

Fordham International Law Journal

Volume 22, Issue 5

1998

Article 7

Transfer of Technology in the Contemporary International Order

Chantal Thomas*

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Abstract

This Essay begins by describing the technology transfer needs arising from both international economic integration and related international law. The Essay then examines the existing international rules for technology transfer and finds them insufficient to address these needs. The goal of this Essay is to advocate the formulation of a viable international legal framework for technology transfer.

TRANSFER OF TECHNOLOGY IN THE CONTEMPORARY INTERNATIONAL ORDER

*Chantal Thomas**

In addition to the three classical factors [land, labor, and capital], economic growth depends on a vital fourth factor, technology.¹

INTRODUCTION

As vital as technology is to economic growth in industrialized economies, it is all the more so in the developing world. And yet, “[i]n a developing country, self-development of independent technology is generally impossible or ruinously costly” precisely because of the relatively low level of industrialization.² The introduction of industrial technology developed elsewhere is, as a consequence, critical to economic development. Moreover, notwithstanding theoretical debate over whether industrialization represents the natural end of a universal economic evolutionary path,³ few dispute that developing-country governments have sought to accelerate the industrialization process, lending even greater import to this process of technology transfer.

No coherent framework for technology transfer has yet arisen at the international level. This gap in the international legal order is far from unique, of course. Yet, as both international economic integration and related international legal regimes have grown, so have the level and complexity of technology transfer needs in developing countries. This Essay begins by describing the technology transfer needs arising from both inter-

* Associate Professor of Law, Fordham University School of Law.

1. PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, *MACROECONOMICS* 208 (15th ed. 1995).

2. Chang Hee Lee, *Taxation of U.S.-Korea Technology Transfer: A Developing Country's Point of View*, 10 *INT'L TAX & BUS. L.* 1, 3 (1992).

3. In development discourse, the view that industrial development represents a universal and natural process of economic evolution contrasts with the view that the development of the international economy during colonialism was premised precisely on a division of the world into the naturally industrial and the dependent satellite providers of resources and markets.

national economic integration and related international law. The Essay then examines the existing international rules for technology transfer and finds them insufficient to address these needs. The goal of this Essay is to advocate the formulation of a viable international legal framework for technology transfer.

I. TECHNOLOGY TRANSFER NEEDS ARISING FROM INTERNATIONAL ECONOMIC INTEGRATION

What we are witnessing today is the realization of Marshall McLuhan's prediction in the 1960's that "electronic interdependence would create the world in the image of a global village."

—Renato Ruggiero,
Director-General, World Trade Organization⁴

The globalization of communication networks is not only culturally significant, as Marshall McLuhan predicted that it would be; it has also played a central role in the globalization of economic flows. Two ascendant examples of the relationship between communication and economics are capital markets and "electronic commerce."

A. *Electronic Commerce*

The rise of "electronic commerce," or commerce over the Internet, has been one of the hottest stories of recent times.⁵ At the moment, however, it is not clear which way the ever-growing "e-commerce" market will cut for developing countries. On the one hand, e-commerce has the potential to reduce the costs of

4. Renato Ruggiero, Address to the 2d DEBIS (Daimler-Benz Interservices AG) Services Conference, "Services for the Working World in the 21st Century," in Berlin, Germany (Oct. 23, 1997) (visited June 28, 1999) <<http://www.wto.org/wto/archives/press80.htm>> (on file with the *Fordham International Law Journal*). Marshall McLuhan coined the term "global village" and is widely credited with first perceiving the import of communications technology for international social and cultural integration. See, e.g., MARSHALL MCLUHAN, UNDERSTANDING MEDIA, THE EXTENSIONS OF MAN (1964) ("Our specialist and fragmented civilization of center-margin structure is suddenly experiencing an instantaneous reassembling of all its mechanized bits into organic whole. This is the new world of the global village.").

5. See, e.g., *The Cutting Edge Special Report: Electronic Commerce*, L.A. TIMES, Feb. 15, 1999, at C1; *Why the Internet Had a Merry Christmas*, WALL. ST. J., Jan. 1, 1999, at A22; *Conference Looks at Global Hookups, Will Focus on Electronic Commerce*, NEWSDAY, June 2, 1998, at A43.

economic growth for developing countries.⁶ On the other hand, participation in e-commerce requires a considerable pre-existing array of technology related not only to communications infrastructure,⁷ but also to ensuring the integrity and security of Internet transactions.⁸ These high costs have meant that in most developing countries, the e-commerce that exists occurs within "intranets" established among the offices of multinational corporations. Small and medium-sized enterprises in developing countries, therefore, do not benefit from the business potential of the Internet in the same way as their counterparts in the West.⁹ This discrepancy characterizes even those developing countries that have otherwise benefited from technology transfer, such as the East Asian newly-industrializing countries ("NICs").¹⁰

Joel Reidenberg has convincingly argued that government

6. See Committee on Trade and Dev., *Seminar on Electronic Commerce and Development* WT/COMTD/18 at 1 (Feb. 19, 1999) <<http://www.wto.org/wto/ecom/wtcomtd18.doc>> (on file with the *Fordham International Law Journal*) [hereinafter *E-Commerce Report*] ("Electronic Commerce is useful to both producers and consumers in developing countries as it helps them to overcome the traditional barriers of distance from markets and lack of information about market opportunities.").

7. See *id.* ("A well functioning and modern telecom infrastructure, satisfactory supply of electricity and access to hardware, software and servers are basic requirements for e-commerce.").

8. See, e.g., Geraldine Lambe, *Under Lock and Key*, BANKING TECH., June 1998, at 41. Lambe explains that

[a]s the internet emerges as the foundation for worldwide communication and electronic commerce, it brings with it business benefits and security problems in equal measure. Banks, corporations, merchants and individuals need assurance that transactions are being conducted securely, that users are who they claim to be, that communications retain their integrity and that there is a solid basis for non repudiation. Without these fundamental guarantees, the value of the internet as a communication and commercial medium is greatly undermined.

Id.; see Joel R. Reidenberg & Françoise Gamet-Pol, *The Fundamental Role of Privacy and Confidence in the Network*, 30 WAKE FOREST L. REV. 105 (1995); Joel R. Reidenberg, *Rules of the Road for Global Electronic Highways: Merging the Trade and Technical Paradigms*, 6 HARV. J. L. & TECH. 287 (1993).

9. See *E-Commerce Report*, *supra* note 6, at 3 (describing typical foreign investment venture into developing economy—in this case Guinea—in which foreign corporation "used its own telecommunications network . . . independent of the domestic telecommunications network of Guinea, which, despite liberalization, was very poor").

10. See, e.g., Mark Landler, *Mapping Out Silicon Valley East: Asian Nations Build Hopes for Revival on Technology*, N.Y. TIMES, Apr. 5, 1999, at C1 (describing Hong Kong as enormously successful trade and finance area, but "seen by many as a technology backwater" insofar as internet is concerned); Margo Towie, *Playing Catch-Up*, BANKING TECH., Nov. 1997, 28 (describing Thailand's attempts to remedy faltering e-commerce). Re-

rulemaking is inappropriate for electronic commerce, whose standards should emerge organically as a result of technological evolution.¹¹ While it may be true that governments cannot effectively set rules for e-commerce, the need for intervention to ensure transfer of e-commerce technology to less-developed areas arguably persists.

B. Capital Markets

In the past decade, the volume of international capital flows has increased exponentially.¹² Even more remarkable has been the increasing concentration of investment capital in developing country debt and equity markets, or "emerging markets."¹³ What globalization gives, however, globalization can also take away¹⁴—as shown by the mass exodus of capital from emerging markets that began in Thailand in 1997 and spread to Asia, Latin America, and Russia, ultimately destabilizing even "mature" capital markets in the West.¹⁵

Many commentators and policymakers have attributed the Asian financial crises to the Asian capital markets' lack of transparency, the resulting prolongation of market distortions, and the ultimate need for sudden and dramatic market correc-

gional leaders in e-commerce are Singapore and India, see *E-Commerce Report*, *supra* note 6, at 9.

11. See Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553, 576-85 (1998).

12. Hal Scott and Philip Wellons have consolidated several statistics portraying various aspects of the manifold increase in international capital flows. See HAL S. SCOTT & PHILIP A. WELLONS, INTERNATIONAL FINANCE: TRANSACTIONS, POLICY AND REGULATION 9-18 (5th ed. 1998). One such data set, drawn from the International Monetary Fund ("IMF") and the Organization for Economic Co-operation and Development ("OECD"), indicates that the total U.S. dollar volume of debt and equity funds raised on the international capital markets increased from 5.2 billion in 1967, to 179.1 in 1982, to 324.1 in 1987, to 727.8 in 1994. See *id.*

13. "Total trading volume for Emerging Markets debt instruments nearly tripled from US\$730 billion face amount in 1992 to nearly US\$2 trillion in 1993, climbed to US\$2.76 trillion in 1994 . . . [and] near doubl[ed] by 1996, when annual volume reached \$5.3 trillion." Emerging Markets Traders Association, *About Emerging Markets* (visited Oct. 2, 1998) <http://www.emta.org/section2/2_1.htm> (on file with the *Fordham International Law Journal*) [hereinafter *EMTA Report*].

14. See GEORGE SOROS, THE CRISIS OF GLOBAL CAPITALISM 126 (1998) (describing international capital markets as driven by "boom/bust pattern").

15. See, e.g., George Melloan, *Do Asia's Troubles Affect Wall Street? You Bet*, WALL ST. J., Aug. 18, 1997, at A15; Garry Schinasi, *Systemic Aspects of Recent Turbulence in Mature Markets*, 36 FIN. & DEV'T 1 (1999); IMF Area Department Directors, *How Has the Asian Crisis Affected Other Regions?*, 35 FIN. & DEV'T 3 (1998).

tions.¹⁶ Prescriptions for reform have correspondingly stressed the need for increased transparency in Asian emerging markets and elsewhere.¹⁷

While the emphasis on transparency seems intuitively consistent with liberalization, it does not suggest a withdrawal of government from the capital markets. On the contrary, the calls for transparency have generated new demands on governments to establish and to administer regulations that increase market disclosure and that otherwise improve monitoring of market flows. Even in Asian markets that had done exceedingly well in attracting industrial technology transfer through foreign investment, monitoring mechanisms were relatively underdeveloped because government intervention in the marketplace was directed primarily towards encouraging export-oriented investment and not towards requiring disclosure or supervising volume and volatility.¹⁸ Instituting such regimes will require not only administrative resources, but also administrative expertise and data-gathering technology.¹⁹ Such requirements constitute an example of need within developing countries for a particular type of technology as a result of increasing economic integration: the technology of administration.

A related issue of administrative technology concerns the management of risks involved in capital transactions. Various risks arise between the time that a capital transaction is initiated and the time that it is settled. Those risks related to technology include the risk that, where more than one currency is involved,

16. See, e.g., "Rebuilding Confidence in Asia," Michael Camdessus, Managing Director of the International Monetary Fund, Address at the ASEAN Business Forum, in Kuala Lumpur, Malaysia (Dec. 2, 1997) [hereinafter Camdessus Address]; IMF Economic Forum, Financial Markets: Coping with Turbulence, Dec. 1, 1998 (remarks of Shakour Shaalan, IMF Executive Director) (describing view attributing crisis to "lack of transparency" as "cliche"). A "lack of transparency" refers to the low level of available information on the Asian capital markets.

17. See Camdessus Address, *supra* note 16.

18. INTERNATIONAL MONETARY FUND, *THE ASIAN CRISIS AND THE REGION'S LONG TERM GROWTH PERFORMANCE 100-01* (1998) (explaining that "economic growth was so rapid that it was difficult for institutional development, and prudential regulation and supervision, to keep pace with requirements").

19. See Manuel Guitian, *The Challenge of Managing Global Capital Flows*, 35 *FIN. & DEV'T* 2 (1998); Group of 22, *Summary of Reports on the International Financial Architecture* (Oct. 1998) (visited June 10, 1999) <<http://www.uiowa.edu/ifdebook/hotdocs/G-22-98.shtml>> (on file with the *Fordham International Law Journal*) [hereinafter *Summary of Reports*].

a delay in settlement will cause a loss arising from currency fluctuation,²⁰ and the more general systemic risk of failure or “unwinding” of the settlement system.²¹

In emerging markets, the bulk of securities trading occurs “over-the-counter” within an informal global network of brokers, dealers, and investors.²² Emerging market trades are generally conducted orally, confirmed by fax, and settled through one of several available companies.²³ While this informal system managed the dramatic growth in emerging markets in the early 1990s, the uncertainty unleashed by the Asian financial crisis fueled unprecedented heavy selling that peaked in November 1997 at “five times normal traffic.”²⁴ The available settlement mechanisms were ill-suited to such volume, leading to “fundamental problems of reconciliation and matching” that only added to the panic.²⁵

The management of settlement risk in the global capital markets is not necessarily an issue strictly for government. In the West, such matters have traditionally been handled by autonomous organizations to which governments are often only informally related,²⁶ and a similar organization was recently established exclusively for emerging markets trades.²⁷ Yet, even if this is the most desirable route, the need for internationally-coordinated oversight of these markets is now undisputed. The discussions on the “international financial architecture” that the “Group of 22” governments have sponsored are directed towards whether such monitoring should occur at an international or na-

20. See John S. Santa Lucia, *Exchange Losses from International Electronic Funds Transfers*, 8 J. INT'L L. & BUS. 759, 760 (1988).

21. See Schinasi, *supra* note 15.

22. See *EMTA Report*, *supra* note 13, at 6. One prominent company is the Depository Trust Company, a “central securities repository . . . owned by most of the brokerage houses on Wall Street and the New York Stock Exchange.” JOHN DOWNES & JORDAN E. GOODMAN, *DICTIONARY OF FINANCE AND INVESTMENT TERMS* 135 (1995).

23. See *EMTA Report*, *supra* note 13, at 6.

24. Garry Booth, *Better Late than Never*, BANKING TECH., May 1998, at 40.

25. See *id.*

26. The two systems that process the bulk of today's international transactions—the Clearinghouse Interbank Payments System (“CHIPS”) and the Society for Worldwide Interbank Financial Telecommunications (“SWIFT”)—are both private entities. See Herbert F. Lingl, *Risk Allocation in International Interbank Electronic Fund Transfers: CHIPS & SWIFT*, 22 HARV. INT'L L.J. 621-28 (1981).

27. See Booth, *supra* note 24, at 40-42 (discussing newly founded Emerging Markets Clearing Corporation, which is clearinghouse established by 26 financial intermediaries heavily involved in emerging markets trading).

tional level.²⁸

II. TECHNOLOGY TRANSFER NEEDS ARISING FROM EXPANDING INTERNATIONAL LAW

A. *Expanding International Trade Law*

The international institutional growth accompanying global economic integration is perhaps best reflected in the World Trade Organization²⁹ ("WTO"), established in 1995. A successor to the General Agreement on Tariffs and Trade³⁰ ("GATT"), the WTO has achieved a new level of institutional cohesiveness and authority among international organizations. In addition to institutional strength, the WTO significantly expands the trade liberalization mandate initiated by the GATT, strengthening rules in the GATT's traditional realm of trade in goods and creating new rules for areas such as trade in services. The WTO also significantly strengthens international property protection law—not strictly a liberalizing move, as these rules increase restrictions on the use of intellectual property by non-rightholders, but consistent with the WTO's liberal vision because it increases incentives and provides rewards for initial rightholders arising out of trade related to intellectual property.

Given its considerable scope, it is perhaps unsurprising that the task of implementing the WTO not only places significant demands on the relatively scarce administrative resources of developing country governments, but also requires administrative technology. The need for technical assistance related to WTO implementation, particularly under the Agreement on Trade-Related Intellectual Property Rights³¹ ("TRIPs"), but also elsewhere under the WTO, falls within the category of administrative technology transfer need described in the first section of the Essay.

28. See generally *Summary of Reports*, *supra* note 19. The "Group of 22" is an informal summit of "22 systemically significant economies." *Id.*

29. The Agreement Establishing the Multilateral Trade Organization ("WTO Agreement") entered into force on January 1, 1995. See *Agreement Establishing the Multilateral Trade Organization* [World Trade Organization], Dec. 15, 1993, 33 I.L.M. 13 (1994) [hereinafter *WTO Agreement*].

30. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, T.I.A.S. 1700, 55 U.N.T.S. 194 [hereinafter *GATT*].

31. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, *WTO Agreement*, *supra* note 29, Annex 1C, LEGAL INSTRUMENTS—RESULT OF THE URUGUAY ROUND vol. 31, 33 I.L.M. 81 (1994).

This need has generated an attempt by several international organizations to coordinate technical assistance to least-developed countries that is related to the implementation of their WTO obligations.³² Similarly, in December 1996, the first Ministerial Conference of the WTO adopted a Plan of Action "aimed at improving the overall capacity of least-developed countries to respond to the challenges and opportunities offered by the trading system."

Like the need for administrative technology to manage capital market flows, the need for technical assistance, as well as more conventional types of aid, described here helps to undo the impression that the prescriptions of the "Bretton Woods" institutions—the International Monetary Fund ("IMF"), the World Bank, and GATT—require only minimal intervention in the economy. The governance required by the "Washington consensus" for liberalized economic growth³³ is different from, but not necessarily less than, other plans typically associated with government intervention. In each case, the policies seek to privilege certain actors to generate certain types of economic growth deemed most beneficial to the cause of development. Under a liberal policy, the privileged actors tend to be those most competitive in the international marketplace. This model, though consistent with the facilitation of international economic flows, requires very specific modes of government intervention, which has costs for developing countries that are increasingly coming to light.

B. *Expanding International Environmental Law*

At the same time that the WTO negotiations culminated, international environmental law entered into a period of consid-

32. See World Trade Organization, *Report on the Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries* (visited June 9, 1999) <<http://ldcs.org/intframe.htm>> (on file with the *Fordham International Law Journal*) (describing framework established by WTO, United Nations Conference on Trade and Development ("UNCTAD"), IMF, World Bank, and United Nations Development Programme).

33. See Tamara Lothian, *The Democratized Market Economy in Latin America (and Elsewhere): An Exercise in Institutional Thinking Within Law and Political Economy*, 28 CORNELL INT'L L.J. 169, 175-77 (1995). Lothian describes the "Washington consensus" as "a body of ideas and a repertoire of solutions" shared by the U.S. government, many U.S. universities, and the major international financial institutions based in Washington. The consensus rests on four major principles: "orthodox stabilization" of the economy through fiscal austerity; export orientation; liberalization; and privatization. See *id.*

erable expansion. The growth in international environmental law over the last two decades represents another aspect of "globalization": the awareness that environmentally unsound practices in particular areas can have global consequences. First, the regional environmental problems created by such practices can affect the global economy; second, where such practices are related to economic production, environmental danger created by the products can spread globally when the products cross borders in the international economy.

Growing awareness of these problems and effective mobilization by non-governmental environmental organizations have led over the last decade to the establishment of several multilateral agreements designed to reduce environmentally unsound practices throughout the world. For example, the 1989 Montreal Protocol on Substances that Deplete the Ozone Layer (the "Montreal Protocol"), which requires member states to control domestic levels of emissions harmful to the atmospheric ozone layer, was deemed "unprecedented because it represents a concerted international effort to prevent the harm to the environment before it occurs."³⁴ Other multilateral agreements include the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and conventions on biodiversity and climate change signed at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro.³⁵

While the benefits of these agreements is undisputed, they have at the same time created significant compliance costs for developing-country signatories. Often, environmental practices in developing countries are the most in need of reform. Indeed, it is the low level of resources together with the high priority placed on economic growth, despite the environmental costs, that often lead to such practices in the first place. Again, compliance costs result not only from the lack of administrative resources, but also from the lack of technology. The Montreal

34. Theron A. Mehr, *International Technology Transfer, Constructing and Financing an Environmental Program*, 15 *LOV. L.A. INT'L & COMP. L.J.* 731, 742 (1993).

35. These conventions include the Framework Convention on Climate Change and the Convention on Biological Diversity. Other documents included "Agenda 21," a "set of priority actions [regarding the environment] and a basket of means for accomplishing those actions," and a Statement of Principles on Forests. Edith Brown Weiss, *Introductory Note, United Nations Conference on Environment and Development*, Rio de Janeiro, Brazil, June 3-14, 1992, 31 *I.L.M.* 814.

Protocol, for example, requires governments to mandate the substitution of environmentally harmful substances, such as chlorofluorocarbons, with safer substitutes. The technology for such substitutes, however, is often not available in developing countries.³⁶

III. AN INTERNATIONAL LEGAL FRAMEWORK FOR TECHNOLOGY TRANSFER

Although there is no international legal framework governing technology transfer, it is not for lack of effort by developing-country governments. In 1974, the United Nations General Assembly adopted a resolution entitled "Declaration on the Establishment of a New International Economic Order,"³⁷ immediately followed by the adoption of a resolution entitled "Programme of Action on the Establishment of a New International Economic Order."³⁸ With these documents, developing-country governments consolidated an agenda for the reform of international law that had been gaining momentum since the end of World War II. The origins of this momentum lay in three changes to the international order in the postwar era: first, the "massive expansion of international organization for cooperative purposes"; second, the "growing importance of states representing non-Western civilizations" in the wake of decolonization and independence movements; and third, "the growing gap between the economically developed and the economically less developed countries."³⁹

In the immediate postwar era, the Bretton Woods institutions provided fora for the construction of rules governing the international economy. By the 1960s, however, many developing-country governments had grown frustrated with the Bretton Woods institutions' prescriptions to adopt a "laissez-faire" stance both towards internal economic growth and towards the relationship of the domestic to the international economy. Many

36. See Damon McDougal, Chlorofluorocarbons 11 (1999) (draft on file with the *Fordham International Law Journal*).

37. G.A. Res. 3201, U.N. GAOR, 6th Spec. Sess., 2229th mtg., Supp. No. 1, at 3, U.N. Doc. A/9559 (1974) [hereinafter Declaration].

38. G.A. Res. 3202, U.N. GAOR, 6th Spec. Sess., 2229th mtg., Supp. No. 1, at 5, U.N. Doc. A/9559 (1974) [hereinafter Programme of Action].

39. WOLFGANG G. FRIEDMANN, CASES AND MATERIALS ON INTERNATIONAL LAW 9-10 (1969).

instead adopted the view that significant government intervention was required to ensure autonomous domestic economic growth.⁴⁰

At the same time that this frustration with the substantive policies of the Bretton Woods institutions was flourishing in the developing world, developing-country governments grew increasingly frustrated with the structure of the institutions and began to turn toward the United Nations as an alternative forum for international rule-making. The United Nations Conference on Trade and Development, established in 1964,⁴¹ provided the institutional framework from which the New International Economic Order ("NIEO") emerged.⁴²

The NIEO documents sought to order the international economy according to both the substantive principle of economic redistribution to "level" the international economic playing field and the institutional principle of international cooperation to achieve these ends.⁴³ The norm of "special and differential treatment for developing countries" was central to the NIEO framework.⁴⁴ This principle provided that industrialized actors were required to accord developing-country actors treatment more favorable than they would accord other industrialized actors, in order to aid the process of industrialization.

40. The theoretical framework for these policies was structuralism, articulated by Raul Prebisch. The policies themselves are often described as import-substitution.

41. See, e.g., TOWARDS A NEW TRADE POLICY FOR DEVELOPMENT, REPORT BY THE SECRETARY GENERAL OF THE FIRST UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (1964).

42. For discussions of the New International Economic Order ("NIEO") movement, see ROBERT E. HUDEC, DEVELOPING COUNTRIES IN THE GATT LEGAL SYSTEM 56-107 (1987); UNCTAD AND THE NORTH-SOUTH DIALOGUE: THE FIRST TWENTY YEARS (Michael Z. Cutajar ed., 1985); and OSWALDO DE RIVERO, NEW ECONOMIC ORDER AND INTERNATIONAL DEVELOPMENT LAW (1980).

43. The Declaration on the Establishment of a New International Economic Order in its preamble proclaims that a

united determination to work urgently for the establishment of a new international economic order based on equity, . . . common interest and cooperation among all States . . . which shall correct inequalities and redress existing injustices, make it possible to eliminate the widening gap between the developed and developing countries and ensure steadily accelerating economic and social development and peace and justice for present and future generations

....

Declaration, *supra* note 37.

44. See David M. Trubek, *Protectionism and Development: Time for a New Dialogue?*, 25 INT'L L. & POL. 346, 349-51 (1993).

Transfer of technology was an important part of the NIEO framework. The Programme of Action on the Transfer of Technology called for the formulation of an "international code of conduct for the transfer of technology corresponding to needs and conditions prevalent in developing countries," "access on improved terms to modern technology," and the adaptation of "commercial practices governing transfer of technology" to the requirements of the developing countries.⁴⁵

The code of conduct was necessary because the primary actors were multinational corporations, due to the fact that most transfers of technology occurred as a by-product of foreign direct investment. Like other aspects of the NIEO, the code sought to frame rules that would transform developing-country economies from mere satellites of the industrialized economic center. For example, NIEO advocates viewed the traditional model of foreign investment in developing-country economies as inadequate for the purposes of generating lasting indigenous growth in these economies. Foreign investment tended to create a sharply circumscribed center of activity geared towards export to industrialized-country markets and generated profits that were largely repatriated to the home countries of foreign investors.⁴⁶ As part of this dynamic, technology necessary to production was tightly controlled by the owners and did not disseminate into the local economy in a way that could spur local growth.⁴⁷

Proposed NIEO reforms to technology transfer, then, were part of a larger agenda for reforming foreign investment in developing countries. The proposed United Nations International Code of Conduct on the Transfer of Technology sought reform in two primary ways.⁴⁸ The first was by authorizing host governments to require foreign investors to train local personnel in the technology and to promote local research and development re-

45. See Programme of Action, *supra* note 38, art. 4(p), at 4.

46. Seymour J. Rubin, *Transnational Corporations and International Codes of Conduct: A Study of the Relationship Between International Legal Cooperation and Economic Development*, 30 AM. U. L. REV. 903 (1981).

47. Richard M. Buxbaum, *The Politico-Legal Context of the Purpose and Effect of Codification: The Example of Technology Transfer Negotiations*, in LEGAL PROBLEMS OF CODES OF CONDUCT FOR MULTINATIONAL ENTERPRISES (Norbert Horn ed., 1980).

48. *Draft International Code of Conduct on the Transfer of Technology*, United Nations Conference on Trade and Development U.N. Doc. TD/CODE TOT/33 (1981).

lated to the technology.⁴⁹ The second was to restrict the foreign investor's proprietary control over the technology in cases where investment occurred through a joint venture with local owners—for example through limiting royalty payments, “grant-back” provisions, and “tie-in” provisions.⁵⁰

Many attempts were made to complete the United Nations code of conduct. Ultimately, however, they became mired in ongoing disputes.⁵¹ In the wake of this stalemate, some commentators attempted to construct an argument for customary rules of international law on technology transfer from other international legal documents and principles.⁵² With the onset of the debt crisis in the early 1980s, however, whatever momentum remained in these efforts dwindled along with the NIEO movement more generally.⁵³

Subsequent to the debt crisis, and often as a condition for debt relief, many developing-country governments set out to liberalize their economic policies.⁵⁴ Well-known aspects of this “structural adjustment” process included privatization and the removal of trade barriers.⁵⁵ As part of this general liberalization, many governments also removed restrictions on foreign investment, including restrictions relating to technology transfer. In Mexico prior to the debt crisis, for example, foreign investment regulation authorized the Mexican government to intervene in technology transfer arrangements to prohibit “excessive” royalty payments and grant-back and tie-in provisions in order to ensure local training, research, and development.⁵⁶ As part of its post-

49. *Id.* at 21-23.

50. *Id.* at 11-14. A “grant back” provision requires that control over the technology had to be returned to the foreign investor. *See id.* A “tie in” provision mandates that the local acquiror was required to purchase supplies from the foreign investor. *See id.*

51. *See* Buxbaum, *supra* note 47, at 89; Thomas H. Reynolds, *Clouds of Codes: The New International Economic Order Through Codes of Conduct: A Survey*, 75 *L. LIB. J.* 315, 337-41 (1982); Rubin, *supra* note 46, at 903.

52. For an early example of such arguments, see CHARLES C. OKOLIE, *LEGAL ASPECTS OF INTERNATIONAL TECHNOLOGY TRANSFER TO DEVELOPING COUNTRIES* 32-44 (1975).

53. *See* Robert L. Rothstein, *Epitaph for a Monument to a Failed Protest? A North-South Retrospective*, 42 *INT'L ORG.* 725, 725 (1988).

54. For an explanation of the role of the debt crisis and its relation to liberalization in the developing world, see STEPHAN HAGGARD, *DEVELOPING NATIONS AND THE POLITICS OF GLOBAL INTEGRATION* 15-27 (1995).

55. *See id.*; Lothian, *supra* note 33, at 175-77.

56. *See* John J. Moss, *The 1990 Mexican Technology Transfer Regulations*, 27 *STAN. J.*

debt crisis liberalization, Mexico has narrowed this authority significantly, giving foreign companies a much freer hand in designing technology transfer agreements and reflecting a "commitment to the infusion of free-market principles into national technology transfer policy."⁵⁷ The expectation is that liberalized regulations will increase foreign investment, and thus, will increase the positive effects of foreign investment, including technology transfer, on the Mexican economy.⁵⁸

IV. TECHNOLOGY TRANSFER IN THE CURRENT INTERNATIONAL ORDER

The NIEO model for regulating international technology transfer has thus been replaced by what might be called the Bretton Woods model. Each of these models liberalizes some rules and tightens other to achieve a balance that privileges certain economic actors. The NIEO model featured relatively loose intellectual property protection and relatively tight technology transfer regulation and was designed to require that foreign investment generate specific benefits to local economic actors. The Bretton Woods model loosens technology transfer restrictions and tightens intellectual property protection and is designed to accord greater allocational authority to foreign investors. Whether the current model will succeed in increasing technology transfer remains to be seen. Yet, as suggested above, broad areas persist in which the Bretton Woods model for technology transfer falls short, and in which greater oversight of technology transfer is needed even in a liberalized regime. Paradoxically, some of these areas arise out of the very changes in the international economic order that eliminated the old technology transfer model. These changes have created implementation costs and a general need for technology necessary to administer increased international trade, finance, information, and intellectual property flows. Technology transfer needs related to international legal compliance also arise under international environmental law.

Under the regime proposed by the NIEO, the costs fell on

INT'L L. 215 (1990); Carlos de la Garza Santos, *A New Era: Deregulation of the Transfer of Technology in Mexico*, 1 U.S.-MEX. L.J. 53 (1993).

57. Moss, *supra* note 56, at 215.

58. *Id.* at 232-33, 242-45.

industrialized-country corporate and governmental actors to provide a certain level of technology transfer. The "new international economic order" that has actually materialized, however, places such costs on developing-country actors. An international legal framework should be developed that will strike a balance between these two poles by distributing the costs of technology transfer across industrialized-country and developing-country governments. There has been some progress along these lines. Within the WTO, for example, industrialized-country members have made efforts, albeit limited and non-systemic, towards providing compliance-related technical assistance to developing countries.⁵⁹ In the area of international environmental law, limited facilities for technology transfer have been established under the Montreal Protocol and by the World Bank.⁶⁰ Arguably, it is time to consider these various demands in a more systematic way.

The proper allocation of technology transfer costs has consistently proved to be a hotly disputed topic. Technology transfer is arguably more valuable than other resource transfers because of its greater productive capacity. Therefore, its transfer represents a greater cost to competitors who are often reluctant to effect complete transfers and seek to retain proprietary rights. Abiding doubts about the effectiveness of attempts to mandate technology transfer have plagued many efforts to do so and have defeated efforts to draft international rules of the matter.

Such efforts should be renewed, however, and should be guided by an understanding that they are consistent with the long-term interest of the global community. Without efforts in technology transfer and other areas, destabilization may occur through the economic volatility that comes from liberalization, or through the political volatility that can result from increasing external demands placed on developing-country governments. An international legal framework that balances costs of technology transfer must join other efforts to manage globalization in a way that recognizes equity as a concern that lies alongside effi-

59. Article 67 of Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPs"), for example, requires industrialized-country WTO members to provide technical assistance associated with the implementation of the TRIPs Agreement in developing countries.

60. See Mehr, *supra* note 34, at 742-46.

ciency in the international order.⁶¹

61. The financier George Soros has been among the most visible, and paradoxical, recent advocates for this view. See Soros, *supra* note 14, at xix ("We live in a global economy, but the political organization of our global society is woefully inadequate. We are bereft of the capacity to preserve peace and to counteract the excesses of the . . . markets. Without these controls, the global economy is liable to break down.").