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Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism

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CONTROLS ON TECHNOLOGY TRANSFER: AN ANALYSIS OF THE SOUTHERN RESPONSE TO NORTHERN TECHNOLOGICAL PROTECTIONISM

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I. INTRODUCTION

Technology,[1] like land, labor and capital, is an important determinant of economic growth.[2] This is clearly evidenced by the developed countries' use of their technological superiority in achieving rapid industrialization, while fostering the dramatic growth in their economies. Consequently, developing countries view the transfer of technology from developed countries as an important means of bridging the ever widening gap[3] between the economic growth rates of developed and de-

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1. Technology is broadly defined here to include industrial processes, engineering design, plant construction and installation, training of technical and managerial personnel, management and operation of production facilities, marketing information and improvements to processes and product designs. *See Guidelines for the Study of the Transfer of Technology*, 5 UNCTAD TD/B/AC.11/9 (1972).

2. P.B. HELLER, TECHNOLOGY TRANSFER AND HUMAN VALUES 14 (1985). The significance of technology to economic growth has thus been expressed by Simon Kuznets, a Nobel prize winning economist:

> The major capital stock of an industrially advanced nation is not its physical equipment: it is the body of knowledge amassed from tested findings of empirical science and the capacity and training of its population to use this knowledge effectively. One can easily envisage a situation in which technological progress permits output at a high rate without any additions to the stock of capital goods.

S. KUZNETS, TOWARD A THEORY OF ECONOMIC GROWTH 34-35 (1968).

3. In 1970, the five richest countries; Switzerland, Luxembourg, West Germany,

veloping countries.[4]

Characteristically, developing countries are overpopulated, lack resources, and suffer from a lack of motivation influenced largely by the absence of know-how, high illiteracy rate, unemployment and ineffective utilization of existing resources.[5] All these factors combine to bring about a lack of productivity, and hence a low level of output in the economy. This bleak scenario places these countries in a vicious cycle of underdevelopment.[6] Technology transfer compares favorably with increased savings, international trade, and foreign aid[7] as a measure for breaking this vicious cycle.[8] Transferred technology can lead to development by expanded export capability and/or import substitution. The infusion of export trade-oriented technologies experienced by Korea, Singapore and Taiwan in the late 1970s and the resulting increases in their exports, enhanced the competitiveness of those countries in the world market.[9] The transfer of suitable technology for production of goods and services to replace the imports would also lead to an im-

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Denmark, and Sweden, with 6.179% of the world population accounted for 9.741% of total income, while the poorest countries; Bhutan, Bangladesh, Nepal, Chad and Ethiopia, with a population of 1.585% had .048% of the world's total income. By 1981, the rich nations had increased their total income to 26.248% and reduced their population to 5.644%. The poor countries, on the other hand, had increased their incomes to a mere .167% and witnessed an increase of their population to 1.692% of the world's population. *See* A.C. Samli, *Technology Transfer to the Third World Countries and Economic Development*, in TECHNOLOGY TRANSFER 17-18 (1985).

4. M. CORTES & P. BOCOCK, NORTH-SOUTH TECHNOLOGY TRANSFER: A CASE-STUDY OF PETRO-CHEMICALS IN LATIN AMERICA 3 (1984).

5. Wasted resources are seen not only in the prevailing unemployment and underemployment but also in the treatment of women. Their exclusion from some of the social, political and business institutions makes it impossible for them to contribute to economic growth and development. *Id.* at 20.

6. As underdeveloped economies, these developing countries typically have low incomes and a concomitant tendency towards consumption, with little savings. Low savings translate into low investments and result in a scarcity of capital, which leads again to a low level of productivity.

7. R.H. CASSEN, RICH COUNTRY INTERESTS AND THIRD WORLD DEVELOPMENT (1982).

8. Savings patterns have not caught on in developing countries as there is a natural tendency to prefer consumption to saving. Additionally, international trade tends to encourage production for world markets at the expense of local consumption, and has been characterized by a precarious dependence on commodities which have fared rather badly in the world markets. Finally, military aid and emergency relief, the main forms of foreign aid, have had little impact on economic development, given the narrowness of their objectives.

9. Samli, *supra* note 3, at 24.

provement in the economy.[10]

Typically, developing countries seek technology by sending their nationals to acquire the necessary skills in institutions abroad or by studying technical literature that has been published in developed nations.[11] However, the most important channels of transfer have been the activities of transnational corporations ("TNCs") when they engage in direct foreign investments,[12] establish joint ventures,[13] or conclude various management and licensing agreements.[14] Turnkey contracts[15] and international subcontracting also serve as forms of technology transfer.[16]

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10. W.A.P. MANSER & S. WEBLEY, TECHNOLOGY TRANSFER TO DEVELOPING COUNTRIES 32 (1979).

11. C.H.G. Oldham, C. Freeman & F. Sercovitch, *The Channels and Mechanisms for the Transfer of Technology From Developed to Developing Countries*, 8 U.N. Doc. TD/28/Supp.1 (1967).

12. Direct foreign investment is characterized by the establishment of an affiliate by the TNC in the host country and the provision of technology, often as a complete package, comprising capital goods; industrial property rights; secret, unpatented process knowledge specific to the investing firms and the TNC's accumulated experience and skills in organization, management and marketing. *Transnational Corporations and Technology Transfer: Effects and Policy Issues*, 3 UNCTC St/CTC/86 (1986) (hereinafter *Transnational Corporations and Technology Transfer*).

13. Nearly the same elements of technology are transferred in joint ventures as are transferred in direct foreign investment, except that in joint ventures the contractual arrangements are often more specific and entail a joint ownership of business and a sharing of the investment risk.

14. Licensing as a form of transfer involves the conferral of rights pertaining to industrial property rights, methods of production and technical services to an agency in the host country for a specific period of time, in return for certain payments. It is not uncommon for the TNC's to provide managerial control over an enterprise in a developing country, covering such matters as production management, purchase and procurement of capital goods and raw materials, marketing and financial management. *Transnational Corporation and Technology Transfer*, *supra* note 12, at 4. *See also* V.N. BALASUBRAMANYAN, INTERNATIONAL TRANSFER OF TECHNOLOGY TO INDIA 9 (1973).

15. Under them, the TNCs typically assume responsibility for all the activities involved in the planning, construction and commissioning of a discrete project. This might entail the supply of know how, basic design and engineering, supply of complete plant and equipment, design and construction of civil works, initial training of process operators and even post start-up troubleshooting. *Transnational Corporations in World Development*, UNCTC ST/CTC/46 172-74 (1983). As they generally provide for the complete physical transfer of technology, turnkey contracts tend to be common in situations where the TNC will not have an on-going interest in the operation or management of the operations of the customer firm, as compared to the relationship between an international engineering firm and a state-owned enterprise. HELLER, *supra* note 2, at 6.

16. This form of transfer is especially common in clothing, electronic equipment

The protectionist policies of industrialized countries have, however, reduced the availability of technology expected by developing countries under the various channels of transfer. Such protectionism[17] is usually seen in the form of export control laws of developed countries and in the restrictive trade practices engaged in by TNCs, who are the principal agents in the technology transfer process. This article's objective is to describe the nature of technological protectionism and to evaluate the policy response of developing countries. The first section examines export controls imposed by industrialized countries by focusing exclusively on United States laws which are the most comprehensive in the area. Section Two analyzes technology controls and the restrictive business practices typically adopted by TNCs in technology transfer contracts. The policy response of developing countries under national and international schemes is discussed in the final portion of the article.

II. EXPORT CONTROLS ON TECHNOLOGY IN THE UNITED STATES

The most important statute for controlling technology exports in peacetime in the U.S. is the Export Administration Act of 1979 (EAA).[18] The EAA provides a detailed system of controls in furtherance of stated national security,[19] foreign policy[20] and short supply[21]

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and semi-conductor assembly industries. Under this type of contract, the TNC would typically place an order with a foreign enterprise in a developing country to produce goods or assemble finished products using inputs and technology supplied by the TNC. Subcontracting does not involve explicit payments for technology and is valuable as a form of technology transfer as technological spin-offs often accrue to the local enterprise participating. *Transnational Corporations and Technology Transfer*, *supra* note 12, at 5-6.

17. The term "protectionism" as used in the literature, refers generally to central government intervention in the market for traded goods through the imposition of tariffs, export subsidies or quantitative restrictions. D. GREENAWAY & C. MILNER, PROTECTIONISM AGAIN 16 (1979). The intervention, which is normally directed against foreign imports in favor of home products, is aimed at providing relief against cheap foreign labor, assuring employment protection and raising revenue tariffs. The term will be used in this paper in a much different sense. Here it will refer to measures that inhibit the flow of technology exports. *See* G.P. VERBIT, TRADE AGREEMENTS FOR DEVELOPING COUNTRIES 56-82 (1969); B. HINDLEY & E. NICOLAIDES, TAKING THE NEW PROTECTIONISM SERIOUSLY (1983); J.T. Cuddington & R.I. McKinnon, *Free Trade Versus Protectionism*, in TARIFFS, QUOTAS AND TRADE: THE POLITICS OF PROTECTIONISM 3 (1979) for differing views on this topic.

18. Export Administration Act of 1979, 50 U.S.C. §§ 2401-2420 (1982 & Supp. IV 1986).

19. With respect to national security, the EAA permits controls on technology exports that "would make a significant contribution to the military potential of any other country or combination of countries which would prove detrimental to the na-

concerns. Export licensing serves as the vehicle for regulating technology exports, and is a power belonging to the President. As permitted by statute, however, the President has delegated his regulatory powers to the Secretary of Commerce who is required to consult with the Secretaries of Defense and State when controls are necessary for the foreign policy and national security of the U.S.[22] Various licenses that the Secretary of Commerce could require of exporters include a "valid license" which allows the export of a specified item following approval of the exporter's application, a "qualified general license" which permits multiple exports following application approval, and a "general license" which permits exports absent an application.[23]

Pursuant to statutory provisions the Secretary of Commerce maintains a commodity control list (CCL), detailing all goods and technologies controlled under the EAA and therefore subject to licensing.[24] Categories of goods in the CCL include commercial goods with potential military application, nuclear weapons and crime control equipment restricted for foreign policy reasons, petroleum products under short supply controls, and technical data relating to design and manufacturing knowledge.[25] Apart from national security, foreign policy and short supply considerations, a key factor in the decision to place an item in the CCL is the foreign availability[26] of the item to controlled countries[27] from sources outside the U.S.

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tional security of the United States." *Id.* at § 2402(2)(a).

20. The Act may also come into play where it is necessary to restrict imports in order "to further significantly the foreign policy of the United States, or to fulfill its international obligation." *Id.* at § 2402(2)(b). Given the broad nature and vagueness of political considerations, the types of goods subject to regulation under these provisions are potentially larger than the national security concerns.

21. The third reason for restricting exports under the Act is "to protect the domestic economy from excessive drain of scarce materials and to reduce the serious inflationary impact on foreign demand." *Id.* at § 2402(2)(c).

22. *Id.* at § 2403(e).

23. Additionally, the Secretary could issue any other types of licenses he deems necessary to enforce the Act. *Id.* at 2403(a).

24. *Id.* at § 2403(b).

25. *Id.* at § 2404(c)(2).

26. *Id.* at § 2403(c).

27. Under the Act, controlled countries fall into two broad categories; communist nations and specific nations to which exports are restricted due to foreign policy considerations. *Id.* at § 2403(b). An interesting mix of considerations determine United States export policy to controlled countries. They include: a) the country's present and potential relationships with the United States; b) its present and potential relationships with countries friendly or hostile to the United States; and c) its ability to control reexport of U.S. goods and technology in accordance with United States foreign policy.

Under a blanket provision of the Trading With the Enemy Act of 1917 (TWEA),[28] the U.S. Treasury Department has been able to monitor a wide variety of transactions including technology exports.[29] Its Foreign Asset Control Regulations, for example, place a nearly total ban on the exports of technology involving strategic and non-strategic goods to North Korea, Vietnam, and Kampuchea.[30] Further, the Transaction Control Regulation controls technology exports to all communist countries except Cuba, Yugoslavia and Laos,[31] while the Cuban Asset Control Regulations monitors non-strategic exports to Cuba by U.S. funded foreign firms.[32]

Section 203 of the International Emergency Economic Powers Act of 1977 (IEEPA)[33] which roughly parallels the broad grant of power given by TWEA, authorizes national emergency controls on various transactions. Included are exports to countries while a national emergency exists which is defined as "any unusual and extraordinary threat, which has its source in whole or substantial part outside the United

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Before imposing export controls on grounds of foreign policy, however, the President must consider among other factors 1) the probability that the controls will be effective; 2) the implementation of foreign policy objectives, such as the control of terrorism; 3) the reaction of other countries to the imposition/expansion of such controls; and 4) the ability of the U.S. to enforce such controls. *Id.* at § 2403(b). Where short supply controls are applied, the President would usually allocate a percentage of export licenses based on a determination of the equitable trade treatment given the U.S. by other countries during periods of short supply. The criminal penalties for willful violations of the Act are fines of not more than $100,000.00 or five times the value of the export, whichever is greater, or a maximum of ten years imprisonment, or both. Civil penalties include a fine of up to $5,000.00 for each violation and/or a suspension of the right to export. *Id.* at § 2410.

28. 50 U.S.C. § 5(b) (1982 & Supp. IV 1986). It provides that:

> 1) During the time of war [or during any other period of national emergency, declared by the President] the President may, through any agency that he may designate, or otherwise, and under such rules or regulations as he may prescribe, by means of instructions, licenses or otherwise, . . . B) investigate, regulate, direct and compel, nullify, void, prevent or prohibit any . . . exportation or . . . any right involving any property in which any country or a national thereof has any interest, by any person, or with respect to any property subject to the jurisdiction of the United States.

29. 31 C.F.R. §§ 500.311, 515.311 (1987). *See also* M.P. Malloy, *Embargo Programs of the United States Treasury Depart.*, 20 COLUM. J. TRANSNAT'L L. 485 (1981).

30. 31 C.F.R. §§ 500.201, 500.533 (1987).

31. *Id.* at § 505.10(b) (1982 & Supp. IV 1986).

32. *Id.* at § 515.559 (1987).

33. 50 U.S.C. §§ 1701-1706 (1982 & Supp. IV 1986).

States, to the national security, foreign policy of the United States."[34] The most notable use of the IEEPA has been in the promulgation of the Iranian Asset Control Regulations which instituted a licensing scheme for technology exports to Iran after the hostage seizure.[35]

The Arms Export Control Act of 1968 (AECA)[36] regulates exports of technology that are considered to have primarily military use and are provided for in a special listing of goods and related technology known as the munitions list.[37] Controlling the export of such "defense articles and defense services" is motivated by the desire to further "world peace and the security and foreign policy of the U.S."[38] For the export of technology subject to the broad control of the AECA[39] an exporter must obtain a license from the State Department.[40]

In addition to its national efforts to control the export of technology, the U.S. has been involved with nearly all its NATO allies[41] and Japan, in promulgating significant technology transfer control measures. These countries belong to the Consultative Group Coordinating Committee (COCOM), an informal cooperative group that was formed soon after the Second World War to implement U.S. strategic controls imposed on the Soviet Union and its satellites. Today, it remains the function of COCOM to coordinate a multinational strategic embargo, and in particular restrict export of goods and technologies to the Soviet Bloc.[42] COCOM regularly updates a detailed list of militarily significant productive services agreed by all participants to be subject to control, and coordinates administration and enforcement activities of the participant countries.

To govern the unauthorized transfer of technologies, developed countries have instituted elaborate travel restrictions on nationals of

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34. *Id.* at § 1701(a).

35. 31 C.F.R. § 535.207(b) (1980).

36. 22 U.S.C. § 2778 (1982).

37. 22 C.F.R. § 121.1 (1987).

38. *Id.* at § 2778(a)(i).

39. Types of technology that would come under the AECA include 1) proposals to any foreign government or foreign national that would enable such person to decide to acquire significant combat equipment; 2) proposed agreements and amendments to existing agreements for the manufacture abroad of or for furnishing abroad technical assistance relating to Munitions list items and 3) classified and unclassified technological data related to items on the Munitions list.

40. The State Department is required to obtain the concurrence of the Defense Department and also coordinate its actions with the United States Arms Control and Disarmament Agency.

41. Iceland is the exception.

42. *See generally* Note, *COCOM: Limitation on the Effectiveness of Multilateral Export Controls*, WIS INT'L L. J. 100 (1983) (hereinafter Note, COCOM).

countries considered unfriendly.[43] Through strict visa requirements, the U.S. maintains control over the number of scholars who can visit the U.S. to study or participate in important seminars and conventions.[44] The recent trend in many U.S. schools of charging foreign students higher educational fees than U.S. citizens, has discouraged foreigners from coming to the U.S. for technical studies.

The implications of U.S. export control laws on the transfer of technology cannot be ignored. It is true that a significant part of these controls, for security reasons, are directed against communist nations and relate to militarily sensitive technology which is not a priority area for developing countries given their present interests in industrial and agricultural technology. To this extent, much of COCOM's controls and the EAA's control of commercial goods with military application do not raise serious concerns in the developing world. Of far greater significance to developing countries, however, are the controls on non-military goods which may be imposed to meet the dictates of foreign policy. The U.S. has not hesitated to apply such controls under a wide variety of circumstances.[45] The definition of foreign policy is particularly troublesome to developing countries who are genuinely concerned about the vagueness inherent in foreign policy.[46] Further, they fear that minor differences of opinion will be labelled as contrary to U.S. foreign policy and therefore attract export controls as a form of diplomatic pressure.[47] Under the EAA, controls could be applied to technical data relating to design and manufacturing knowledge[48] which is desperately

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43. Given that population movements between countries constitute such an important method for the transfer of technology, to the extent that developed countries place restrictions on travel to their countries, there will be a corresponding negative effect on technology transfer. Oldham, Freeman & Sercovitch, *supra* note 11, at 8.

44. The United State's attempts at one time to deny visas to students and academics from countries such as the Soviet Union and the People's Republic of China, suspected of illegally trying to obtain technical or military information, was criticized as an intrusion into the policy of academic freedom. *See, e.g.*, K. McDonald, *U.S. to Restrict Visas for Visitors Likely to Obtain Data Illegally*, 26 THE CHRONICLE OF HIGHER EDUCATION NO. 12 21 (1986).

45. See for example, its application following the seizure of U.S. hostages in Iran, the Soviet invasion of Afghanistan and the imposition of martial law in Poland.

46. Thus, although the U.S. professes to restrict sales of critical technology to the communist world, it nevertheless sells advanced computer technology to China. It also sells the same technology to Pakistan but not India, although both countries can be described as friendly to the U.S.

47. *See* H.E. Moyer & L.A. Mabry, *Export Controls as Instruments of Foreign Policy: The History, Legal Issues and Policy Lessons of Three Recent Cases*, 15 L. & POLICY IN INT'L BUS. 1, 156-158 (1983).

48. *See* 15 C.F.R. § 379.1(a) (1987).

needed by the developing world. Regulations directed against North Korea, Vietnam, Kampuchea, Cuba and Iran show the reach of export control laws over non-strategic goods in their application to some developing countries considered unfriendly to the U.S., a phenomenon which clearly demonstrates the potential of export control as a severe restriction on the transfer of technology.

III. Technological Protectionism Through Restrictive Business Practices

Aside from export controls by the governments in developed countries, some technology transfer arrangements by private foreign technology suppliers also limit the technology access by the developing countries. The monopoly TNCs have over technology undoubtedly gives them a superior edge in the negotiation process and they are able to win generous concessions granting them almost complete control over the technology receiving enterprise. Contractual limitations on technology access generally relate to tied purchases of imports, restrictions on exports, requirements of guarantees, restrictions on competition in the domestic market, and control of industrial property rights.

Where contractual provisions require the developing country to purchase intermediate products, capital equipment and spare parts from the technology supplying countries ostensibly for technical reasons or the purpose of guaranteeing the quality of the product, these provisions have in fact worked as a convenient method for the withdrawal of profits from developing countries.[49] Tied purchase clauses, by preventing developing countries from buying necessary inputs at a competitive world market rate, force them to rely on a technology supplier who thereby acquires monopoly control and may engage in various transfer practices.[50] Export restrictions which may take the form of global bans on exports, export permission for specified countries only, export quotas, or higher royalties for exported products, adversely impact on the export potential of developing countries, and consequently limit the advantage that could otherwise be derived from the sales abroad of goods

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49. J. Bhagwati, The Tying of Aid, Proceedings of the United Nations Conference on Trade and Development, Second Session, U.N. Doc. TD/7/supp. 4, U.N. Sales No. E.68.11.D17 (1968).

50. Overpricing of inputs imported by foreign pharmaceutical companies in Columbia reportedly increased 155%, while it reached 500% and 300% in Chile and Peru, respectively. *See Major Issues Arising From the Transfer of Technology to Developing Countries*, 17 UNCTAD TD/B/AC.11/10/Rev.2 (1975) (hereinafter UNCTAD, *Major Issues*;) *Transnational Corporations and International Trade: Selected Issues*, UNCTC at 13-14 (1985).

produced with the imported technology.[51] This is particularly disappointing because many developing countries, as debtor nations, look to their exports to generate much needed foreign exchange.[52]

In some cases, guarantees have been required from the technology recipient regarding changes in profits and royalties, tax rates, tariffs and the exchange rate.[53] Fixed royalty payments, required regardless of the level of operations, increase production costs and reduce the profitability of the investment for the developing country. Onerous stabilization clauses on rates of taxation, depreciation, allowances and tax holdings, seriously limit the developmental potential of the technology transfer process. Not surprisingly, several transfer arrangements have in the past collapsed because of the unwillingness of developing countries to accede to the conditions presented by the developed countries.[54]

A large portion of the restrictive practices are found in the industrial property area which includes patents, licensing, and trademarks. The contracts typically impose an obligation on recipients to keep all technical information confidential and not to transfer, assign or sublicense the rights to anyone, an obligation which may continue even after the expiration of the agreement. In some cases, the recipient is even required to return all the technical information and stop using the technology after expiration of the agreement.[55] As a consequence of the prohibition on transfer, technology is confined to the technology recipient, unavailable to other producers, who are then forced to make fresh arrangements with the same technology supplier, giving rise to the problem of repetitive import of technology.[56]

In situations where imported technology could be used in several

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51. S.J. Soltysinski, *The Impact of New Transnational Technology Transfer Control Systems on the International Patent System: A European System*, in CONTROLLING INTERNATIONAL TECHNOLOGY TRANSFER, ISSUES, PERSPECTIVES AND POLICY IMPLICATIONS 89, 98 (1981).

52. J.H. Barton, *The Role of Private Enterprise in Technology Transfer*, at 20, USAID PDC-0-00-6033-00 (1986).

53. UNCTAD; *Major Issues*, *supra* note 51, at 21-24.

54. It is not uncommon for the technology supplier to insist on a provision requiring the developing country's government to compensate him for any losses suffered as a result of changes in the fiscal regime. *See* K.K. SUBRAHMANIAN IMPORT OF CAPITAL AND TECHNOLOGY: A STUDY OF FOREIGN COLLABORATION IN INDIAN INDUSTRY (1972).

55. *Control of Restrictive Practices in the Transfer of Technology Transactions*, 11 UNCTAD TD/8/C.6/72 (1982) (hereinafter UNCTAD *Control of Restrictive Practices*).

56. REPORT OF WORKING GROUP III: PROCEEDINGS OF THE UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, THIRD SESSION, annex. VI, 1.22 U.N. No. E.73.II.04 (1973).

areas, it is possible for the technology supplier to restrict the use of technology to only one sector. Grant back provisions, often inserted in agreements, oblige the technology recipient to inform the technology supplier of any improvements made in the use of the transferred technology, but often do not impose any obligation to inform the recipients of any improvements the suppliers may make themselves.[57] This is manifestly unfair as the recipient is thereby denied access to the fruits of the licensor's research and development which, in most cases, he has contributed to through royalty payments.

Other restrictions relate to limitations on changes to import design which often require the recipient to manufacture the products adhering strictly to the specifications of the technology suppliers, without the right to make changes in the product or process designs. In some contracts, the recipient is obliged to incorporate changes introduced in the technology of the suppliers country regardless of their usefulness or suitability in the developing country.[58] The import of these restrictions is to prevent the adaptation of imported technology to local conditions, a step which is puzzling given that the imported technology is generally made for the developed country, and there is often the need for some modification when the technology reaches the developing country.[59]

Restrictive tendencies are also found in exclusive or representation agreements which limit the freedom of the developing country enterprise to organize a distribution system independent of the technology suppliers, and in price-fixing clauses which compel the recipient of technology to sell his products at prices specified by the supplying parties. To protect their interests, the technology suppliers insert non-competition clauses to restrict the developing country from entering into arrangements related to competing or other technologies not provided by the technology supplier.[60] By tying the recipient to outdated technology, the duration of an arrangement can limit the value of technol-

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57. UNCTAD *Control of Restrictive Practices*, *supra* note 55, at 128.

58. SUBRAHMANIAN, *supra* note 54, at 149-152.

59. Technology sold by TNCs is that which is developed for use in the industrialized countries. There is little incentive to direct their technology production to satisfy developing country needs as these markets are often too small to guarantee sufficient profits. Additionally, TNCs would much rather encourage the purchase of existing technology than the creation of varieties of technology, in line with their established goal of efficiency derived from standardization. *See Transfer of Technology, Its Implications for Development and Environment*, 35 UNCTAD TD/B/C.6/22 (1978) (hereinafter UNCTAD *Transfer of Technology*).

60. Such clauses generally require the recipient to refrain from manufacturing or selling competing products, acquiring competing technology and even terminating the further use of technologies and products developed by the technology supplier himself.

ogy.[61] All of these restrictions in the technology transfer contracts are commonly safeguarded by the use of no challenge clauses requiring the technology recipient not to challenge the validity of rights granted under the technology transfer arrangement.[62]

IV. Developing Country Response to Technological Protectionism

A. National Policies

The leading early attempt at regulation of technology transfer is Decision 24 of the Cartagena Agreement[63] ("The Decision") adopted in 1970 which sets a common approach for the treatment of foreign technology by the six Andean Group countries.[64] The Decision recommended the establishment by each member state, of a national agency to supervise technology transfer contracts.[65] In deciding whether to approve or deny a transaction, the national agency was to consider the potential impact of the imported technology, and in particular the expected benefits and price. It was mandatory that every agreement describe its duration, the form of technology transfer and the value of every aspect of transfer.[66] Tie-in clauses, restrictions on volume of output, restrictions on the use of competing technologies and price-fixing arrangements were specifically barred from all technology transfer contracts.[67] To enable a better evaluation of the cost of technology, information and control systems over the prices of imported intermediate goods were required to be maintained in each country. A concerted effort was made to weaken industrial property protection by prohibiting among other things, grant back provisions and payments of royalties for unused patents. Further, the grant of patent privileges could be denied to particular products and processes.

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61. A survey in India demonstrated that up until March, 1964, 51% of all contracts in the pharmaceutical industry were for a duration of 10-15 years. Restrictions on Exports in Foreign Collaboration Agreements in India, U.N. Sales No. E.72.II.07 (1972).

62. UNCTAD *Control of Restrictive Practices*, *supra* note 55, at 20.

63. Passed in 1971, the Decision provides regulations governing foreign capital movement; trademarks; patents; licenses and royalties. *See Compilation of Legal Material Dealing with Transfer and Development of Technology*, 227 UNCTAD (1982) (hereinafter 1982 *Compilation of Legal Material*) for extracts of the Decision.

64. They are Chile, Bolivia, Peru, Ecuador, Columbia and Venezuela.

65. 1982 *Compilation of Legal Material*, *supra* note 63, at Art. 6.

66. As a rule, a contract had to specify among other things, the form of transfer, the value of aspects of the technology and the duration of the contract. *Id.* at Art. 19.

67. *Id.* at Art. 20.

The Decision recommended the adoption by member states of continuous and systematic identification of available technologies on the world market to facilitate the selection of the most desirable technologies for the region.[68] Governments were urged, in their purchases, to grant preference to products incorporating subregional technology while further taxes were to be levied on goods produced from imported technology already publicly available or readily accessible.

Other developing countries, following the Andean Group lead, have passed their own technology transfer legislation. Typically, the laws create a national agency to screen technology transfer agreements for restrictive business practices. As the following examples demonstrate, some of the national laws have expanded on the list of prohibited clauses and emphasized the development of local technology. For example, under Colombian legislation, that country's Foreign Exchange Office, in approving the registration of contracts requiring payments in foreign currency,[69] not only examined the duration of patents applicable and the effects of the proposed contract on the country's balance of payments, but also the feasibility of manufacturing the same product using available national technology.[70]

Brazilian regulations[71] limit the duration of contractual obligations resulting from a license to the same period of validity accorded to industrial property rights[72] and prohibit limits on the free use of technical data and the use of no-contest clauses.[73] There is also a limitation of ten years on royalties paid on listed patents and trademarks. Following the initial ten year period the licensee could use the patent or trademark without further obligation to the licensor. Brazil's National Institute of Industrial Property (INIP), the agency charged with administering patent and trademark systems and regulating technology transfer agreements[74] may condition the approval of foreign contracts on the implementation of a program of investment in the technological

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68. *Id.* at Art. 22.

69. Decree No. 444 on International Exchange Regulations Relating to the Approval and Registration of Contracts for the Transfer of Technology, March, 1967, *reprinted in* 1982 *Compilation of Legal Material*, *supra* note 63, at 53 (hereinafter Decree No. 444).

70. *Id.* at Art. 102.

71. Normative Act. No. 015 Establishing Basic Principles and Norms for the Registration of Contracts Involving the Transfer of Technology and Related Agreements, September, 1975. *See also* 1982 *Compilation of Legal Material*, *supra* note 63, at 25.

72. Decree No. 444, *supra* note 69, at Art. 3.4.

73. *Id.* at Art. 2.5.2.

74. Law No. 5,648 Establishing the National Institute of Industrial Property, December, 1970, *reprinted in* 1982 *Compilation of Legal Material*, *supra* note 63, at 21.

infrastructure of the recipient company and research and development in the same enterprise or through a research institute. Brazilian law also obligates firms acquiring technology abroad to justify their need for import and selection of the foreign supplier by providing the INIP with comparative data for similar technology on file with its Patent Bank.[75]

To meet its goal of expanding the use of technological information contained in patents, the Brazilian government has established a program for the automatic provision of technological information known as PROFINT.[76] In furtherance of this objective, appropriate arrangements have been made with some government agencies[77] to facilitate access to patent information by small firms. There is even an obligation to consult the Patent Bank prior to the acquisition of foreign technology although small firms and other firms participating in the PROFINT program are exempt.[78]

Mexican technology transfer laws[79] with few exceptions,[80] mandate registration of agreements relating to trademark licenses, patent assignments, technical assistance, and computer programs.[81] Restrictive

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75. Normative Act No. 65/83. *See Periodic Report on Policies, Laws and Regulations Conducive to Development, Transfer and Acquisition of Technology*, UNCTAD TD/B/C.6/111 Corr. 1 and Corr. 2 at 7 (1984) (hereinafter 1984 Periodic Report).

76. Participants must first register with the INIP, after which they are granted automatic access to information contained in patents.

77. See for example the National Confederation of Industry and National Council of Science and Technology.

78. Normative Ace No. 074/85 August 29, 1985. *See Periodic Report 1986: Policies, Laws and Regulations on Transfer, Application and Development of Technology*, 15 UNCTAD TD/B/C.6/133 (1986) (hereinafter 1986 Periodic Report).

79. The present law is the Law on the Control and Registration of the Transfer of Technology and the Use and Exploitation of Patents and Trademarks, supplemented by the Regulations of the Law on the Control and Registration of the Transfer of Technology and the Use and Exploitation of Patents and Trademarks. *See* 1982 *Compilation of Legal Material*, *supra* note 63, at 96.

80. Those agreements exempted from registration include agreements of international technical cooperation executed between Governments; the industrial exploitation of copyrights pertaining to the publishing, motion picture, recording, radio and television fields, emergency assistance or repairs and the bringing into Mexico of foreign technicians to install factories or machinery or make repairs. Law on the Control and Regulation of the Transfer of Technology and the Use and Exploitation of Patents and Trademarks, Art. 3. *See also* 1984 Periodic Report, *Supra* note 75 at 96.

81. They include licenses on patents of invention or of improvements and on certificates of invention; licenses on industrial models or drawings; trademark assignments and tradename licenses; transfer of know-how; technical assistance; supply of basic or detail engineering; company operation or administration services; advisory, consulting

practices prohibited in contracts include exclusive sales agreements, clauses which allow the supplier to intervene in the management of the technology recipient and impose limitations on the recipient's technological research and development, as well as those under which the supplier does not warrant the quality and results of the contracted technology.[82] The law prohibits the registration of agreements for technology that is already available or of agreements made at prices considered to constitute an excessive burden on the national economy or acquiring company.[83]

The maximum term allowed for any contract is ten years and all agreements are to be governed by the laws of Mexico, or the applicable international agreements to which Mexico is a party.[84] The Ministry of Technology in the national interest, could waive any of the prohibitions against, or conditions for, the registration of any agreement.[85] To promote research, development and the marketing of national technology, incentives in the form of aid facilities and tax credits are provided[86] to companies which register with the Registry of Scientific and Technological Institutions, and the Registry of Technological Enterprises.[87]

One of the conditions the Ghana Investments Centre may impose in approving the establishment of an enterprise involving the technology transfer is the training of Ghanaians in technical and managerial skills related to the operations of the enterprise concerned. To encourage domestic technological development, Ghana approved enterprises which sponsor scientific research that mirrors the Mexican practice since it provides some tax incentives like capital expenditure deductions.[88] The Ghanaian law does not deal with restrictive practices, but provision has been made for the future adoption of regulations on the subject.[89]

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and supervisory services and copyright licenses that imply industrial exploitation. *Id.* at Art. 2.

82. *Id.* at Art. 15.

83. *Id.* at Art. 16.

84. *Id.*

85. *Id.* at Art. 17.

86. *See* Decree Establishing Fiscal Incentives to Promote Research, Development and the Marketing of National Technology, November, 1980, *reprinted in* 1982 *Compilation of Legal Material*, *supra* note 63, at 106 (hereinafter Decree of 1980).

87. Registration entitles the applicant to a Certificate of Fiscal Promotion, valid for five years.

88. Investment Code 1985, Provisional National Defense Council Law 116, at § 12(2).

89. *Id.* at § 30.

Like its Mexican counterpart, the Nigerian law on technology[90] is broad in scope.[91] Among restrictive practices forbidden are clauses that provide for the submission to foreign jurisdiction for interpretation or enforcement of a technology agreement.[92] The Nigerian attitude regarding restrictive conditions appears to be flexible, for the Governing Council, in exercise of its discretionary powers, may overlook a restrictive practice where it is in the national interest to do so.[93]

The policy of the Indian Government has always been "to welcome foreign private investment on a selective basis in fields in which such investment would be of advantage to the Indian economy."[94] As a result, foreign participation has been prohibited in some areas, in others foreign collaboration is required in the form of licensing agreements, while in yet other areas, no collaboration is necessary. Where foreign investment is permitted, the foreign equity participation is limited to 40%[95] and some limitations are placed on the fees and royalties that may be paid.[96] To ensure approval of their agreements, the Government urges technology suppliers to adhere to guidelines which require among other things, the consideration of alternative sources of technology and an explanation for choosing a particular technology, and permit sub-licensing of technology to another Indian party. The Indian laws prohibit guaranteed royalty payments regardless of the quantum and value of a product, the use of foreign brand names for internal sales and the extension of collaboration agreements.[97]

The guidelines also encourage the training of Indians in fields of production and management, the strengthening of Research and Development efforts and require that consultancy services for the project be obtained from Indian firms.[98] In 1984, in a bid to promote the computer industry, the Indian government revised the application of its

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90. National Office of Industrial Property Decree No. 70 (1979).

91. Under § 40(d) of the National Office of Industrial Property Decree No. 70, the following arrangements must be registered: a) the use of trademarks; b) the right to use patented inventions; c) the supply of technical expertise; d) the supply of basic or detailed engineering; e) the supply of machinery and plant; and f) the provision of operating staff or managerial assistance and the training of personnel.

92. 1982 *Compilation of Legal Material*, *supra* note 63, at Decision Art. 6(2).

93. *Id.* at Art. 6(3).

94. Government of India: Guide to Investing and Licensing in India (1978).

95. Government of India: Guidelines for Industries, Part I, Policy and Procedures § 3(a) (1982) (hereinafter Indian Guidelines for Industries).

96. Ordinarily, royalties do not exceed 5% of the value of the annual output and are taxed at a 40% rate, while lump sum fees attract a 20% rate.

97. Indian Guidelines for Industries, *supra* note 95, at § 4.

98. *Id.*

guidelines in so far as they applied to the computer industry. Computer programs are now protected by copyright,[99] and procedures for the manufacture, import and export of computers have been revised to encourage the indigenous manufacture of computers.[100] The revisions led to the abolition of an upper limit on manufacturing capacity, facilitated faster processing of applications, and permitted a more liberal import of computer technology. The importation of small computers[101] has been banned but large computers may be imported after approval by the Department of Electronics.

Since the late 1970s, Korea has maintained a liberalized policy regarding the entry requirements for foreign investment and technology transfer. To improve existing law, a negative list system was established which opens all sectors of the Korean industry to foreign investment unless prohibited by a presidential decree or by the Ministry of Finance.[102] Where a contract is not on the negative list and satisfies some minimum requirements, automatic approval is given by the Ministry of Finance.[103] In other cases, the approval is subject to referral to the relevant ministries and review by the Foreign Project Review Committee. The new law currently only requires the registration of agreements although power has been reserved to the government to review contracts ex post facto.[104] Imports of sophisticated technology are automatically approved twenty days after reporting.

B. International Efforts

The most significant effort to regulate technology transfers at the

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99. The Copyright (Amendment) Act of 1984, Act. No. XIX defines literary property to include computer programs.

100. 1984 Periodic Report, *supra* note 75, at 8.

101. Defined to include computers that cost less than Rs. 10 million (US $8,000).

102. *See* The Foreign Capital Inducement Act of 1983. *See also* 1986 Periodic Report, *supra* note 78, at 11. The old law contained a positive list system which permitted investment only in specified sectors.

103. Automatic approval is available in all fields where the contract is for less than 10 years and where the royalty rate is 10% or less.

104. Although the competent minister can review an agreement with regard to the contents of technology, the method of transfer, and the royalty and conformity with national legislation, he is only empowered to request a modification of the agreement if the technology inducement is accompanied by the use of a foreign trademark. In this context Korean regulations limit the use of a foreign trademark on consumer goods for domestic sale and prohibit extensions of the term of an agreement, the sole purpose of which is to continue the use of the trademark. The Minister also has broad power to prohibit an agreement to protect a domestic industry for a specified period of time. *See* 1986 Periodic Report, *supra* note 78, at 12.

international level[105] is by the United Nations Conference on Trade and Development (UNCTAD). Initiatives on a code for technology transfer date as far back as 1961 with attempts to modify the international law on patents in favor of developing countries.[106] In 1970, the UNCTAD Secretariat was instrumental in the conduct of surveys which focused on the problems of the existing world technology market and the costs of technology transfer.[107] Conclusions of these surveys made a clear case for multilateral action to assist the market process, a move which was facilitated by events in Latin America where governments had begun to argue for greater national regulation of technology transfers.

Negotiations for a code of conduct on technology transfer have been conducted by the Group of 77, which represents developing countries, and Group B, which represents developed countries. From the perspective of developing countries, the objective of the Code is to protect technology recipients, promote an equitable and relatively stable technology market, legitimatize and harmonize national methods for the regulation of international transfer contracts, and assist in data collection and the enforcement of technology contracts.[108] Developed countries, on the other hand, view the Code as a means of establishing procedures for the adjudication of technology transfers and other forms of investment and establishing standards for the treatment of TNCs.[109]

The United Nations Conference on an International Code on Transfer of Technology ("the Conference") which has been meeting since 1978 to narrow these fundamental difference,[110] failed at its sixth

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105. *See* MANSER & WEBLEY, *supra* note 10, at 42-48 for a useful chronology of United Nations discussions on technology transfer.

106. The early efforts led to a United Nations Conference on the Application of Science and Technology for the Benefit of Less Developed Areas on February 8, 1963, and the founding of a technology advisory committee. *See* W. Fikentscher, 11 Draft International Code of Conduct on the Transfer of Technology (1980).

107. Citations to the early works on technology transfer can be found in UNCTAD Guidelines, *supra* note 1.

108. A.A. Fatouros, *International Controls of Technology Transfer*, in CONTROLLING INTERNATIONAL TECHNOLOGY TRANSFER, ISSUES, PERSPECTIVES AND POLICY IMPLICATIONS 478, 494 (1981).

109. *Id.* at 495.

110. These contrasting views have come to be reflected in an ongoing debate about the legal nature of the code, i.e. whether it should be adopted in a binding form such as a convention or a less binding form such as a recommendation. Developing countries apparently prefer a very detailed code, applicable to all technology transfer contracts, while Group B countries prefer a code establishing non-binding guidelines and applicable to just a small number of contracts. *See* H.V. PERLMUTTER & T. SAGAFI-NEJAD, INTERNATIONAL TECHNOLOGY TRANSFER 42 (1981) for a comparison of these views.

session held May 13 to June 5, 1985, to reach a final agreement on a code. The major stumbling block was the lack of consensus on the definition of restrictive practices as it applies to intra-enterprise transactions.[111] Some minor disagreement arose in the discussions of issues relating to unpackaging, confidentiality and the national regulation of transfer of technology enterprises. The Conference did agree in principle to condemn as impermissible a number of items similar to those already prohibited under national laws.[112] In 1985 and again in 1986, the United Nations General Assembly invited the Secretary General of UNCTAD[113] to consult with regional groups and relevant governments on issues unresolved in the code. In his report, the Secretary General has indicated that the matter of restrictive business continues to be a devisive issue, although flexibility from some governments has been evidenced which makes a compromise solution to those issues likely.[114] Therefore, one of his recommendations call for the convening of a seventh negotiating session.

In addition to its efforts to produce a technology transfer code, the UNCTAD Secretariat has prepared a set of multilaterally approved equitable principles and rules for the control of restrictive business practices,[115] which was adopted by the UN General Assembly in

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111. *See* THE SIXTH SESSION OF THE UNITED NATIONS CONFERENCE ON AN INTERNATIONAL CODE OF CONDUCT ON THE TRANSFER OF TECHNOLOGY UNCTAD TD/CODE/TOT/49 (1985); P. Roffe, *UNCTAD: Code of Conduct on Transfer of Technology*, 19 J. WORLD TRADE L. 669 (1985).

112. The practices so far agreed upon include restrictions after expiration of arrangement; payments after expiration of right; exclusive grant-back provisions; challenges to validity and sales or representation agreements relating to competing technologies or products. Others relate to restrictions on research; use of personnel; price-fixing; restrictions on adaptations; tying arrangements and export agreements. The rest are cartel, patent-pool or cross-licensing agreements; limitations on volume; use of quality controls; obligations to use trademarks; requirements to provide equity; unlimited or unduly long duration or arrangement and limitations on the use of technology already imported. *See* M. Ariga, *Restrictive Business Practices and International Controls on Transfer of Technology*, in CONTROLLING INTERNATIONAL TECHNOLOGY TRANSFER, ISSUES, PERSPECTIVES AND POLICY IMPLICATIONS 177, 188 (1981).

113. *See International Code of Conduct on the Transfer of Technology*, G.A. Res. 40/184, 40 U.N. GAOR Supp. (1985); *International Code of Conduct on the Transfer of Technology*, G.A. Res. 41/184, 40 U.N. GAOR Supp. (1986).

114. *Negotiations on a Draft International Code of Conduct on the Transfer of Technology*, 8 UNCTAD TD/CODE/TOT/51 (1987).

115. *See Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices*, UNCTAD TD/RBP/CONF/10 (1980). *See also* C.R. Greenhill, *UNCTAD, Control of Restrictive Business Practices*, 12 J. WORLD TRADE L. 67 (1978); M.R. Joelson, *The Proposed International Code of Conduct as Related to Restrictive Business Practices*, 8 L & POLICY INT'L BUS. 837

1980.[116] The practices condemned include price-fixing agreements, collusive tendering, market or customer allocation arrangements,[117] and predatory behavior towards competitors.[118] Though the principles focus primarily on international anti-trust, they still bear some relevance to technology transfer contracts. Nations have been urged to control the identified negative business practices by the adoption of appropriate legislation which are reviewed periodically by the United Nations Conference to Review All Aspects of the Set of Multilaterally Agreed Equitable Principles and Rules for the Conference of Restrictive Business Practices.[119]

The Intergovernmental Commission on Transnational Corporations (ICTC) and the UN Center of Transnational Corporations (CTC) have undertaken a substantial of the work on the international regulation of the activities of TNCs. The CTC is presently working on a code of conduct to reduce some of the negative activities of TNCs and encourage them to make more positive contributions to Third World.[120] A final TNC code has not been adopted since some important issues such as the treatment of TNCs are not yet resolved.[121]

Various international projects have also been commissioned in the area of industrial technology whose results impact on the transfer of technology to developing countries. The definition of patents in the Paris Convention on the Protection of Industrial Property of 1883[122] has been amended to make it more conducive to developing countries.[123] The objective is to provide greater local control over technolog-

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(1976).

116. *Restrictive Business Practices*, G.A. Res. 35/63, 35 U.N. GAOR Supp. No. 40-48 at 123 (1980).

117. Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices, *supra* note 115, at § D3.

118. *Id.* at § D4.

119. *See Review of All Aspects of the Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices*, UNCTAD TD/RBP/CONF/2/3 Adds. 1,2,3,4 and TD/RBP/CONF/2/4 (1985).

120. Fikentscher, *supra* note 106.

121. *See* S.K.B. Asante, *The Code: The January, 1986 Reconvened Special Session*, 21 CTC REPORTER 14-19 (Spr. 1986).

122. The Convention has gone through a number of administrative and substantive revisions, most recently in 1967.

123. The major issues tackled in the revision include the principles of national treatment and independence of patents for the same invention granted in different countries. Working requirements, grace periods and licenses of right are also considered. Additional issues include grants of preferential treatment to developing countries without reciprocity, technical assistance, types of protection other than patents and trademarks. The remaining issues involve reservations, colonial clauses, scope of protec-

ical development through such measures as compulsory licensing to force the working of patents, the grant of less than national treatment to certain patentees/licensors, and extended priority filing dates, for citizens of developing countries.[124] Two international conventions, the Berne Convention for the Protection of Literary and Artistic works of 1896,[125] and the Universal Copyright Convention[126] now provide for preferential treatment of developing countries. The United Nations Industrial Development Organization (UNIDO) and World Industrial Property Organization (WIPO) have been able to provide guidelines which are helpful in the acquisition of foreign technology by developing countries, particularly regarding technology license agreements and the negotiation of technology transfer agreements in general.[127] Within WIPO, a legal technical program has been set up to aid developing countries with licensing, patent documentation, and model clauses for national property laws.[128]

The General Agreement on Tariffs and Trade (GATT), International Monetary Fund (IMF) and World Bank, although traditionally more concerned with economic matters, play a significant role in the transfer of technology. Major reforms are continually urged in GATT and IMF to make them more responsive to the needs of developing countries for better terms in trade and the transfer of technology.[129] It

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tion of process patents, right of priority and unanimity. *See* H.P. Kunz-Hallstein, *The Role of Patents in the Transfer of Technology to the Less Developed Countries, Report by the Secretary-General of the United Nations*, U.N. Doc. E/3861/Rev.1 (1964); Kunz-Hallstein, *Patent Protection, Transfer of Technology to Developing Countries - A Survey of the Present Situation*, 6 INT'L REV. COPYRIGHT & INDUSTRIAL PROPERTY L. 427-28 (1975); N. Mangalo, *Patent Protection and Technology Transfers*, 9 INT'L REV. COPYRIGHT & INDUSTRIAL PROPERTY L. 100 (1978); S. Timberg, *The Role of The International Patent System in the International Transfer and Control of Technology*, in CONTROLLING INTERNATIONAL TECHNOLOGY TRANSFERS, ISSUES, PERSPECTIVES AND POLICY IMPLICATIONS 64 (1981); *The International Patent System; The Revision of the Paris Convention for the Protection of Industrial Property*, UNCTAD TD/B/C.6/AC.3/2 (1977).

124. *License Agreements in Developing Countries*, 5 UNCTC ST/CTC/78 (1987) (hereinafter *License Agreements*).

125. The Convention was first completed in Paris on May 4, 1896 but has since been revised several times, most recently on July 24, 1971. The current law can be found in Diplomatic Conference for Revision of the Berne Convention 135 (1971).

126. The present revision of the Convention can be found in 25 UST at 1341 (1974).

127. *See* UNITED NATIONS, GUIDELINES FOR THE ACQUISITION OF FOREIGN TECHNOLOGY IN DEVELOPING COUNTRIES WITH SPECIAL REFERENCE TO TECHNOLOGY LICENSE AGREEMENTS (1973).

128. *License Agreements*, *supra* note 124, at 5.

129. Fikentscher, *supra* note 106, at 21.

is significant that the Brandt commission,[130] created by the IMF and the World Bank, in its 1980 report, recommended the large scale transfer of resources to developing countries as well as reforms in the international economic system.[131]

Measures have also been undertaken by various regional groupings with the goal of improving the transfer of technology among the participating countries. For example, the conventions that created the African Carribean and Pacific (ACP) countries and the European Economic Community (EEC), have emphasized the need for technological cooperation in various fields, and have contained commitments from the EEC to assist developing countries in their efforts to consolidate indigenous technology and to acquire appropriate technology.[132] This pledge has been followed by the establishment of suitable administrative agencies, one of which, the Centre for Industrial Development, is responsible for the development and acquisition of technology in developing countries.[133] Countries participating in the Council for Mutual Economic Assistance (CMEA)[134] have agreed to cooperate in new technology areas related to computerization of national economies, automation, nuclear power and biotechnology.[135] Where necessary, it is envisaged that the CMEA countries would integrate their research and development production and establish international and engineering technology centers for the development and production of new technologies.[136]

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130. Its official name is the Independent Commission for International Problems of Development. It was created to seek ways of improving the trade and monetary aspects of transactions involving developing countries.

131. *North-South, A Program of Survival*, Independent Commission on International Development Issues (1980). For a critical appraisal of the report, *see* S. Lall, *Brandt on Transnational Corporation Investment and the Sharing of Technology*, in THIRD WORLD STRATEGY: ECONOMIC AND POLITICAL COHESION IN THE SOUTH 149 (1983).

132. *See* Lome I Convention of February 28, 1975; Lome II Convention of October 31, 1979; Lome III Convention of December 8, 1984.

133. In performing these functions, the Centre is expected to identify, collect, evaluate and supply information and advice on the acquisition, adaptation and development of appropriate industrial technology relating to specific projects. *See* 1986 Periodic Report, *supra* note 78, at 26-27.

134. CMEA countries include the socialist nations of Eastern Europe, Cuba, Mongolia and Vietnam.

135. These principles contained in the Comprehensive Programme for Scientific and Technological Progress of the Member Countries of the CMEA up to the year 2000, were agreed upon at a meeting of the CMEA held in Moscow on December 18, 1985.

136. 1986 Periodic Report, *supra* note 78, at 27-28.

Similarly, the Latin American Council has adopted a strategy for Latin America and the Carribean to strengthen the region's scientific and technological capacity. Methods utilized include intra-regional cooperation in the transfer of technology and the creation of a regional forum to analyze and generate information.[137]

Reports and recommendations of the Organization for Economic Cooperation and Development (OECD) evidence its efforts to control restrictive practices.[138] In April 1985, its Council of Ministers adopted the Declaration on Transborder flows which affirmed the desire of OECD countries to promote access to data, information and related services, and to avoid the creation of unjustified barriers to the international exchange of data and information.[139]

V. EVALUATION

Governments of developing countries have reacted to perceived limitations in the technology transfer process by modifying general trade laws to give existing regulatory agencies more control over technology transfer, and by creating new agencies directly responsible for the technology transfer process.[140] The adverse impact export controls have on technology transfer has been noted, but since developing countries typically wield no influence in the formulation of developed country trade policies, they have been unable to respond to the controls at a policy level. Consequently, critics of export controls on technology reside in developed countries themselves, and many of them argue that export controls are not only ineffective,[141] but in the long run harm the developed country economies.[142]

The scope of the new laws is quite comprehensive and often clearly outlined as in the Nigerian and Mexican examples. Only necessary technology is to be imported, and for this reason there is a restriction

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137. *See* Decision No. 229, adopted April 19, 1986.

138. *See, e.g., Recommendation Concerning Cooperation Between Member Countries and Restrictive Practices Affecting International Trade*, OECD Doc. C(67) at 53 (1967).

139. *See* 1986 Periodic Report, *supra* note 78, at 32.

140. Specific technology transfer laws have been passed in Mexico, Argentina, Honduras, India, Iraq, Tanzania, Nigeria, Brazil, Zambia, Venezuela, Columbia, Nepal, Peru, Thailand and the Philippines. General laws on trade and investment, which have some significant bearing on technology transfers have been passed in the Dominican Republic, Ghana, Pakistan and Korea.

141. For example, when the United States government refused to grant Arco a license to build a $353 million electric steel mill in the Soviet Union, a French firm took over the contract. *See* HELLER, *supra* note 2, at 106.

142. *See, e.g.*, Note, COCOM, *supra* note 42, at 106.

on imports of technology that is readily available in the country. India in particular, has a highly selective approach to investment,[143] permitting foreign collaboration in limited areas and insisting on large domestic participation through its equity participation requirement. In sharp contrast, the Korean regulation has a liberalized approach and opens all sectors to foreign investment unless specifically prohibited.

As discussed above, the technology legislation of a developing country prohibits restrictive practices from any technology transfer agreement for which approval is sought from the competent national authority. Progress has been made in the attempt to modify the law on industrial property in favor of developing countries by the general prohibition of grant back provisions. It frees the technology recipient from any obligation to assign to the supplier any improvements he may have made to the technology. Technology-receiving countries no longer bind themselves to keep technical information secret after the expiration of the contract, and they require that the technology supplier expressly assume liability for the infringement of industrial property rights by third parties. Other efforts have concentrated on eliminating controls that the supplier would seek to place on the receiving industry concerning management, volume of production, prices of goods, and exports sales agreements. The duration of contracts has been shortened considerably and it is now provided that questions of interpretation or enforcement of the contract are to be governed by national law.

The main objective of governments in passing these laws has been to promote the transfer of appropriate technology for industrial development by increasing the bargaining position of national firms vis a vis foreign technology suppliers. The elimination of restrictive practices is sought to reduce any long term technological dependence of developing countries on foreign suppliers. Typically, the regulations aim to strengthen the recipient country's technological capacities and improve its bargaining position vis a vis the supplier. For example, licensing controls would prohibit certain types of technology in order to allow the growth of the domestic sectors in that industry.[144] The specialized agencies have a role to play in this as some of them have been assigned responsibility for organizing research and development activities and promoting the growth of local technology. The specialized agencies also guide local importers to select on the best terms, the best type of technology available for adaption to local needs. Through their licensing

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143. J. Baranson & R. Roark, *Trends in North-South Transfer of High Technology*, in INTERNATIONAL TECHNOLOGY TRANSFER 24, 31 (1985).

144. F. Sagasti, *Science and Technology for Development*, Main Comparative Report of the Science and Technology Policy Instruments Project 67 (1978).

efforts, adequate information is gathered to aid the governments in the development of coherent national policies on technology. Policies adopted have favored the unpackaging or unbundling of technology, a move believed to strengthen the bargaining power of the purchaser, increase the learning effects of the technology transfer and reduce the loss of control by the recipient. Attempts at the international level to formulate codes of conduct for technology transfer and TNCs are aimed at further strengthening the regulatory and negotiating capacity of developing countries.

Predictably, these efforts by developing countries to enhance their access to technology have met with some resistance from the developed world.[145] The United States, in particular, views these developments as unacceptable incursions on the principle of freedom of contracts that underlies its free market system. Under such a system, the parties to a contract are generally presumed to be of equal bargaining strength capable of reaching a binding agreement in their mutual interests.[146] A mandatory code of conduct for TNCs and the various national technology transfer laws by prohibiting standard contract terms typically inserted by TNCs for their protection, impinge on the freedom of the TNCs to acquire the best terms for themselves. The U.S. has countered the efforts of developing countries to eliminate typical fiscal guarantees and control prices in technology transfer arrangements by reiterating its strong support for the profit motive of TNCs, which it is argued, leads to a healthier economy.[147] Appropriate technology should not be provided in developing countries as a charity at the expense of the TNCs. The U.S. contends that placing price controls on technology transfer will not only decrease the supply of that technology but will lead to long-run distortions.[148] The reduction in industrial property protection, which is sought by the developing countries, has also been strenuously opposed. As required under its law,[149] the U.S. guarantees

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145. *See, e.g., Statement by the Under Secretary for Economic Affairs Before the Subcommittee on Courts, Civil Liberties and the Administration of Justice of the House Judiciary Committee, on July 23, 1987*, in 87 DEPARTMENT OF STATE BULLETIN 2127 at 27 (1987).

146. *See generally* S. WILLISTON, A TREATISE ON THE LAW OF CONTRACTS (3rd ed. 1967).

147. F.F. Farabow & J.M. Bagarazzi, *Development at the United Nations Conference on Science and Technology*, 70 TRADEMARK REP. 134, 136 (1980).

148. Barton, *supra* note 52, at p.v. *See also* L. Hoffmann, *The Transfer of Technology to Developing Countries: Analytical Concepts and Economic Policy Aspects*, INTERECONOMICS 73, 80 (March/Apr. 1985).

149. U.S. CONST. art. 1, § 8 enables Congress to "promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive

patent protection as a way of encouraging further research and does not agree with the view that patent protection ought to be modified, or worse, that technological information be made freely available.[150] The U.S. has continually insisted that developing countries adopt the traditional property system in the hope that it would not only encourage a greater investment by developed country firms in the developing countries, but also halt the spread of counterfeit goods which adversely affect the market for the goods in question.[151]

The freedom of contract arguments have done little to dissuade the governments of developing countries which continue to see the assertion of equal bargaining power by parties to a contract as a myth. TNCs typically possess far superior knowledge about the technology they transfer.[152] Also, in the monopolistic market of technology suppliers, developing countries do not have an opportunity to discriminate among sellers to obtain the best terms and are forced to rely on one seller who exacts the highest prices. Anti-monopoly legislations of developed countries have, by and large, been unhelpful in checking these abuses.[153] Developing countries are not unaware of the profit motive of TNCs[154] as the U.S. position tends to assume; they only discourage contracts where, by relevant standards of the industry, the profits are considered excessive. Developing countries continue to be baffled by U.S. opposition to their control of restrictive trade practices when the U.S. Justice Department prohibits many of the same practices from patent licenses.[155]

It is yet too early to draw conclusions on the success of efforts of the various developing countries at regulation, since most of the laws have only recently been implemented. A few studies prepared so far in

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right to their respective writings and discoveries."

150. Note, *The United States and North-South Technology Transfer: Some Practical and Legal Obstacles*, WIS. INT'L L. J. 205, 221-223 (1983).

151. Barton, *supra* note 52, at 15.

152. Fatouros, *supra* note 108, at 483.

153. United States antitrust laws, though mainly concerned with monopolies within U.S. territory, will also reach contracts made outside the United States, where those contracts produce illegal effects within the U.S. The monopolies complained of by developing countries often fail to meet this criteria and hence go unregulated under United States law.

154. G.K. Helleiner, *International Technology Issues: Southern Needs and Northern Responses*, in MOBILIZING TECHNOLOGY FOR WORLD DEVELOPMENT 84, 87 (1979).

155. The prohibited clauses include compulsory grant-backs of new inventions, mandatory package licensing and requirements that the licensee adhere to the minimum price. P. MARCUS, ANTI-TRUST LAW AND PRACTICE 436 (1980).

the area indicate that some appreciable benefits have indeed been derived from regulation, although some problems have been found. In the Nigerian case, the NOIP, although established in 1979, did not begin evaluating agreements until 1983. To date its major activities have been monitoring payments and restrictive clauses and little is known about its other important function of selecting industrial technologies. With respect to payments, a report released in 1985 indicated that the NOIP's intervention in 62 registered agreements resulted in a total savings of N33,041.654.[156] Its attempts to control restrictive clauses have been equally impressive. The office has worked hard to eliminate the numerous restrictive clauses it found during its examination of agreements, but given the economic and technological importance of some projects it has found it necessary to adopt a flexible policy of eliminating only the least acceptable restrictions.

Problems encountered in the implementation of the Nigerian law include inadequate information furnished by applicants, reception from the Nigerian public[157] and a reluctance on the part of the foreign technology suppliers to revise existing contracts to conform to the requirements of the decree.[158] Solutions are evolving gradually with the availability of detailed questionnaires for use by applicants, the enhancement of the image of NOIP through effective publicity campaigns by the office, and by general acceptance in the world community of technology transfer regulations.

Appraisals of the Andean Pact have also been positive. Initially, however, there were many problems since the pact met with great resistance from TNCs in the region. Statistical tests showed a significant initial decline in the growth rate of foreign investment in the region, the obstacles to investment cited include the rules on ownership and profit remittances.[159] Nevertheless, the Code is to be credited for securing an increase in the proportion of local ownership of foreign affiliates, reducing profit remittance to almost twenty percent of registered capital in any year, and generally disallowing payment for technology transfers from parent firms. Not surprisingly, the verdict on the Andean Pact is that it has "altered permanently [company behavior] in

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156. *The Implementation of Laws and Regulations on Transfer of Technology: The Experience of Nigeria*, 14 UNCTAD UNCTAD/TT/74 (1985) (hereinafter *The Experience of Nigeria*).

157. This was because few in the business community went to the Office for advice on proposed agreements.

158. *The Experience of Nigeria*, *supra* note 156, at 18-19.

159. R. GROSSE, FOREIGN INVESTMENT CODES AND LOCATION OF DIRECT INVESTMENT (1980).

the region, in directions desired by host governments."[160]

Substantial foreign exchange savings have been reported in Mexico as a result of its technology transfer law. Up until 1976, some $250 million had been saved, a figure which matches the figure from a year's import of technology.[161] Between 1973-1978 the Mexican Registry examined 4,600 contracts and rejected thirty-five percent as containing restrictive clauses, while between 1967-71, the Comite de Regalias evaluated 395 contracts, modified 3,334 and rejected 61.[162] It managed to reduce royalties by forty percent, tie-in clauses by ninety percent, minimum royalty payments by ninety percent and was able to eliminate restrictions on exports. Similar successes at reductions in technology payments have been reported in Brazil.[163]

Some commentators have questioned the effectiveness of these controls, arguing that although the restrictions might have disappeared from contractual language, foreign technology suppliers are still able to manipulate policy makers in developing countries, in effect mitigating the impact of the regulations.[164] Further, they are able to replace de jure restrictions by de facto controls, for as suggested, "a potential licensee who needs technology is in fact at the mercy of the licensor who has the technology. No amount of government intervention can restrict the pressures imposed by a licensor and most licensees submit voluntarily to the demands, although the formal contract may not reflect any controls."[165] This was the case in Brazil when the INPI encountered some difficulties in controlling technology transfer agreements because of the existence of informal agreements quite separate from the formal contract, between the national supplier of technology and his foreign supplier.[166]

To be realistic, however, it does not appear feasible at the moment

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160. R. Grosse, *Codes of Conduct for Multinational Enterprises*, 16 J. WORLD TRADE L. 414, 429 (1982). *But see* S. Bitar, *La inversion estadounidense*, en 98 EL GROUPO ANDINO INTEGRACION LATINOAMERICA 42, *cited in* Barton, *supra* note 52, at 21.

161. H.A. Janiszewski, *Technology-Importing National Perspectives* in CONTROLLING INTERNATIONAL TECHNOLOGY TRANSFERS, ISSUES, PERSPECTIVE AND POLICY IMPLICATIONS 306, 312 (1981).

162. *Recent Developments in the Regulation of Foreign Technology to Developing Countries*, UNIDO TD/B/AC.11/19 Rev.1. (1974).

163. L.P.R. CAMPOS, REGULATING TECHNOLOGY TRANSFER: BRAZILIAN AND MEXICAN EXPERIENCE 53 (1984).

164. F. Stewart, *Technology Transfer in North-South Relations: Some Current Issues*, in TECHNOLOGY AND INTERNATIONAL AFFAIRS 203, 211 (1981).

165. *Id.*

166. CAMPOS, *supra* note 163, at 53.

to eliminate all restrictions given the contractual obligations of technology suppliers in earlier contracts, the importance of some technologies to the developing countries, the monopolistic nature of some of the suppliers and the types of patents they control. But the data indicates a general positive trend for technology transfer regulation with the elimination of most restrictive trade practices.[167] Additionally, there is the gradual acceptance of the new controls by technology suppliers. This change in attitude has resulted in large part because of the flexible nature of some of the controls as indicated in the Nigerian and Mexican examples. National legislation, contrary to the initial fears, has not resulted in the provision of inferior technologies, rather, it has encouraged competition among technology suppliers, much to the advantage of developing countries. Although the policy of controlling technology transfer is costly for the developing countries — there are the usual regulatory costs and delays, as well as problems of corruption — [168] policy makers feel that such costs are heavily outweighed by the benefits, and as developing country expertise and administrative capacities improve, the efforts to screen technology imports will undoubtedly continue.[169]

The continuing progress in the formulation of a code of conduct is very encouraging. A great deal of compromise is necessary to make the code universal, flexible, and adaptable to the technology transfer arrangements of the various political groups in the world. Opposition to the code has traditionally been centered on the ground that it would reduce the volume or increase the cost of technology transfers.[170] With the positive results reported from the short experience of national regulatory laws on technology, such fears about the code can now be laid to rest. When adopted, the code will constitute a broad framework for promoting technology transfers between nations and provide adequate procedures for enforcing technology transfer contracts. Developments taking place at the regional level show a tendency toward collaboration to present a unified effort in the search for suitable technology for development. Such a coordinated effort will be necessary to supplement the individual national efforts to fight the restrictive practices of TNCs, a problem which is not to be taken lightly given the sheer sophistication of the TNCs.

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167. Janiszewski, *supra* note 161, at 3-14.
168. Barton, *supra* note 52, at 19.
169. Helleiner, *supra* note 154, at 87.
170. *Id.* at 90.