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Technology Transfer to Developing Nations: A Pragmatic Approach to Industrialization

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INTRODUCTION

The international transfer of technology has been dominated by a small group of technologically advanced states since the beginning of the Industrial Revolution.¹ These industrialized nations, which produce almost all scientific and technological advances,² have supplied them to the "less developed countries" (LDCs)³ on terms that were subject to negotiation with regard not only to compensation, but also to the control of intellectual property rights, including patents, trademarks, trade secrets and know-how. National laws of the host country often regulate technology transfers⁴ through restrictions, such as limits on royalty payments and terms of patents and trademarks. In the past, the restrictions were often waived contractually or through special legislation because the technology was badly needed and otherwise unavailable.

Aided by these waivers and encouraged by the possibility of exploiting the often vast natural resources of the host, businesses

1. Ledakis, Evolving Technology Transfer, 1978 Les Nouvelles 255, 256. Advanced states will be referred to throughout this paper as "developed" or "industrialized."
3. The term "developing countries" has often been applied to those nations which had been colonized by the Western world. Generally, the "developing countries" have only recently been afforded independence.

Technology has been "defined as the knowledge necessary for the productive functioning of an enterprise . . . [including] process (engineering), management, marketing, and production know-how." The transfer of technology "takes place when [it] is transmitted, received, and applied. Transfer is generally a voluntary act by the technology owner . . . ." The transfer "can occur through various mechanisms, such as licenses, direct investment, joint ventures, [and] technical assistance . . . contracts." Fund for Multinational Management Education, Council of the Americas, United States Council of the International Chamber of Commerce & The George Washington University, Preface, in 2 PUBLIC POLICY AND TECHNOLOGY TRANSFER 1, 5 (1978) [hereinafter cited as INDUSTRY CHARACTERISTICS].

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within the industrialized countries expanded into the Third World nations and grew into the "multinational corporations" (MNCs) which dominate international technology transfers today.

Through their growing contacts with Western business and culture, the LDCs have become aware of, and increasingly dissatisfied with, the widening gap between their standards of living and those of the industrialized nations. As their level of economic sophistication has grown, they have begun to realize that the acquisition of the advanced technical and scientific knowledge and skills possessed by the developed world is vital to their desired commercial growth and to the achievement of economic independence.

The LDCs have examined the present system of international laws regulating technology transfers which, until recently, has been primarily the product of commerce among the developed nations. They have concluded that the pattern of business transactions regulated by the existing laws is detrimental to their interests.

Conditions imposed contractually on the recipient of technology, such as export restrictions, required grantbacks, price controls, tie-ins and overbilling for primary and intermediary materials, have led LDCs to conclude that although they need and have benefited from the imported technology, the prices they have been paying are exhorbitant. As a result, they are seeking revision of the

5. These businesses are chiefly based in the United States, Western Europe and Japan. DEVELOPING COUNTRIES, supra note 2, at 1. See also Fund for Multinational Management Education, Council of the Americas, United States Council of the International Chamber of Commerce & The George Washington University, in 1 PUBLIC POLICY AND TECHNOLOGY TRANSFER 48 (1978).

One hundred and twenty corporations were involved in "reviewing and assessing policies on technology development and transfer." DEVELOPING COUNTRIES, supra note 2, at 2. Among the "supporting background materials are 70 industry case histories and the impact of governmental constraints and incentives on them." Id. at 3. The entire project was an attempt to present "the practical viewpoints of U.S. suppliers of technology." Id. at 4.

6. One of the stated aims for revising the Paris Convention is recognition of the fact "that individual enterprises had no longer an unrestricted right to fix the conditions of transfer of technology." WIPO, AD HOC GROUP OF GOVERNMENTAL EXPERTS ON THE REVISION OF THE PARIS CONVENTION 9 (1975) [hereinafter cited as AD HOC GROUP].

7. DEVELOPING COUNTRIES, supra note 2, at 1.


11. Gugliotta, supra note 8, at 11.
international legal system, implementing national legislation, and forming coalitions, such as the "group of 77," in their effort to eliminate practices which they define as "abuses."

These attempts at revision arise at a time when the developed countries are increasingly concerned that "[t]echnology is being transferred too freely." Some developed nations fear "a loss to the strategic and/or economic position of that developed country" from technology transfer, and are therefore advocating strict control over the exportation of technology.

These fundamentally opposed viewpoints have led to a series of international debates, conferences and proposed changes in current business practices.

**HISTORY OF CONFERENCES AND RECOMMENDATIONS**

**A. United Nations Conference on Trade and Development**

In response to the LDC demands, the United Nations General Assembly passed a resolution calling for a United Nations Conference on Trade and Development (UNCTAD). The first meeting took place at Geneva in 1964 and was followed by three other meetings at New Delhi in 1968, Santiago in 1972, and Nairobi in 1976.

The recommendations and proposals in the Final Reports of the four conferences differ little. They call on the developed world for assistance in the form of financial and technical aid and termination

12. *Id.* at 8.

13. The "group of 77," which was organized in the last 15 years, is a technology transfer "economic alliance" involving 102 nations of the developing world. Tabor, *Technology and the Developing World*, 1975 *Les Nouvelles* 216, 216. See Finnegan, *supra* note 10, at 72 n.4.

14. *Developing Countries, supra* note 2, at 1, 12.


17. *Id.*

18. See notes 19-101 *infra* and accompanying text.

19. The United Nations Conference on Trade and Development was organized in 1962 pursuant to a United Nations General Assembly Resolution. Its first meeting was held in Geneva in 1964. Since that time three more meetings have been held, with a fifth meeting to be held in 1979. The goal of these conferences has been the improvement of the status of Third World nations. Gugliotta, *supra* note 8, at 8.

of trade barriers against imports from developing countries. The LDCs are encouraged to diversify their economies, increase their exports to developed countries, and thereby improve the balance of payments problems that most of them face.

The Final Reports encourage integration of LDC economies, which has been accomplished to some extent through the establishment of pacts, such as the Andean Pact in Latin America. The LDCs are urged to seek technology which will lead to exports, rather than mere substitution of domestic products for those which were previously imported.

The majority of recommendations in UNCTAD I were aimed at securing the cooperation and assistance of the developed countries. While acknowledging that private investment is of great importance, the conference recommended that technical and financial aid should come directly from the governments of the developed countries. Some of the specific recommendations included debt rescheduling, the earmarking of aid for specific programs, increasing technical assistance tailored to individual LDC needs, the establishment of capital markets within developed countries, and the facilitation of the process of technology transfer, including the implementation of international agreements, legislation and the creation of United Nations facilities for information exchanges.

UNCTAD II made many of the same recommendations, but the emphasis shifted from attempting to obtain financial aid toward stimulating the transfer of technology. The need for LDCs to develop their own scientific-technological capabilities was given considerable attention.

The continuing talks led to increased awareness of the complexity of the issues involved with technology transfer, such as the appropriateness of the technology to the host country, the need for

21. Gugliotta, supra note 8, at 12.
22. Id. at 12-13.
23. Id. at 13.
24. See notes 102-06 infra and accompanying text.
26. UNCTAD I was held in Geneva in 1964. Id. at 8.
27. Id. at 15.
28. A "capital market" is a data bank with information on investors and amounts of available capital within a country for technology transfer.
29. Gugliotta, supra note 8, at 15-17.
30. UNCTAD II, a continuation of UNCTAD I, was held at New Delhi in 1968. Id. at 8.
31. Id. at 21.
LDCs to provide environments conducive to the transfer of technology and the need to create a comprehensive international legal system regulating intellectual property.

The suggestion that centers be created to disseminate information on the availability of technology and the facilitation of its transfer first appeared in the UNCTAD II Final Report. The establishment of these centers, where representatives of LDCs could formulate plans for their industrial development prior to any purchase of technology could be of great assistance in the extensive planning which is essential to controlled industrialization and economic growth. As a basic minimum, these data banks should contain descriptions of available technology, lists of possible suppliers and inventors, a survey of economic and technological status and a projection of the host country's developmental goals.

In addition, UNCTAD II recommended that transferor governments facilitate technology transfers by ending restrictions on the use of the information transferred. The United States, in particular, imposes heavy limitations on the re-exportation of technology or products from a transferee to certain countries which are considered unfriendly. These restrictions on re-exportation have been widely criticized because they prevent the recipient from entering a vast portion of the export market.

The hope that the recommendations of UNCTAD I and II would be implemented and would accelerate the industrialization of the LDCs has not been realized. In evaluating the present economic status of the Third World, UNCTAD III cited the unfortunate fact that LDCs economic conditions had deteriorated relative to the developed world. The Third World concern that the MNCs were controlling most technology transfer was expressed in the Final Report. The report concluded that "[t]he conference recognizes

33. Gugliotta, supra note 8, at 22.
34. Id. at 19-24.
35. Id. at 22. One such example is the restriction that the United States imposes on recipients not to transfer products or technology considered to be sensitive to certain unfavored nations (including most of the communist nations).
36. Id. at 23.
38. Gugliotta, supra note 8, at 24-27. UNCTAD III was held during 1972 in Santiago, Chile.
39. Id. at 24-25.
that the results of the conference have in many cases fallen short of expectations."

The meeting of UNCTAD IV at Nairobi in 1976, which itself directed substantial attention to technology transfer, went on to schedule yet another conference focused almost exclusively on technology transfer and the problems of development. The goal of the developing countries, as set forth in the Final Report of UNCTAD IV, is: "1) To restructure the legal environment for technology transfer, and 2) To strengthen the technological capacity of developing countries in order to reduce their technological dependence."

B. World Intellectual Property Organization

In 1970, the United Nations set up the World Intellectual Property Organization (WIPO) to promote the "[p]rotection of intellectual property throughout the world." WIPO's initial efforts have been aimed at both the revision of the international legal system to facilitate the acquisition of technology by LDCs and the provision of information to LDCs, which is vital to their use of the existing system.

In August 1977, WIPO published a licensing guide for developing countries which includes: a description of the present legal system; specific information which can be used as a guide to contract negotiation; legal issues which commonly arise in contract matters, along with suggestions for dealing with them; and a list of contract provisions which may be detrimental to the LDC, with suggestions for possible alternative provisions.

WIPO is currently working on a new Model Law for use in updating national patent laws to aid LDCs in achieving their general economic aims. Part III of the Model Law contains a "legal and administrative framework for the examination and registration" of contracts dealing with technology transfer in the form of patents

40. Id. at 27.
41. DEVELOPING COUNTRIES, supra note 2, at 13.
42. Two major United Nations conferences have been scheduled for 1979. UNCTAD V is scheduled to meet in Manila, "while the U.N. Conference on Science and Technology for Development . . . is set for late summer in Vienna." "Appropriate Technology", supra note 32, at 22.
43. DEVELOPING COUNTRIES, supra note 2, at 13.
44. McAuliffe, Prospects for Improved Protection of Trademark in International Trade, 61 TRADEMARK REP. 82, 82 (1971).
45. Ledakis, supra note 1, at 262.
46. See WIPO, LICENSING GUIDE FOR DEVELOPING COUNTRIES (1977).
and know-how. In order to qualify for registration under the Model Law a contract must be free of nineteen restrictive clauses which WIPO feels are abusive. If a host country believes that the benefits of the contract justify inclusion of any of these clauses, it may approve the contract.

WIPO is currently preparing an LDC guide for establishing a system of evaluation and registration of technology transfer contracts. Current international transfer of patents and trademarks is controlled largely by the Paris Convention.

In 1975, the WIPO ad hoc group of governmental experts met in Geneva to attempt to revise the Convention. Signatories to the Convention have agreed to the national treatment of patents held by aliens of other signatory states. One stated objective of the Convention is the inclusion of preferential treatment without reciprocity for developing countries in all fields of international economic activity, with special reference to patent systems. A second objective is more extensive cooperation between members of the international community to ensure both prosperity and participation in the benefits of modern technology to LDCs. The state-by-state comments are clear indications of the vast differences in goals that are represented within the ad hoc group.

It was noted that only 1 percent of the patents held worldwide are owned by developing country nationals, resulting in a virtual monopoly by the developed world. Further, the owners of the tech-

47. Ledakis, supra note 1, at 262.
49. Ledakis, supra note 1, at 263-64.
51. AD Hoc Group, supra note 6, at 1.
52. National treatment requires that signatory nations treat nationals of other signatory nations equal to their own nationals in the granting of patents and trademarks. Convention, supra note 50, art. 2. See generally AD Hoc Group, supra note 6, at 2.
53. A patent is the exclusive right to use, or to license others to use, an invention for a limited time. It is granted to the inventor in return for his publication of a detailed description of the invention, including methods of production or use of the process. Without the patent this information would otherwise remain secret. Access to this information allows other inventors to refine or to improve the invention, thereby stimulating innovation. Address by Luc Benoit, Chairman, Committee on Technology Transfer of the Los Angeles County Bar Association (Jan. 20, 1979) [hereinafter cited as Luc Benoit].
54. AD Hoc Group, supra note 6, at 2.
55. Id.
nology were accused of abusive practices which are viewed as harmful by developing countries. The Convention prescribes waiting periods during which signatories may not use patented inventions. In rationalizing the use of patented inventions prior to the expiration of the prescribed period, the delegation from India cited the need to ensure the public welfare. It also favored licenses of right which could be used if patents were not adequately worked by their owners.

According to the delegation from Brazil, 80 percent of all patents granted in developing countries are issued to nonnationals, of which 90 percent are unworked. The Brazilian delegation believes that these are unworked because they were obtained merely to prevent any possible use of the technology by competitors in the host country. It was not reported what percent of the patents owned by nationals are unworked. Brazil attacked “national treatment” as a “reverse system of preference to the disadvantage of developing countries.”

The Mexican delegation attacked the Convention as being so outdated as to have no validity with regard to the developing countries. In advocating revisions to provide for preferential treatment for developing nations, Mexico pointed out that national treatment of patents and trademarks between the developed and developing nations results in unequal treatment because of the inherent differences in technological ability.

Several delegations, including Israel and the represented Socialist countries, suggested that alternative forms of intellectual property rights, such as inventor’s certificates and protection for employee inventions, be developed and included in the revised Convention.

Cuba recommended that trademarks be subject to cancellation

56. Id. The abusive practices they are accused of include underworking or nonworking of patents which results in the patented article being produced exclusively outside the country, and requiring “grantbacks” of new technology, which do not permit the recipient-developer use of the new technology without paying the supplier for it.

57. A license of right is a compulsory license granted to anyone seeking it to produce the patented process or device. Vedaraman, Patent Law in India as a Means Toward Accelerating Industrial Development, in WIPO WORLD SYMPOSIUM ON THE IMPORTANCE OF THE PATENT SYSTEM TO DEVELOPING COUNTRIES 137, 144 (1977).

58. AD HOC GROUP, supra note 6, at 3.

59. Id.

60. Id. at 7.

61. Id. at 4, 6-7.

62. Id. at 7.
for nonwork. In making this suggestion, Cuba failed to acknowledge that trademarks are issued not only to protect the trademark owner, but also to protect the public by ensuring that a product carrying that trademark was produced by the specific manufacturer associated in the public mind with that mark.

The French delegation supported maintenance of the Convention, although it acknowledged that the virtual monopoly by developed nations could perhaps be corrected through international agreements. Its members expressed the fear that “removal of the [existing international] patent law would ultimately stop the dissemination of technology.”

The delegations from the United States and the United Kingdom joined France in strongly supporting the Convention, particularly with respect to trade between industrialized countries. They viewed the end of the national treatment of patents as certain to adversely affect international trade.

The delegation from Japan viewed the Convention as a stimulus to both the importation of foreign and the development of domestic technology. In support of this position, it noted that Japan’s accession to the Convention in 1899, before that state had begun to develop, had “contributed considerably to the industrial development of Japan.”

Nine international “non-governmental organizations were represented by observers.” UNCTAD favored revision to resolve numerous conflicts over “the national treatment principle, inventors’ certificates, priority, independence of patents, compulsory licenses, provisions on trademarks and appellations of origin.”

In opposing any fundamental changes to the Convention, the representative of EIReMA pointed out that technology suppliers were already burdened with the high cost of development and transfer of technology combined with the risk of transferee competition

63. Id. at 8.
65. Ad Hoc Group, supra note 6, at 4.
66. Id. at 3-5.
67. Id. at 6.
68. Id. at 1.
69. Id. at 9.
70. European Industrial Research Management Association.
within the transferor's own sales territory. EIRMA cautioned that patentees might be discouraged from entering foreign markets. It also stressed the need to encourage domestic companies to develop their own inventive activities.\footnote{71}

Following the comments of the representatives, the WIPO ad hoc group went on to consider specific legal questions.\footnote{72} It was generally understood that the law regarding national treatment would remain unchanged as between developed countries. The question as to whether revisions should be made to assist developing countries, and if so, what those changes should be, remained unsettled.\footnote{73} Reduced fees for technology, shortened terms for patents, and the addition of requirements that patents obtained in developing countries be fully worked were among the possible areas for revision.\footnote{74}

Areas suggested for future study included nonworking of patents, compulsory licenses, licenses of right, preferential treatment of LDCs without reciprocity, technical assistance, types of protection other than patents, trademarks and industrial designs, and appellations of origin.\footnote{75} C. Other Conferences and Reports

In 1975, UNCTAD, UNDES\footnote{76} and WIPO prepared an analysis entitled *The Role of the Patent in Technology Transfer to Developing Countries*. The report includes descriptions of the international patent system, national legislation, suggested safeguards against abuses, and the presumed effect of technology transfer on the economic advance of LDCs.\footnote{77}

The United States government states in its comments on the study that the analysis is biased.\footnote{78} The United States supports the establishment of sound patent systems within developing nations but opposes dilution of economic or other incentives to foreign suppliers of technology as counter to the stated aim of LDCs to become industrialized, exporting nations.\footnote{79}

\footnotesize{\begin{itemize}
\item[71.] Ad Hoc Group, supra note 6, at 10.
\item[72.] Id. at 11.
\item[73.] Id.
\item[74.] Id.
\item[75.] Id. at 12.
\item[76.] United Nations Department of Economic and Social Affairs.
\item[77.] UNCTAD, The Role of the Patent System in the Transfer of Technology to Developing Countries, U.N. Doc. TD/B/AC.11/19/Rev. 1 (1975) [hereinafter cited as The Role of the Patent System].
\item[78.] U.S. Government Comments, supra note 64, at 2.
\item[79.] Id. at 1.
\end{itemize}}
A great deal of interest and discussion has been focused on patent systems as a vehicle for facilitating LDCs' industrialization. Patents, however, are only one aspect of the complex network of information and know-how which must be present in order for an economically advantageous transfer of technology to take place.\footnote{Id. at 2.}

The UNCTAD study concentrated a great deal of attention on the economic impact of patents on developing countries.\footnote{The Role of the Patent System, supra note 77.} The United States, in its comments, lists nine important factors which, although necessary for a sound analysis, are conspicuously absent from the UNCTAD report. They are as follows:

a. adequacy of country planning  
b. lack of indigenous technological infrastructure  
c. social and cultural impediments  
d. stability of national governments and national attitudes towards technological transfer  
e. rigid rules prescribing the form and extent of local participation in a technological enterprise  
f. lack of insurance against expropriation or loss of investment  
g. dispersion of markets  
h. limitations on venture capital  
i. protectionism.\footnote{U.S. Government Comments, supra note 64, at 6-7.}

The United States favors retention of the Convention as a necessary framework for the "orderly meshing of diverse national systems" and a minimum standard for acceptable international business practice. Accession to the Convention has traditionally signaled to the investing community that the country encourages technology transfer and investment.\footnote{Id. at 31.}

In the 1977 summary proceeding of the Section of Patent, Trademark and Copyright Law of the American Bar Association, the section members joined the United States government in strongly opposing enactment of any laws in contravention of the Convention as it now stands.\footnote{ABA, SECTION OF PATENTS, TRADEMARKS AND COPYRIGHT LAW 14 (A. Jackson, Jr. ed. 1977).}

At a 1972 conference in Brasilia (CACTAL) conducted by the General Secretariat of the Organization of American States (OAS),\footnote{The Specialized Conference on the Application of Science and Technology to Latin American Development (CACTAL). Gugliotta, supra note 8, at 87.}
the application of science and technology to Latin American development was studied. The Final Report proposals call for changes and suggest ways of achieving them. Adaptation of technology to the needs of the LDC, growth of indigenous research and development (R&D) systems, and expanded government regulations and incentives were regarded as crucial to industrialization. The acquisition of technology was regarded as the most important aspect of industrial development.84

The Brasilia conference added refusal of the transferor to set up R&D facilities within the host nation to the list of practices considered by UNCTAD to be abusive.87 In practical terms, it would be extremely expensive for suppliers to establish R&D centers in every country to which they transferred technology. It would also result in wasted effort, duplication and confusion. CACTAL specifically recommended that LDCs regulate all transfers of technology and implement regional patent systems.88 The conference called for increased education and training, combined with economic and other incentives, to reduce the emigration of the domestic technologists from LDCs to developed nations,89 which offer excellent employment opportunities. The basic thrust of the conference was to encourage use of domestic, rather than foreign, technology.90 Interestingly, the conference noted that the LDC private sector views imported technology as both superior to, and less expensive than, domestic technology.91

The CACTAL conference also urged that Latin American countries compare prices before purchasing technology,92 "[t]rain local personnel in the use of the imported technology,"93 . . . [r]emove obstacles to full use of imported technology,"94 and induce importers to conduct research locally.95 One conference objective was to reduce technological dependence, which was recognized by the conference to result from weak technical infrastructures.96 It was recognized

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86. Id. at 88.
87. Id. at 89. See note 49 supra and accompanying text.
88. Gugliotta, supra note 8, at 89.
89. Id. at 90.
90. Id. at 91.
91. Id. at 89.
92. Id. at 106.
93. Id.
94. Id.
95. Id.
96. Id. at 104-05.
that overpricing as well as restrictive trade practices exist, and the failure to adapt imported technology to local conditions contributes to this dependence.

The third Round Table on Foreign Private Investment in Latin America met in Caracas February 13-16, 1973, and urged investors to provide assistance to educational institutions and to establish local research facilities. The panel concluded that the establishment of a Regional Center for information on international investments in Latin America should be thoroughly investigated.

**REGIONAL AND NATIONAL LEGISLATION**

**A. Andean Pact**

One example of regional legislation is Decision 24 of the Cartagena Agreement enacted by the Andean Pact nations. Decision 24 is aimed at decreasing the Andean Pact nations’ dependence on foreign capital and technology through regional control of foreign investments involving technology transfer. The Andean Foreign Investment Code (AFIC) seeks to integrate development, while discouraging intra-regional competition for available foreign investments.

The AFIC requires registration of all contracts which involve technology transfers. It specifically excludes from registration contracts containing restrictive clauses calling for “tie-ins,” price setting, limitations on volume production, forced “grantbacks,” and similar devices which are viewed as abusive. Under the AFIC, certain sectors of national economies, including communications, utilities and financial institutions are reserved exclusively for national investors.

97. Id. at 105.
98. Id.
99. Id. at 88.
100. Id. at 133.
101. Id. at 135.
105. Id. at 197-98.
106. Id. at 199-200.
Many of the developing countries are implementing national laws restricting technology transfers. Of laws currently in effect, those in Mexico, Brazil, India and the Andean Pact are of interest because they fairly represent the types of changes desired and demands being made by the LDCs.

B. Mexico

Mexico began enacting technology transfer legislation in 1972.¹⁰⁷ Companies with equity more than 51 percent foreign owned or which are controlled or managed by foreigners are defined as foreign businesses.¹⁰⁸ Foreign ownership is generally limited to 49 percent or less of new manufacturing companies and is strictly limited to no more than 49 percent of mining industries.¹⁰⁹

Article 23 of the foreign investment law, which became effective in 1973, sets up a national registry by which all foreign investments governed by the new law and all Mexican companies with capital partially held by foreigners must be registered.¹¹⁰ Sanctions for non-registration include denial of the right to pay dividends,¹¹¹ invalidation of agreements,¹¹² and possible criminal penalties which include imprisonment for up to nine years and fines of up to 100,000 pesos.¹¹³

Under the new registration procedures, existing companies with foreign investment must obtain approval before they issue capital stock increases, enter into a new field of economic activity, open new facilities or start new product lines. The existing companies may be forced to Mexicanize if they wish to expand.¹¹⁴

The 1976 Law of Inventions and Trademarks reduces patent protection to ten years, rather than the previously prescribed fifteen-year term,¹¹⁵ and denies patent protection to pharmaceuti-

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¹⁰⁷. Whipple, supra note 3, at 155. The four recently enacted Mexican laws relating to patents, trademarks, and technology are:
  3. The 1972 Law on Technology Transfer.
  4. Laws establishing CONACYT (Consejo Nacional de Ciencia y Tecnologia).” Id.


¹¹¹. Id. art. 27 at 649.

¹¹². Id. art. 28 at 649.

¹¹³. Id. art. 29 at 649.

¹¹⁴. F. Laffan, supra note 108, § I.

¹¹⁵. The Law of Inventions and Trademarks of Feb. 10, 1976, art. 40, D.O. Feb. 10,
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cals, fertilizers and other agricultural chemicals, and certain other products considered to be essential to the basic welfare in the country.\textsuperscript{116}

Although the provisions listed thus far make the importation of technology more difficult, they would not, in and of themselves, discourage most prospective investors. However, when combined with other provisions yet to be reviewed, they become definite deterrents.

The 1973 foreign investment law requirement that the Ministry of Industry and Commerce approve the royalty paid for the technology is particularly onerous to business. Generally, the registry will not approve contracts calling for greater than a 3 percent royalty. If the technology is not particularly important to the economy, the percentage authorized has often been limited to as low as 1 percent of sales. For strongly desired sophisticated technology a higher percentage may be authorized.\textsuperscript{117}

Under the 1973 law, there are six situations in which contracts must be rejected absolutely. They are:

1) where the technology is already freely available within the country
2) where "grantbacks," exclusive to the transferor, are included
3) where raw materials must be purchased from the technology supplier
4) where the contract exceeds ten years
5) where restrictions or prohibitions against exporting are included
6) where the parties agree to settle disputes outside Mexico.\textsuperscript{118}

The inability to limit exports places businesses that have existing agreements granting exclusive markets to companies in other countries or regions in violation of those agreements if they manufacture in Mexico.

The Law of Inventions and Trademarks provides that patents which are unused within three years of registration (plus an additional year of nonexploitation) are subject to cancellation.\textsuperscript{119} Com-

\begin{footnotes}
\footnote{Id. art. 10}
\footnote{F. Laffan, \textit{supra} note 108, § II(A).}
\footnote{The Law of Inventions and Trademarks, \textit{supra} note 115, arts. 41-42, 48.}
\end{footnotes}
Compulsory licenses may be granted to anyone requesting them, for any patents on which work has been suspended for six months or more, which are underexploiting export markets, or which are unworked within three years of registration.120 Under this law, the owner of a patent on which a compulsory license has been granted is required to supply know-how to the licensees.121 Patents which are needed for the "public good" may be expropriated.122

Mexico will not absolutely refuse contracts with export limitations where the supplier has other conflicting exclusive licenses,123 but will "look very carefully into other sources of supplies,"124 such as Japanese or European companies, in an attempt to obtain similar technology without export restrictions.125

In an exclusive interview, the Director of the Dirección General Del Registro Nacional de Transferencia de Tecnología was asked whether Mexico had lost any technology due to its restrictive laws. His reply, that Mexico did not believe it had lost any technology, was based upon discussions with businessmen in the United States and Europe and with representatives of international organizations. The Director took the position that foreign investors know what to expect and are aware that Mexico honors its commitments.126 However, there have been indications to the contrary.127

In a 1978 article in Les Nouvelles, Robert P. Whipple presented a personal canvass of American business views that was based on interviews with eighty-six attorneys who had advised clients on the use of patents, trademarks and technology in international business. He states "[n]ow, through necessity and not choice, they relegate Mexico to a last-tier country for consideration as a country into which technology can be safely transferred."128 Mr. Whipple foresees that small and medium sized companies, which often are the source of practical technology of the kind needed and easily assimilated by developing countries, will become unwilling to invest in Mexico as a result of the new restrictions.129 It is just this type of "intermediate technology" which forms the basis for an infrastruc-

120. Id. art. 50.
121. Whipple, supra note 3, at 156.
122. Id. See The Law of Inventions and Trademarks, supra note 115, art. 63.
123. MEX-AM REV., supra note 118, at 15.
125. Id. at 149.
126. MEX-AM REV., supra note 118, at 15.
127. Whipple, supra note 3, at 159.
128. Id. at 155.
129. Id.
ture and a technology base within the developing country sufficient to support the indigenous growth and maintenance of major industries.\textsuperscript{130}

While "appropriate technology" is being sought by the LDCs, a conflict often arises within the LDC itself because the country wants the newest technology available, rather than old established methods which, although appropriate to the host environment, are viewed by the LDC as "obsolete." Although there is no precise definition of the term "appropriate technology," one illustrative example is the use of a $100 hand pump in an area where unemployment is high, rather than a $1,300 diesel pump requiring expensive fuel.\textsuperscript{131} The term is generally used to denote technology geared to the needs, technical ability, existing markets, region of implementation, management ability, available support network, natural resources and labor market of the recipient.\textsuperscript{132}

In general, the reaction of business owners who might have invested in Mexico has been negative. The former Mexican incentives\textsuperscript{133} to business, combined with low labor costs and Mexico's proximity to the United States, led to heavy United States investment there. Until 1970, fully 71 percent of total foreign investment capital came into Mexico from the United States.\textsuperscript{134} "Certainly U.S. companies and the individuals managing them and advising them see little or no business opportunity in Mexico to attract them."\textsuperscript{135}

The Whipple article cites the following reactions of United States business and counsel to the new law:\textsuperscript{136}

1) A Los Angeles, California, licensing attorney stated "[t]he net result is that smaller businesses and entrepreneurs simply do not want to get involved in a situation made more difficult than it previously was."\textsuperscript{137}

2) An Orange County, California, lawyer stated "[t]he royalty approved by the appropriate agency in Mexico has in my experience been unrealistically low. Indeed in one case which came across my desk within the last several days, the reaction of the president of the

\textsuperscript{130} "Appropriate Technology", supra note 32, at 19.

\textsuperscript{131} Rosen, Technology Transfer to Developing Nations, 1 J. TECH. TRANSFER 93, 100 (1977).

\textsuperscript{132} "Appropriate Technology", supra note 118, at 19.

\textsuperscript{133} These include reductions in import taxes, tax incentives for exports and accelerated depreciation.

\textsuperscript{134} F. Laffan, supra note 108, at introduction.

\textsuperscript{135} Whipple, supra note 3, at 159-60.

\textsuperscript{136} Id. at 155-60.

\textsuperscript{137} Id. at 159.
company involved was in effect that we should forget about Mexico . . . .” 138

3) Two pharmaceutical manufacturers stopped filing patents in
Mexico, although one has a local operation and one a license there. Low royalties were specifically cited as the basis for their decisions not to transfer further technology. 139

4) Counsel from a large corporation said, “if we had not already entered the Mexican market through substantial investment in that country, needless to say, we would have thought twice before entering Mexico as a new market.” 140

5) A large industrial products company is no longer willing to use its trademark on items from manufacturing operations in Mexico because the quality of the product has declined while the price has risen. A senior executive informed Mr. Whipple that the reasons for the company’s removal of its trademark were the requirements of trademark linking 141 and purchase of components within Mexico. 142

Because of the laws permitting utilization of that technology in shipments all over the world, we are not inclined to share the basic and certainly not the most important technology with people with whom we deal. . . . [W]e have made efforts in Mexico for the last 20 years and have really made little inroad in establishing a successful program, whereas in 17 other countries of the world in the same period we have increased the total sales of our company by 20%. These kinds of statistics should tell the Mexican authorities something about the strange and difficult barriers which they have built with nothing but a view of nationalism in their minds. 143

It has been observed that

If a technology owner sees that a Third World Country is going to create problems and raise barriers to the transfer of technology, the source, because it has limited time to devote to this process, will decide not to transfer to that country and will instead transfer to other countries that do not have these barriers and problems

138. Id.
139. Id. at 158.
140. Id. at 159.
141. Trademark linking requires that “all foreign owned trademarks which are destined to cover goods manufactured in Mexico under license or not shall be used in combination with a trademark originally registered in Mexico.” Id. at 156.
142. Id. at 159.
143. Id.
and that have a more favorable environment for transfer of technology.\textsuperscript{144}

That Mexico is attempting to justify its low royalties, forced licenses and refusal to register contracts with export restrictions is implicit in its comment that it is industry practice to set the price for technology at whatever the market will bear.\textsuperscript{145} This argument is based on a nonreciprocal right to control price and market, for if this rationale were applied to all exports, rather than just technology transfer, Mexico would not have the right to set the price of its oil and natural gas at the highest price purchasers are willing or forced to pay.

"Particularly repugnant" is the Mexican insistence that because the licensee has paid a royalty for the technology, he therefore owns it outright.\textsuperscript{146} American business is "not willing to give away technology based on years of engineering and know-how experience" without adequate compensation.\textsuperscript{147} The overall impact is to discourage business from transferring technology into Mexico.\textsuperscript{148} This is clearly opposed to the Mexican statement that there will be no reduction of technology importation due to the new Mexican law.\textsuperscript{149}

The following case histories of technology suppliers' experiences in dealing with Mexico's new law will illustrate some of the problems facing prospective investors.

1) A European MNC, primarily transferring process know-how, entered into an agreement in 1971, which was to run until 1978. The initial royalty of 6 percent of sales declined to 5 percent, then to 4 percent when sales reached an agreed level. The Mexican registry refused to approve the contract at the negotiated rates, but did agree to extend the contract term at a 3 percent rate for a sufficient time so that the company's return remained the same, although the payment period was extended. Because the Mexican officials acknowledged the original agreement was the result of hard, fair bargaining they allowed the return to remain at the agreed level.

\textsuperscript{144} Fund for Multinational Management Education, Council of the Americas, United States Council of the International Chamber of Commerce & The George Washington University, \textit{Descriptive Materials}, in \textit{3 Public Policy and Technology Transfer} 109, 344 (1978) [hereinafter cited as \textit{Host Country Environments}].
\textsuperscript{146} \textit{Host Country Environments}, \textit{supra} note 144, at 341.
\textsuperscript{147} \textit{Id.} at 342.
\textsuperscript{148} \textit{Id.}
\textsuperscript{149} See note 126 \textit{supra} and accompanying text.
The company accepted the new terms because it recognized Mexico's desire to set uniform royalties for particular types of technology.\textsuperscript{150}

2) A pharmaceutical company, although favorably disposed, did not invest in Mexico because of the limit on royalties. In its worldwide licensing program it was able to get a royalty of 8 percent for the same process. The company could not take 8 percent from the European licensor and only 3 to 4 percent from Mexico, so it stayed out of Mexico altogether.\textsuperscript{151}

3) When the Mexican government insisted that a fairly negotiated royalty rate, satisfactory to both parties, be reduced, the transferor decided that its services were being undervalued. The fact that the contract required continuing technological assistance for which the new law did not permit adequate time to reasonably compensate the transferor, the need for improvements in the recipient's existing facilities, combined with the forced royalty reduction, led the company to conclude that it was doubtful that it would transfer other technology into Mexico if forced to comply with the new law.\textsuperscript{152}

The new law recognizes that Mexican licensees must pay some of the costs of research and development. However, the government's wishes to have "R&D efforts generated in Mexico"\textsuperscript{153} have led to costly adaptations for which Mexico is reluctant to pay.

Mexico is being selective in an effort "to assess the value of a particular technology" before registering the contract.\textsuperscript{154} When a licensee is Mexican managed and controlled, the new law demands unreasonable guarantees on performance of equipment over which suppliers have no control.\textsuperscript{155} Suppliers who merely train and lend experience to the equipment purchasers should not be held liable for plant operation failures due to actions of the licensee operators.

4) The requirement that transferors allow unlimited, uncompensated use of the imported technology is viewed by business as an unreasonable interference with property rights. One company's response to this was a refusal to transfer further technology to any company which used it in areas other than those provided for in the original contract.\textsuperscript{156} Restrictions on use protect the markets of the

\textsuperscript{150} Host Country Environments, \textit{supra} note 144, at 347-48.
\textsuperscript{151} Id. at 349-50.
\textsuperscript{152} Id.
\textsuperscript{153} Aguilar, \textit{supra} note 124, at 151.
\textsuperscript{154} Id. at 146.
\textsuperscript{155} Host Country Environments, \textit{supra} note 144, at 153.
\textsuperscript{156} Id. at 153-54.
supplier, as well as a recipient of the technology, from cross-competition by other licensees exceeding the scope of their licenses. Clearly, the host will experience a decline in technology transfers if it pursues a policy of using technology for any purpose it chooses, as though it had purchased that technology outright, rather than merely obtaining a license for a price based on the one use only.

5) A United States chemical company, which was in the process of transferring "Nylon 6" tire yarn manufacturing technology, had reached an agreement which became subject to mandatory revision when the new Mexican law was implemented. The company indicated that if the required changes in the contract had occurred prior to completion of the transfer of much of the technology, it would not have invested in Mexico.157

6) Another United States chemical company found that its licensee failed to honor even the revised contract, which had been approved for registration after the new law became effective. The agreement was thereafter terminated. The licensee is believed to be using the technology and the licensor fears that its technology will be disclosed to others. If the constraints of the new law had been in effect in 1969, when it entered into the contract, this company states that it would have invested elsewhere.158

7) A plastics binding firm has been transferring technology into Mexico for more than twenty years, thereby creating a steady stream of jobs, wages and profit-sharing, taxes, and technical training and know-how, all of which has resulted in a reduction in imports and an increase in exports. This has clearly been beneficial for Mexico. The company's expectation of a continued "reasonable return on its investment" has not materialized.159 Recently it has been questioning the advisability of continuing its operations in Mexico. It is facing divestiture of 51 percent of its ownership and the loss of control over exports. Under these circumstances, it states that "it is highly unlikely that the transfer of new and more sophisticated technology will occur in the future."160

157. Id. at 340-42.
158. Id. at 343-44.
160. Id. at 420.
C. Brazil

Countries throughout Latin America limit reimbursement from a subsidiary to a parent corporation. Under the Brazilian limits, which are particularly restrictive, the costs of supplying technical expertise may not be reimbursed by the licensee.  

Brazil imposes mandatory time limits on technology transfer contracts. This creates special problems where the transfer of know-how and new technology must be ongoing. There is no compensation permitted for assistance furnished after the time limit has passed under the Code of Industrial Property.  

Brazil does not follow the Paris Convention, nor does it provide adequate patent or trademark protection for transferred technology.  The major provisions of Brazil's Industrial Code are:

1) No patents can be obtained for chemicals, food, drugs, alloys, or the processes for making food and drugs.  

2) No restrictions are permitted "on imports required in the process or the manufacture of the product involved."  

3) The term for patents is fifteen years from date of filing; for industrial models, the term is ten years; all patents and processes must be translated into Portuguese within 180 days after filing in Brazil.  

4) The restrictions on trademarks are similar to those on patents; any distinction in mark permits the use of that mark on products similar to those covered by the original trademark.  

5) Compulsory licenses will be granted if patents are unused for three years.  

6) Royalties are limited to 1 to 5 percent.  

7) Royalties for trademarks are limited to 1 percent.  

8) Companies are permitted to remit up to 12 percent of capital, 

163. Id. at 226.  
164. Id.  
166. Because the translation process is expensive, it is viewed by many as unreasonable and may be negotiable. Industrial Property Code, supra note 162, at 226.  
167. In practical terms there is no protection for trademarks. Id. at 225.  
168. Id. at 227.  
169. Id.  
170. Id.
with payments for technical assistance limited to 1 to 5 percent of sales.\textsuperscript{171}

9) There is a 25 percent tax imposed on base profits which escalates as profits increase.\textsuperscript{172}

10) Royalties from subsidiary to parent are treated as dividends for tax purposes.\textsuperscript{173}

11) “Fees for technical assistance must be paid each time the assistance is obtained” and cannot be contracted or paid in a lump sum.\textsuperscript{174}

12) Fees other than royalties are limited; they can only be paid for five years by contract, but the payment agreement can be extended for another five years.\textsuperscript{175}

13) Contracts containing restrictions on marketing, including export limitations, will not be registered.\textsuperscript{176}

The Brazilian Code is enforced by the National Institute of Industrial Property (INPI), which must register all contracts involving technology transfers.\textsuperscript{177} INPI is also a center for information for domestic companies on problems of technology transfer.\textsuperscript{178} It aids domestics in contract negotiations and sometimes supplies the actual negotiators as well.\textsuperscript{179}

The Brazilian Code’s original aim of import substitution has recently been changed. The country’s new goal is to become an exporter.\textsuperscript{180} The stated objective of INPI is to attract foreign investment and to promote domestic research and development through a system of incentives.\textsuperscript{181} The ultimate objective is to strengthen the scientific-technological base within the country.\textsuperscript{182}

The Code recognizes the need to reduce abuses, such as avoidance of taxes, and to alter the balance of payments.\textsuperscript{183} Avoidance of trademarks as a form of market control is felt to be more important than patent regulation.\textsuperscript{184}

\textsuperscript{171} Carneiro, supra note 165, at 243.
\textsuperscript{172} Id.
\textsuperscript{173} Industrial Property Code, supra note 162, at 227.
\textsuperscript{174} Id. at 227-28.
\textsuperscript{175} Id. at 228.
\textsuperscript{176} Carneiro, supra note 165, at 243.
\textsuperscript{177} Industrial Property Code, supra note 162, at 228.
\textsuperscript{178} Carneiro, supra note 165, at 240.
\textsuperscript{179} Id.
\textsuperscript{180} Id. at 234.
\textsuperscript{181} Industrial Property Code, supra note 162, at 228.
\textsuperscript{182} Carneiro, supra note 165, at 239.
\textsuperscript{183} Industrial Property Code, supra note 162, at 229.
\textsuperscript{184} Id. Market control describes a situation wherein the licensor uses the licensee to
Brazil has studied the world technological and economic scene in preparation for integrating itself into the world marketplace as an exporter. Brazil recognizes that foreign capital is essential to the growth of its industrial sector. There are indications that the Brazilian ideologically based regulation and control of payments for technology is becoming more pragmatic.

Attempts have been made to stimulate domestic research and development through government funding and loans to both private research and research facilities at the University of Sao Paulo. For example, the government has loaned an engineering firm $3 million for fifteen years at 4 percent interest. Three new companies to fund technology development have been created. Brazil is seeking more sophisticated technology. Therefore, it is asking, "What is the technology we are buying?" and "How good is it?"

The new law, as written, is very strict, but signs of flexibility were apparent in a question-and-answer period that followed introduction of the legislation, and in special legislation under which whole factories may be imported without being subjected to taxation. The United States, though, views the INPI staff as technically incompetent and, therefore, unable to properly evaluate technology.

Some case histories of companies conducting business within Brazil follow.

1) An engineering company was asked to submit a bid for a project. The extensive engineering required would have amounted to at least 40 percent of the project's cost. Because engineering services had to be performed outside Brazil, the Brazilian tax on 25 percent of payments going outside the country applied. This raised

create a market until the contract term expires. The licensor then refuses to renew the contract and imports his product to fill the demand of the created market.

185. Carneiro, supra note 165, at 233.
186. Id. at 234.
187. Id. at 232.
188. These governmental funds are channeled through the government owned company, Finep. Id. at 233.
189. Id. at 236.
190. These companies are Embraemec for engineering; Fibase (Financimento do Isumos Basicos) for development of raw materials, particularly ferrous material and fertilizers; and Investbras, an investment company. Id. at 237.
191. Id. at 238.
192. Id. at 239.
194. HOST COUNTRY ENVIRONMENTS, supra note 144, at 319.
195. Id. at 317.
the company's bid above that of companies in countries with non-tax treaties with Brazil. Therefore, the company was underbid for the contract.196

2) An aluminum extruder earning 20 percent royalty elsewhere was willing to accept 5 percent if costs of technology could be applied as capital to their investment in a joint venture. INPI would not approve the contract. Red tape and the inability to capitalize technology costs led the company to abandon its attempt to transfer the technology.197

3) A consulting company was told by Central Bank198 and INPI that its contract would probably be approved. In reliance, it went ahead on the contract, but after two years the approval had still been withheld. As a result, the company was forced to pull out and was left with a large amount of non-repatriable cruzeiros. This company will not do business with Brazil again.199

4) A manufacturer was induced to come to Brazil by a company which, thereafter, changed its internal rules so that it could no longer buy from foreign-owned companies. The manufacturer was thus faced with a virtual expropriation or with forced entry into a joint venture whereby it would supply all of its technology and know-how to a competitor. The company chose to abandon the project.200

5) A chemical company with past dealings and a good working relationship with the recipient was never given payment approval, although the Brazilian company was anxious to get the technology. The licensee was able to arrange payment through a New York bank and, therefore, the transfer went through without the approval of the Brazilian government.201

6) A petrochemical company made a proposal for the design of a complex refining processing unit. The technology was primarily confidential information. The research and development involved was expensive; therefore, a twenty to twenty-five year confidentiality obligation was imposed on all licensees. Under Brazil's Normative Act 15,202 contracts requiring maintenance of confidentiality for more than five years, with the possibility of one five-year renewal,

196. Id. at 319-20.
197. Id. at 320-21.
198. Id. at 321.
199. Id. at 322.
200. Id. at 323.
201. Id. at 313-14.
202. Id. at 325.
are prohibited. As a result of this time limitation, obligations of confidentiality which the transferor owes to other licensees, and the likelihood that the information will be valuable for more than the ten years allowed, the company is considering withdrawing its proposal.\textsuperscript{203}

7) A United States chemical company which transferred technology to its wholly owned subsidiary in Brazil cited "[d]elays in the registration process [as] one of the greatest sources of frustration for foreign companies transferring technology to Brazil."\textsuperscript{204}

8) The Normative Act 15 prohibition against restrictions on technology exportation would have created a problem for another United States chemical company which limited its subsidiary's use of transferred technology to plants already in operation if the subsidiary had not been owned by the transferor. The company decided to comply with the Normative Act but has nevertheless been unable to get approval of its contracts.\textsuperscript{205} There are, however, encouraging signs that Brazil may ease restrictions on technology transfer arrangements.\textsuperscript{206}

\textbf{D. India}

Foreign industry reaction to India's demands for trade secrets and divestiture of ownership, in exchange for the right to continue operations there, has been decidedly negative in two notable instances:

Coca-Cola's secret formula for syrup was demanded as the price of continuing to do business in India. In view of the widespread use of Coca-Cola, the number of licensees with whom Coca-Cola had confidentiality obligations, and the lack of any social or public welfare justification, the demand was clearly unreasonable. Coca-Cola stood to lose its entire world market if, having complied with the Indian disclosure requirement, the Indian bottlers had disclosed the formula to Coca-Cola competitors. As of November 1977, the dispute between Coca-Cola and the Indian government had been unresolved.\textsuperscript{207}

IBM chose to leave India rather than divest itself of sufficient ownership and control to comply with the Indian requirement "that

\textsuperscript{203. Id. at 326-27.}
\textsuperscript{204. Id. at 331.}
\textsuperscript{205. Id. at 331-33.}
\textsuperscript{206. Id. at 341.}
\textsuperscript{207. Wall St. J., Nov. 16, 1977, at 48, col. 1.}
unless a foreign company is substantially employed in export or in sophisticated technology it can’t hold more than 40 percent of the equity in any Indian operation.”

In contrast to the Coca-Cola and IBM examples, the Nestlé Company is continuing its substantial Indian operations. India has profited in terms of employment, increased revenues from taxes, training of technical and other personnel, reduction in imports and the creation of products for export through the vast investments of the Nestlé Company. Nestlé set up an entire dairy industry and successfully created an acceptable product by canning and processing buffalo milk. In order to set up its canning center, it was necessary to train regional farmers in the proper care of dairy buffalo and irrigation methods. In addition, Nestlé supplied food supplements for the cattle, fertilizer for the growing of feed, trained field paraveterinarians to care for the animals, and trained technicians and workers to man and manage the canning facilities. Through Nestlé’s investments, there has been a change in lifestyle and culture, a tremendous improvement in the standard of living for farmers, their families, and factory personnel, and the creation of a continuing supply of quality milk for domestic as well as export purposes.

**DISCUSSION AND RECOMMENDATIONS**

**A. Past Recommendations**

“[E]xisting theories and policies place more emphasis on reshaping the activities of the supplier than on ways for the user country to improve its ability to utilize technology” which it is acquiring. Perhaps the major contribution of the conferences on revision of international laws and policies has been the increased communication between the developed world and the LDCs and the realization that simplistic solutions are not the answer to increased industrialization of the Third World.

Recommendations for revisions of agreements dealing with intellectual property rights and for implementation of national laws to control imported technology within the Third World countries and regional pact areas will be limited in their impact by the reaction of businesses and governments of the countries supplying the technology.

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208. Id.
211. See notes 137-61, 197-209 supra and accompanying text.
The international conferences, which have centered on generalities, have produced few practical suggestions for increasing technology flow.\textsuperscript{212} One suggestion, mentioned in several publications, is the formation of technology centers to store data on available technology, possible investors and suppliers of technology, and national needs of LDCs.\textsuperscript{213} Representatives of companies or nations seeking technology could evaluate available technology for solving particular problems in terms of value, costs and appropriateness, rather than waiting for potential investors to offer a package of know-how which may or may not fit into a rational scheme of industrial growth.

Technology data centers could also supply information about the host's environment, laws and industrial goals to assist potential investors in determining whether their technology was suitable or adaptable for transfer to that nation.

Most of the discussions concerning technology centers have been brief. They appear to be concerned with importation of large, rather than small and intermediate sized industry which could arguably be of greatest benefit in the development of an infrastructure within the Third World. "Today, the multinational enterprise provides such an easy and effective source of technology that it may discourage developing countries from investing in the long-term development of their own universities, laboratories and other potential national suppliers of technology."\textsuperscript{214}

Law revision and the dissemination of information are important aids to the continued transfer of technology, but by themselves do not contribute to the actual transfer of any technology.

The recommendations for law revisions and technology centers are intriguing, but do not deal directly with the practical side of all technology transfers. Namely, the recommendations do not deal with the recipient's ability to absorb the technology,\textsuperscript{215} the use and adaptation of the technology as required by the marketplace,\textsuperscript{216} the technological infrastructure,\textsuperscript{217} the supply of skilled labor,\textsuperscript{218} or the cultural, political, and legal environments of the importing nation.\textsuperscript{219}

\begin{itemize}
\item[]{212. Technology Transfer, supra note 4, at 297.}
\item[]{213. See note 29 supra and accompanying text.}
\item[]{214. Wallender, III, supra note 15, at 69.}
\item[]{215. Hoelscher & Hummon, supra note 16, at 80.}
\item[]{216. Holland, Developing Country Incentives and Constraints of Technology Transfer and Development, in 3 Public Policy and Technology Transfer 43, 50 (1978).}
\item[]{217. Id. at 52.}
\item[]{218. Id.}
\item[]{219. Id. at 51.}
\end{itemize}
B. An Expansion of the Recommendations

The technology center recommendation is being implemented in several countries. One possible expanded model for a center is Western Electric's Research and Development Center, which has been operating for some years within its corporate structure. It is staffed with trained scientists and engineers who develop new products and processes. During development they bring in "customers"—in this case, engineers from their factories who will be putting the new products into production. The field engineers work with the R&D personnel throughout the development of the new production system. This normally requires about two years. They are on hand to give direct input during the planning stages, to supply information about the conditions at their facility, and to control the direction of development so that they will be able to better implement the system at their facility. In this way, problems which might arise at the site are often prevented.

This system leads to a product which the engineers from the field can easily produce, allows for trouble shooting along the way, but perhaps most important, builds a cooperative working relationship which is invaluable when the system is in operation. The understanding of the needs and difficulties of each party facilitates the continuing transfer of technology and assistance, which is often essential to continued productivity.

A system analogous to Western Electric's could be implemented whenever technology is to be transferred. If the representatives of the recipient were to work within the transferor's R&D program in order to adapt the technology to their market and environment, the appropriateness of the technology and the success of the operation would be greatly enhanced.

In the Conclusion of the text Technology Transfer and Development: An Historical and Geographical Perspective, the suggestion is made that "a training center with the participation of host and home governments as well as multi-national corporations" be developed. "The training programs should be in the application of specific types of know-how for the utilization of new technology," which might eventually develop into a full-fledged research and develop-

220. Sagal, Effective Technology Transfer — From Laboratory to Production Line, 1 J. TECH. TRANSFER 7, 7 (1977).
221. Id. at 8.
222. Id. at 10.
223. TECHNOLOGY TRANSFER, supra note 4, at 300.
“No overall policy will fit the multiple situations that exist among the various sectors.” This results from the great differences in manufacturing technology from industry to industry, and the numerous means of transfer. Many of the past recommendations have been concerned solely with the MNC as the transferor of technology and with the developed world as the source of that technology. As the size and complexity of an organization transferring or implementing technology increases, the efficient use of industrial technology requires that expertise be expanded to include “engineering, marketing, sales, finance, accounting, data processing, legal, personnel, corporate relations, quality control, maintenance” and other areas. Should the LDC refuse to allow the transferor continuing control over the operation, the recipient must be capable of supervising and managing all of these diverse matters. The MNC is already cognizant of, and prepared to deal with, these diverse aspects of international industrial trade and is, therefore, better able to properly manage the enterprise than the LDC. Perhaps for this reason alone, the LDCs should revise their policies to allow MNCs continuing control of imported large-scale technology, and to permit adequately compensated technological assistance contracts.

The MNC is rarely capable of dealing with “socio-psychological factors.” Successful transfer of technology may be impossible due to the “failure of source-nation representatives to understand fully the societal implications, overtones and interactions of a specific new and alien technology introduced into an economy seeking rapid changes.” The study by LDCs of internal societal factors and the education of MNC transferors to deal with them, would reduce the possibility of failure due to the cultural impact of the technology.

224. Id.

The transfer of technology from LDC to LDC is also being promoted. India is already "building on its base of technology expertise by exporting know-how to other LDCs." Id. at 22.
228. Id. at 81.
229. Id. at 82.
Technology is political and cultural in its origins and in its impact upon the nation to which it is transferred. The user must be able to absorb the technology transferred. Absorption requires "suitable interactions between the new technology and societal structures . . . and value systems, attitudes toward change and activity patterns" of the host. In addition, absorption of large-scale technology requires that the recipient have, or create, a scientific and technical infrastructure capable of supporting that industry locally. Large industry within the developed world relies on small industry for numerous components and supplies which are not produced within the corporation. The sources of supply vary in size from other MNCs to one-man shops producing a single item required by the MNC. Without an indigenous technical infrastructure, the LDC recipient must rely on the transferor or other foreign suppliers to maintain large-scale imported industries.

Developing nations sincerely desiring to industrialize should realize that the growth of an infrastructure sufficient to support current technology, and to allow participation in the development and sales of future technology, ultimately requires the development of a technological middle-class of skilled, small and medium-sized business operators. Countries which discourage the importation or growth of small businesses through overly restrictive labor laws, technology regulations, and unreasonable limits on investment return or on patent and other protections are actively slowing their own entry into the ranks of producers of technology capable of commanding a fair share of the international market.

"Recently, some developing countries have begun to relax their regulations on technology transfer and foreign investment."

230. Id. at 80. See INDUSTRY CHARACTERISTICS, supra note 4, at 7.
231. Luc Benoit, supra note 53.
233. INDUSTRY CHARACTERISTICS, supra note 4, at 7.
234. Interview with Raymond Bogucki, patent attorney for Fraser & Bogucki, in Los Angeles, California (Jan. 12, 1978).
235. Id.
236. Id.
237. Although small-scale technology is already being used extensively by entrepreneurs throughout the developed world, the know-how involved is unlikely to be included in data banks or technical literature because there is no system of recording it. Interview with Raymond Bogucki, supra note 234. The Netherlands has proposed stimulation of the transfer of small-scale technology through an "International Mechanism for Appropriate Technology," which is "an organization that would coordinate and promote this type of technology through an international network of government and volunteer agencies." "Appropriate Technology", supra note 32, at 22.
238. Holland, supra note 216, at 45.
easing of restrictions results from the recognition "that the flows of technology . . . may have been decreasing because of their restrictive laws and policies . . . ." These countries should also recognize the need to encourage indigenous innovation. They should undertake the study and implementation of domestic systems of assistance and incentives designed to stimulate the inventiveness of their nationals.

Although the fundamental requirements for stimulating the inventive mind are not known and should be studied, it has been learned that from 50 to 80 percent of the notably striking inventions are produced by inventors from small-scale environments. This figure of 80 percent may be produced by only 5 percent of the funds expended for research and development. In an article in the WIPO Colombo Symposium, Zachariassen lists a number of studies of inventiveness conducted during the last twenty years. He concludes that "in several major industrial fields the main initiative has come from independent inventors and smaller industrial firms, and in the latter case the inventor has quite often been the entrepreneur-manager himself."

Most contributions of larger companies are merely refinements of inventions by independents. Therefore, LDCs seeking to develop their own indigenous industries must realize that independent, small-scale inventors provide the major source of significant inventions. The characteristics and attitudes which are socially and culturally supportive of the innovative spirit must be studied and encouraged in order for these countries to develop their own inventiveness.

C. Proposals for the Stimulation of Technical Infrastructures within LDCs

1) LDC governments should actively seek out small technical business operators within other countries. They can encourage the importation of small-scale technology by providing tax incentives, adequate protection and payment for the technology provided, as-
sistance in entering the market within the LDC, assistance in dealing with "red tape," simplification of processes and registration requirements incident to the transfer, help in securing labor and raw materials or supplies, supplying cultural and social data and any other governmental actions which will assist the small entrepreneur in entering into production within the LDC.

2) Domestic, small-scale research and development can be encouraged by providing incentives to locals to develop and produce products involving technical innovation. Governmental obstacles to entering and maintaining a place within the domestic or export marketplace should be removed.245

3) Data centers dispensing information to domestic inventors should be established in order to assist domestic inventors in the analysis of problems and to supply information about available solutions.246 Universities and existing data centers could be included in this network of information and support.

4) Financial assistance should be provided for the development and manufacture for market of newly invented products and processes.247

5) Apprenticeships should be established, and LDC nationals should be encouraged and assisted in obtaining work in small businesses in developed countries. There they can participate in all phases of the production process and learn first-hand how to set up and maintain small businesses. An entrepreneur must not only have a process or invention, but must be able to produce, market, obtain supplies, adapt, change and refine production methods, and comply with business and labor laws. One must also maintain quality control, establish a reputation of reliability with customers, manage personnel, and continue to develop new products.

The characteristics essential to the entrepreneurial success have not been studied extensively.248 LDCs should therefore initiate comprehensive studies of the entrepreneurial personality in order to encourage its development within their populations. Cultural barriers to these characteristics may be slow to change.

245. Id. at 237-45.
246. Id. at 241. See note 35 supra and accompanying text.
CONCLUSION

The conflict between the LDCs goal of attaining technical independence and the internal conditions which limit or prevent their achievement of this goal cannot be resolved by simply revising the international legal system, although some legislative reforms may be beneficial. The transfer of technology and its utilization require the development of a technical infrastructure capable of generating innovation and supporting heavy industry. In order to stimulate the growth of an adequate infrastructure and to encourage domestic invention and development, the LDC must fully understand its own cultural, societal and legal structures and their interactions and effects on imported technology, and must establish internal support systems consistent with the social system to assist entrepreneurs, inventors and small technical businesses.

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