of hindering transfer of technology to developing countries and come up with recommendations as to how to mitigate the negative effects of these provisions.

(iii) It is well known that multinational enterprises (MNEs) adopt a number of restrictive policies on transfer of technology. In the past licensing was a route through which at least some transfer of technology was taking place. However, the onset of globalization has removed barriers to investment. As a result, MNEs set up their own production facilities in developing countries and are reluctant to transfer technology through licensing because of the fear that such an approach will create competition for their own subsidiaries. There are also situations in which MNEs put restrictions on the export of products which are manufactured utilizing the technology transferred.

A *third* recommendation could be that the Working Group should examine the restrictive practices adopted by MNEs in the area of transfer of technology and come up with recommendations as to how to prevent MNEs from taking recourse to such restrictive practices. Simultaneously, recommendations could be made as to the methods through which MNEs could be made to effectively use the licensing route for transfer of technology.

(iv) It is recognized that the continued existence of tariff peaks and tariff escalation in developed countries limit the scope for technology transfer and reduce opportunities for learning and innovation in developing countries.

A *fourth* recommendation could be that the Working Group should examine the impact of tariff peaks and tariff escalation in developed countries on technology transfer and come up with recommendations to remove the adverse impact.

(v) It is well known that developing countries face a number of problems in knowing about and meeting the new trade standards set within the WTO. One example of this is sanitary and

phytosanitary standards. Another example is technical standards. It is basically the technological backwardness of developing countries, which comes in the way of their meeting the required technical or SPS standards. Though there are provisions in these two agreements for technical assistance (Article 9 of SPS and Article 11 of TBT Agreement), in reality, developed countries do not seem to have initiated serious action to help developing countries in terms of these provisions.

In light of this, the Working Group should examine the difficulties faced by the developing countries in meeting the standards set by different agreements because of non-availability of the relevant or required technology. It should also make recommendations as to how to overcome these difficulties by facilitating transfer of the relevant technology on terms which could be considered reasonable from the point of view of developing countries. The Working Group could also deliberate on the practicality of developing an early warning system with regard to standards and a mechanism to facilitate adjustment by developing countries to meet the new standards.

(vi) It is well known that the ongoing process of globalization is rather skewed. While barriers to investment are coming down rapidly and consequently capital is becoming highly mobile, the mobility of other factors of production like labour and technology is becoming increasingly restricted. The problem is that there are no internationally agreed rules for facilitating transfer of technology. This untenable situation is sometimes sought to be defended on the argument that technology is privately held and that therefore, governments cannot make rules relating to transfer of technology. In this context, one cannot forget the fact that IPRs are essentially private rights and that there is a full-fledged WTO Agreement relating to IPRs. One cannot also ignore the fact that there is a demand for international rules on investment in the WTO, though investment is essentially a private sector activity. It cannot be anybody's case that only those topics/subjects/issues where developing countries have to undertake

commitments without receiving commensurate benefits, should be brought into the WTO.

In light of these considerations, the Working Group should examine the need for and desirability of internationally agreed disciplines on transfer of technology with a view to promote trade and development and come up with appropriate recommendations. In particular, the Working Group should examine and come up with recommendations regarding possible internationally agreed commitments in the field of transfer of technology to developing countries and LDCs in areas such as:

(a) *Expanding global technological exchange:*

- To expand the global technological exchange, Members should facilitate access by firms and experts of other Members to scientific and technological support and capability. This may include the commitment to provide access to results emanating from publicly funded R&D institutions and activities.
- Restrictions on public funding of R & D activities, like limiting them to only national firms and experts, could be removed. This would enable firms, experts and institutions from developing countries to participate in R&D consortia/R&D activities in other Members.
- The application of policy measures should be in a way that makes entry into certain industries feasible. This is particularly important in areas and fields where intellectual property rules may operate more as barriers to entry than as incentives to innovation.

(b) *Special treatment for developing countries*

- With a view to facilitate and encourage the initiation and strengthening of the scientific and technological capabilities of developing countries, Members should ensure access by developing countries to scientific literature and databases.
- Additional technical and financial assistance will be needed for developing countries and in particular LDCs to facilitate achievement of their educational, scientific and technological objectives.

- Commitment to support programmes for providing scientific and technological goods to all countries.
- To encourage firms to carry out science and technology development work in host developing countries.
- To encourage the training of personnel from developing countries.
- To transfer technology on reasonable terms and conditions and in a manner that contributes to the long-term development prospects of the host developing country.
- To encourage firms and public funded institutions from developed countries to participate in cooperative research projects with local partners in developing countries and to adopt practices that permit the transfer and rapid diffusion of technology and know-how.

With a view to expanding technological exchange and diffusion, improved policy coherence in developed countries is needed in the area of sectoral, tax, and fiscal measures related to transfer of technology. These measures should, in order to be effective, be transparent, stable and predictable with a view to encouraging the transfer of technology to developing countries.

Commitments on the above lines will provide mutual and reciprocal benefits to all countries by accelerating the rate of scientific and technological advance, and will facilitate free and enhanced flow of trade among them.

- (vii) It is widely acknowledged that the technological gap between developing and developed countries is increasing. This is because of the difficulties developing countries

face in acquiring technology from developed countries even on commercial terms as well as the inadequate attention paid to R&D aimed at developing new technology. In order to reduce this gap the problem has to be tackled on both fronts, transfer of technology as well as development of technology through research. In order to encourage developing countries to engage in technology research, it is desirable that the measures implemented by developing countries with a view to strengthening technology research are treated as a non-actionable subsidy.

In light of this, the Working Group should examine ways and means of helping developing countries to strengthen their technology base and come up with appropriate recommendations.

- (viii) After examining various issues relating to technology transfer, the Working Group should examine the need and desirability of a self contained agreement on trade related technology transfer and development, since it is becoming increasingly clear that technology transfer is a cross cutting issue and make appropriate recommendations in this regard including on the desirability of initiating negotiations aimed towards such an agreement as part of the Doha Work Programme.

4. The proposed recommendations are based on our initial reflection and we reserve the right to make additional suggestions. We look forward to discussion on these recommendations in the Working Group. The discussion would no doubt help in the finalization of possible recommendations for inclusion in the report of the Working Group to the General Council.

(WTO, WT/WGTTT/W/6, 7 May 2003)

Proposals on Intellectual Property Rights Issues

(Paper Submitted to WTO by India on 18 February 1999)

(1) The TRIPS Agreement has as its preamble objective a desire to ensure that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade. Further, one of its objectives is to contribute to the transfer and dissemination of technology. It has, amongst its principles, the promotion of public interest in sectors of vital importance to the socioeconomic and technological development of its Members. At the same time, the Agreement recognizes intellectual property rights as private rights. Finally, the Agreement encourages adjustments aimed at higher levels of protection of intellectual property rights. With these objectives, principles and provisions in view, India would like to initiate a discussion on some of the issues that have been of great concern to WTO Members, including many developing countries. These issues are by no means exhaustive, nor do they represent the entirety of Members' concerns on intellectual property rights. They are intended to initiate discussions on issues related to IPRs so that the objectives of the WTO Agreement such as raising standards of living, ensuring full employment, increasing trade and promoting sustainable development are achieved.

Proposal 1 : Transfer of Technology

(2) This proposal aims at a more effective implementation of the provisions relating to transfer of technology.

Article 7 of the TRIPS Agreement states:

"The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations."

Article 8.2 states:

"Appropriate measures, provided they are consistent with the provisions of the Agreement, may be needed to prevent the abuse of intellectual

property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology."

(3) India believes that Articles 7 and 8.2 are overarching provisions that should qualify other provisions of the Agreement that are meant to protect intellectual property rights. Technology has become one of the most important determinants for economic development. Emerging patterns of technology generation and transfer have been researched intensively. A recent analysis of the mode of technology transfers suggests a reversal of the growing popularity of arm's length licensing in the 1970s and mid-1980s to intra-firm transfers since the mid-1980s. For example, 80 per cent of transfers by US corporations and 95 per cent by German corporations in 1995 were made on internal basis compared to 69 per cent and 92 per cent respectively in 1985. This is only one example of the changing pattern of technology transfers, provided here to highlight the need to address in the WTO issues such as transfer, dissemination and innovation.

(4) One of the important objectives of the WTO Agreement, as mentioned in its preamble, is the need for positive efforts designed to ensure that developing countries secure a share in the growth in international trade commensurate with the needs of their economic development. However, the TRIPS Agreement in its current form might tempt IPR holders to charge exorbitant and commercially unviable prices for transfer or dissemination of technologies held through such IPRs. It is important, therefore, to build disciplines for effective transfer of technology at fair and reasonable costs to developing countries so as to harmonize the objectives of the WTO Agreement and the TRIPS Agreement.

(5) Similarly, Article 40 recognizes that licensing practices or conditions pertaining to IPRs could restrain competition and have adverse effects on trade and may impede the transfer and dissemination of technology. It provides Members with certain rights to ensure that this does not

happen. Further, of more importance to developing and least developed countries, Article 67 obliges developed country Members to provide, on request and on mutually agreed terms and conditions, technical and financial cooperation in their favour. Since developing countries are still availing transition periods under the Agreement, awareness and capacity to seek such cooperation may be lacking. Again, Article 66.2 obliges developed country Members to provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least developed countries. There has been little effort to implement this provision, raising doubts about the effectiveness of the Agreement to facilitate technology transfers.

(6) One proposal on technology transfers has already been made in the Committee on Trade and Environment. In that Committee, India has proposed that owners of environmentally sound technology and products should sell such technologies and products at fair and most favourable terms and conditions upon demand to any interested party which has an obligation to adopt these under national law of another country or under international law. Similar concerns regarding the need for the transfer of technology have been expressed with respect to electronics commerce also. Concerns have also been raised on the need for transfer of technology in a commercially viable manner for ensuring positive outcomes for developing countries through the increasing linkage between trade and investment.

(7) Transfer of technology at fair and most favourable terms has been highlighted in all discussions and debates on sustainable development. The Rio Declaration of 1992 as well as most of the multilateral environmental agreements emphasizes the need for such technology transfers. The preamble of the WTO Agreement affirms the objective of sustainable development in a manner consistent with the respective needs and concerns of Members at different levels of development. Thus, an obligation is cast upon the WTO to bring about easy access to and wide dissemination of technology relevant for sustainable development.

(8) Facilitating the access to developing countries of technologies selected by them as appropriate to

their requirements constitutes one of the key elements in accelerating the pace of their economic and social development. Such access is generally the result of licences and technology transfer agreements. Prospective technology seekers in developing countries face serious difficulties in their commercial dealings with technology holders in the developed countries. These difficulties are basically of three kinds: those which arise from the imperfections of the market for technology; those attributable to the relative lack of experience and skill of enterprises and institutions in developing countries in concluding adequate legal arrangements for the acquisition of technology; and those government practices, both legislative and administrative, in both developed and developing countries, which influence the implementation of national policies and procedures designed to encourage the flow of technology to, and its acquisition by, developing countries. These difficulties may have to be addressed specifically in order to fully implement TRIPS provisions relating to transfer and dissemination of technology, particularly in the light of Articles 7, 8, 40, 66.2 and 67. Some of these difficulties may be overcome by suitable safeguards in the domestic IPR laws of developing countries, particularly those arising out of the provisions of Articles 30, 31 and 40. Since developing countries have transition periods available under Article 65, these laws may still be in the formulation stage. In addition, the transfer and dissemination needs of the developing countries have to be seen from the point of view of the capacity of those in need of accessing technologies, particularly where the cost of technology may be prohibitive due to economies of scale and other reasons. In such cases, in order to implement the related provisions of the TRIPS Agreement, commercially viable mechanisms need to be found. This could be studied in the WTO, particularly in the light of the need for effective implementation of Articles 7, 8, 40, 66.2 and 67.

(9) The high cost of technology makes it difficult for the smaller, poorer developing countries to acquire appropriate technology on commercial terms. Such countries may be able to acquire appropriate technology critically needed for their development only through government to

government negotiations and with the financial assistance provided by government and other institutions in developed countries or inter-governmental organizations. For those enterprises and institutions in developing countries, which will not have the benefit of external financing, the acquisition of appropriate technology on international commercial terms will impose a burden on the local economy unless the price of the technology can be brought within manageable limits.

(10) The denial of dual-use technologies, even on a commercial basis, to developing countries is another aspect that leads to widening of the technology gap between developed and developing countries. Under this guise a variety of technologies and products are being denied to developing countries which could otherwise have helped to accelerate their growth process. This issue needs to be carefully examined and seriously dealt with as a trade distorting and restrictive measure.

(11) It is therefore proposed that the TRIPS Agreement may be reviewed to consider ways and means to operationalize the objective and principles in respect of transfer and dissemination of technology to developing countries, particularly the least developed amongst them.

Proposal 2: Biodiversity

(12) The scope of this proposal is limited to harmonization of the approaches to the utilization of living resources found in the TRIPS Agreement on the one hand and the UN Convention on Biological Diversity (CBD), on the other. It does not address issues which are likely to come up in the built-in agenda with regard to Article 27.3(b) or Article 71. It does not address issues relating to patenting of plants and animals or to the issue of benefit sharing in commercial exploitation of *ex situ* materials. The above issues are being and will be engaging the attention of the international community in the WTO and other fora and separate proposals would surely be presented there.

(13) The preamble of the TRIPS Agreement recognizes IPRs to be private rights. Article 27.3 incorporates specific obligations on the issue of patenting life forms to the extent that it obliges Members to provide product patents for microorganisms and for non-biological and

microbiological processes. In addition, Article 27.3(b) stipulates that all Members shall provide for the protection of plant varieties, either by patents or by an effective *sui generis* system or by a combination thereof.

(14) CBD on the other hand, in its preamble, categorically reaffirms that nation states have sovereign rights over their own biological resources, recognizes the desirability of sharing equitably the benefits arising from the use of these resources as well as traditional knowledge, innovations and practices relevant to the conservation of biological diversity and its sustainable use, and acknowledges that special provisions are required to meet the needs of developing countries.

(15) These two international agreements are intrinsically linked with one another. It is important to study the relationship between the provisions of the CBD and those of the TRIPS Agreement and suggest reconciliation of any contradictions therein within the overall objective of conservation of biological resources with sustainable development. CBD unambiguously states that the authority to determine access to genetic resources rests with national governments and is subject to national legislation. It also states that access, where granted, shall be on mutually agreed terms and shall be subject to the prior informed consent of the resource provider. It also enjoins the international community to respect, preserve and maintain knowledge innovations and practices of indigenous and local communities and encourages the equitable sharing of benefits arising from their utilization. The conference of parties of CBD have initiated a work programme to give effect to these provisions.

(16) Sustainable development being an objective of the WTO also, it becomes incumbent upon us to examine ways and means to harmonize the approaches to utilization of living resources in the CBD and in the TRIPS Agreement. In implementing their obligations under the CBD, Members would exercise sovereign rights over their biological resources. In order that this does not impede innovation, intellectual property rights may have to be integrated into such an exercise. At the same time, the right of holders of traditional knowledge to share benefits arising out of such innovation cannot be over emphasized. This could be possible

if commercial exploitation of such innovation is encouraged only on the condition that the innovators share the benefits through material transfer agreements/transfer of information agreements. A material transfer agreement would be necessary where the inventor wishes to use the biological material and a transfer of information agreement would be necessary where the inventor bases himself on indigenous or traditional knowledge. Such an obligation could be incorporated through inclusion of provisions in Article 29 of the TRIPS Agreement requiring a clear mention of the biological source material and the country of origin. Article 29 deals with conditions on patent applicants. This part of the patent application should be open to full public scrutiny on filing of the application. This would permit countries with possible opposition claims to examine the application and state their claims well in time. At the same time domestic laws on biodiversity could ensure that the prior informed consent of the country of origin and the knowledge holder of the biological raw material meant for usage in a patentable invention would enable the signing of material transfer agreements or transfer of information agreements, as the case may be. Such a provision in the domestic law should be considered compatible with the TRIPS Agreement. The suggestion basically asks for further transparency in the form of additional information in patent applications, and an approach which allows a harmonious construction of the two international agreements.

(Continued from page 15)

Small Economies

At the Doha Ministerial it was agreed to establish a work programme to examine issues relating to the trade of small economies with the intention of promoting fuller integration of small, vulnerable economies into the multilateral trading system.

The work programme on small economies will be a standing item on the General Council agenda and recommendations for action are to be made to the Fifth Session of the Ministerial Conference.

Least Developed Countries (LDCs)

The Doha Ministerial instructed the Subcommittee for Least Developed Countries to report on an agreed work programme. This was presented

Proposal 3: Higher Level of Protection for Geographical Indications of Goods

(17) Section 3 of Part II of the TRIPS Agreement deals with geographical indications. Article 23 therein provides for additional protection for geographical indications for wines and spirits even where the true origin of goods is indicated or the geographical indications is used in translation or accompanied by expressions such as "kind", "type", "imitation" or the like. Such additional protection is not available to goods other than wines and spirits.

(18) It is an anomaly that the higher level of protection is available only for wines and spirits. It is proposed that such higher level of protection should be available for goods other than wines and spirits also. This would be helpful for products of export interest like basmati rice, Darjeeling tea, Alphonso mangoes, Kohlapuri slippers in the case of India. It is India's belief that there are other Members of the WTO who would be interested in higher level of protection to products of export interest to them like Bulgarian yoghurt, Czech Pilsen beer, many agricultural products of the European Union, Hungarian Szatmar plums and so on. There is a need to expedite work already initiated in the TRIPS Council in this regard, under Article 24, so that benefits arising out of the TRIPS Agreement in this area are spread out wider.

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to the General Council in February 2002 and commits the Committee to focus on:

- Market access;
- Trade related technical assistance and capacity building;
- Providing support to agencies assisting with diversification;
- Mainstreaming trade;
- Participation of LDCs in the multilateral trading system;
- Accession of LDCs to the WTO; and
- Follow up to Ministerial decisions/declarations.

The UK is also party to a number of other non-WTO initiatives aimed at promoting better integration of developing countries into the world trading system.



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