Global Environmental Accords
Nazli Choucri, editor

Global Accord: Environmental Challenges and International Responses, Nazli Choucri, editor

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Global Accord
Environmental Challenges and International Responses

edited by
Nazli Choucri

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Series Foreword

A new recognition of profound interconnections between social and natural systems is challenging conventional intellectual constructs as well as the policy predispositions informed by them. Our current intellectual challenge is to develop the analytical and theoretical underpinnings crucial to our understanding of the relationships between the two systems. Our policy challenge is to identify and implement effective decision-making approaches to managing the global environment.

The Series on Global Environmental Accords adopts an integrated perspective on national, international, cross-border, and cross-jurisdictional problems, priorities, and purposes. It examines the sources and consequences of social transactions as these relate to environmental conditions and concerns. Our goal is to make a contribution to both the intellectual and the policy endeavors.

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Multinational Corporations and the Global Environment

Nazli Choucri

Private firms operating across national boundaries have dominated international business since the end of the last century. Changing international realities—politics, economics, technology, finance, and investments—have forced changes in both the structure and function of cross-border enterprises. Formidable growth in the scale and scope of corporate activities has accentuated both the *need* for change and the *consequences* of change. The rapid growth in the global economy since World War II has created unprecedented alterations in ways of doing business. Now environmental factors generate new challenges for corporate activities, shaping new constraints as well as new opportunities.

This chapter (1) illustrates the environmental implications of corporate activities worldwide; (2) draws upon the theory of lateral pressure to illustrate some generic features of the growth, expansion, and increased complexities of international investments and related transactions; (3) examines corporate activities in three industries—oil, chemicals, and construction—to show environment/technology linkages and the emergence of awareness, patterns of response, and consequences for corporate planning; and (4) presents a synthesis of new imperatives for corporate environmental linkages in terms of theory, policy, and practice.

Generation and Transmission of Effluents

The uneven growth and development of states—while often supporting economic and political stability—also contribute to a wide range of effluents that threaten environmental balances (see chapters 1 and 3 of this volume). International investments and transactions (trade, overseas

production, and associated activities) that are undertaken primarily for economic purposes also serve as conduits for effluence generation, energy use, excessive carbon emission, and the transmission of pollution and other forms of environmental degradation throughout the global system—all in the course of pursuing legitimate economic and business transactions. Environmental problems of this sort are traced largely to normal economic activities—exploration, extraction, production, distribution, consumption, and disposal of both wastes and products (Walter 1982, 23; North 1990).

Agents and Institutions

The generation of effluence and depletion mechanisms is basically inadvertent in that it is a concomitant material aspect of the development paradoxes that shape development-environment relationships (see chapter 3 of this volume). These paradoxes may assume different characteristics (forms and types) as different institutions serve as agents in the distribution of effluents. As used here, *agents* refers to technologies (mechanical and organizational knowledge, skills, designs, tools, machines, and processes) and to resources and goods (fuels, herbicides, insecticides, and other materials) that are environmentally depleting and/or degrading. Such effects can, and normally do, occur at both ends of relevant international transactions (i.e., exports, imports, and associated exchanges.) And in this context, by *institutions* we mean the organized collectivities (formal and informal), characterized by regular and routinized forms of activities, rules, and regulations, through which the actions generating international transactions (production, trade, investment, consumption, etc.) are undertaken.

Earlier we referred to the border-crossing activities and interests of states, and their populations and institutions, as manifestations of lateral pressure (Choucri and North 1975, 16–19 and 1989, 294–297; North 1990, 21–24). The political map of the world—a fairly simple and conventional device delineating "sovereign" entities—may help us to visualize some of the critical issues that are involved when agents of pollution and other forms of degradation cross borders that jurisdictionally separate one country from another. This reference to the map is to remind ourselves that the depletion-pollution-degradation process normally occurs, to some degree, on both ends of every transaction.

Environmental effects on the exporting country include resource depletions and degradation associated with product manufacturing, use, and transportation, whereas environmental impacts on the importing country are likely to be attributable to consumption, storage, domestic distribution, and end-use effects.

Are these issues matters of trade, of investment, of finance? Should they be viewed in the context of trade theory, investment theory, management, and finance? As Rubin and Graham (1982, 62) properly note, there are tight interconnections among both the empirical realities and the theoretical perspectives. Compelling stories about the human sources of transmission and distribution of depleting and degrading agents into and across the international system are already becoming legendary. Illustrative is the exporting worldwide—including, sometimes especially, to developing countries—by the United States and other industrialized countries of three prominent categories of enterprise: chemical plants producing highly toxic goods (asbestos, herbicides, pesticides, plastics, and so on); those involving heavy metals (copper, lead, and the like); and automobiles, trucks, tractors, and other machines that generate highly polluting emissions (UNCTC 1988, 230). Also relevant is the adoption by the newly industrialized countries of the same type of polluting and environmentally detrimental industries learned or imported from the industrial countries.

These processes are becoming considerably more complex as a function of the worldwide process of growth. As countries grow and develop, their total international transactions tend to expand. "Third-World multinationals" refers to the corporate structure and activities that originate in developing countries. There is every indication that multinational corporations (MNCs) from developing countries behave more or less like those of industrial countries (Lall 1983, 2–18). As global producers, distributors, and consumers—from all national origins—multinational companies play powerful roles both in the creation of environment as an issue and in the shaping of investment-environment relationships.

Environmental Accounting

While accepted forms of environmental accounting are still at early stages of formalization, it is clear that environmental costs are exacted with most economic exchanges and that some form of measuring device

must be developed. When extensive patterns of effluence and emission are generated locally, these impacts may aggregate and translate into global-level impacts. Under such circumstances the environmental accounting problem becomes more complex, especially in the absence of an operational view of the global system that integrates natural and social systems and reflects ecological decision systems (see figure 1.6).

Clearly, there are numerous difficulties associated with efforts to analyze relationships between the exporting and importing of resources, goods, and services (the purview of economics and finance) and the agents of environmental depletion and degradation that in effect are inadvertently generated and transmitted from one country to another as trade and financial exchanges occur. The quality of environmental data available from many countries is generally much more suspect than that of the economic data, thereby making it all the more difficult to consider specific causal relationships.[1] Underlying this venture, however, is the extraordinary difficulty confronted by anyone who attempts to assign cost/benefit values to the actions of depleting and degrading agents and to balance these values against the economic costs and benefits with which they are associated. (Even more compelling are the implications for intertemporal and intergenerational effects. See Chapters 10, 11, 12 of this volume).

Multinationals in Practice

We begin with three facts: (1) Since multinational corporations conduct most of the world's economic activity, they are the major environmental actors as producers, managers, and distributors of goods and services; (2) by necessity, these firms are generic polluters as they engage in a wide range of hazardous and pollution-intensive activities; and (3) corporations are also central to the "solution." Global enterprises are the major technological innovators, the institutions of technological change, and agents of commercialization for new technology (both organizational and mechanical) worldwide.

Because MNCs serve as the major innovators and the transmitters of technology, as well as often being both the sources and the diffusers of commercial ideas, their involvement in the active search for solutions is necessary—but certainly not sufficient (Schmidheiny 1992). Their actions

and strategies are crucial in determining the overall dimensions of the environmental landscape or, as we point out later on, the environmental aspects of "organizational fields" for firms (Fligstein 1990). It is the corporations—their technological capabilities and edge—that will shape new modes of economic performance.

Scale and Scope

Clearly, industrial countries account for almost all multinational corporate activities overall. In 1980–81 the United States accounted for 28 percent of all direct investment abroad, in contrast to 65 percent in 1965–69. At the same time Japan's share grew from 2 percent to 7.5 percent of all global investments. Concurrently the largest magnet for corporate investments outside the country of origin is the United States. Together the United States and Canada were recipients of 25 percent of the stock of foreign investment in 1980. That figure was roughly similar to that of all the developing countries hosting foreign investors (which stands at 27 percent). Europe as a whole also attracted about 27 percent of the global total. While the shifts in corporate activities worldwide may have important market implications, environmental consequences remain unaffected by who pollutes. However, how much they pollute and why are obviously not neutral with respect to global economic, political, or legislative effects, as will be noted further along.

Recurrent debates as to whether the size of firms affects external investments remain unresolved. On the one hand is the argument that firm size is a significant factor; on the other is the argument that size does not affect the propensity to expand. Based on a survey of six hundred international firms with sales over $1 billion, the United Nations Center on Transnational Corporations (UNCTC) found no relationship between firm size and share of foreign sales relative to total sales. But there is a threshold: Attaining a certain size is necessary before external expansion can take place; once that threshold is reached, size is no longer a significant factor.

By contrast, there is a significant positive relationship between the size of a firm's domestic market and the propensity to expand outward: The larger the size of the domestic market, the greater the constraints on further expansion of size and the higher the propensity for expansion. In lateral pressure terms, expansion processes are shaped by the con-

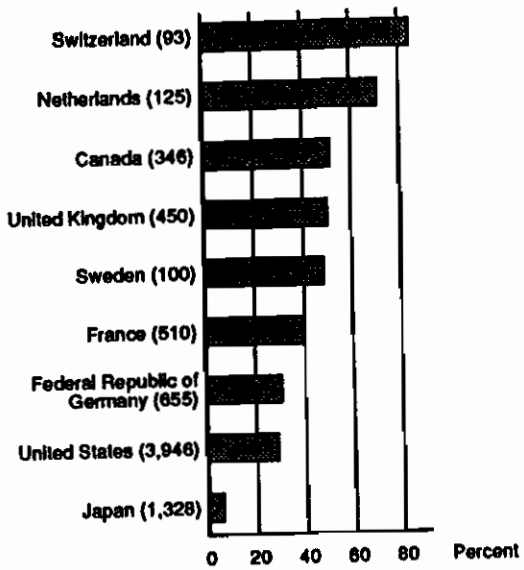

Figure 6.1
TNCs in the "Billion Dollar Club": relationship between foreign content of sales and size of home market, 1985
Source: U.N. Center on Transnational Corporations 1988.
Note: The amounts given in parentheses are the figures in billions of U.S. dollars for the country's GDP in 1985.

straints on activities within national boundaries, which in turn propel extended expansion abroad. The UNCTC analyses appear to confirm such a hypothesis with respect to firms in the "billion-dollar club" (UNCTC 1988, 35). The smaller the size of the domestic market relative to the capabilities and output of the firm, the greater the propensity for outward expansion. A rough indication of this relationship is seen in figure 6.1.

Environmental and Empirical Evidence

Industrial activity anywhere and of any sort has the inevitable consequence of generating effluents of various types. According to the UNCTC five trends appear noteworthy with respect to the environmental consequences of international investments (UNCTC 1985, 47). Together they may provide a sense of broad tendencies upon which more specific

hypotheses can be framed about the interrelationship between corporate and environmental action.

First, there are notable differences between sources of process pollution and those of product pollution—each with distinct patterns, agents, and effects. Process pollution problems are generated by the chemical, iron and steel, petroleum, and pulp and paper industries, among others; product polluters are concentrated in the agriculture, automotive, and tobacco industries, among others. Such differences have been determined on the basis of patterns of pollution control expenditures that point to significant distinctions between product and process pollution.

Second, there is a notable trend in the shift in location—away from developed countries and toward developing countries. This trend toward production in developing countries is due mainly to growth and industrialization in developing countries rather than to conscious efforts by private agents to relocate activities of corporations in industrial countries beyond their own borders and into jurisdictions of developing countries. The proposition that relocation of activities is driven by avoidance of environmental legislation has not been refuted by recent trends (Walter 1975, 129–30).

Third, shifts in the location of investments and corporate activities overseas cannot to date be attributed solely (or even largely) to differences in national environmental policies. It is reasonable to expect that the more stringent the environmental policies may be in a particular country, the less attractive that country may appear to be to foreign direct investors. As of 1988, however, "pollution havens" had not yet become apparent.

Fourth, shifts in corporate location of activities—from more to less developed nations—are notably attributable to policies of site exclusion rather than to movement to world environmental legislation. Then, although shifts in location to exclude industrial activities from densely populated areas are evident in Japan, Denmark, and Holland, among others, site exclusion in itself is a significant determinant of the lateral mobility of industrial activities. The greater the exclusion based on site characteristics, the greater is the likelihood that industries will relocate elsewhere. There appear to be no consistent patterns indicating where "elsewhere" is likely to be.

Fifth, shifts in responsibility for pollution management are becoming increasingly apparent. The locus of final responsibility appears to move away from corporate headquarters, or operations in the home country, and toward overseas locations. This means that more responsibility is assumed in the field—in the host country and on site—rather than in corporate management at the center. This type of shift is reinforced by the trends in developing countries for national operations to assume greater control of their own industrial and manufacturing sectors rather than to perpetuate reliance on foreign companies.

Environmental Investments

In practice, to date the multinational corporations have shown little environmental responsiveness. With regard to the United States, table 6.1 shows the historical trends of domestic and overseas pollution control expenditures in relation to total capital spending over a ten-year period, 1970–1980, by U.S. firms with foreign operations, by industry. This was an important decade as it pre-dated the surge of environmental legislation in the United States. In 1980, gross annual costs for pollution abatement as a share of the total value of shipments was negligible. Based on U.S. Bureau of Census data, the average for all industries stood at .0043, a rather minuscule share. Of the nineteen major industries examined, primary metal industries showed the largest percentage of pollution expenditures relative to the value of shipments, namely .0125 percent (UNCTC 1988, 100). All of this reflects the marginal corporate response to environmental degradation due to industrial activities.

More recent trends in investments for the control of pollution by U.S. industry are presented in table 6.2. Expenditures targeted to the control of air, water, and solid waste pollution (as percentages of capital spending) are presented in table 6.3. There is evidence of increased environmental responsiveness.

Environmental Legislation

The nature of the relationship between environmental laws and investment patterns remains ambiguous. The strengthening of environmental laws does not in itself determine investment patterns, nor does it serve

Table 6.1 Domestic and overseas pollution control expenditures as a percentage of total capital spending by United States firms with foreign operations

	1970		1971		1972		1973		1974		1975		1976		1977		1980	
Industry[1]	U.S.	O/S	U.S.	O/S	U.S.	O/S	U.S.	O/S	U.S.	O/S	U.S.[2]	O/S	U.S.[2]	O/S	U.S.[2,3]	O/S	U.S.[2,3]	O/S[4]
Iron and steel and nonferrous metals	9.2	1.8	11.5	2.0	13.8	9.5	14.8	3.7	18.8	10.3	21.2	9.8	20.4	15.0	15.4	8.5	12.2	—
Fabricated metals	4.3	2.5	7.1	1.8	7.3	2.3	7.2	2.8	5.6	3.0	10.8	4.9	11.2	4.4	6.2	3.0	17.2	—
Stone, clay, and glass	6.4	3.0	13.2	7.2	9.6	4.5	9.0	6.5	17.5	2.9	17.6	8.0	9.0	4.6	7.5	5.0	9.7	—
Chemicals	4.9	5.8	8.2	3.2	10.9	7.6	10.2	5.9	7.3	3.9	8.9	5.3	12.3	5.5	11.8	6.1	13.5	—
Paper and pulp	9.3	4.2	20.6	8.7	23.3	8.1	22.8	6.2	16.6	9.7	21.9	11.8	25.7	7.9	25.8	5.7	13.0	—
Rubber	5.3	3.2	5.4	1.1	5.8	1.1	6.2	3.1	3.0	2.2	4.8	2.6	5.7	2.7	7.3	3.9	8.3	—
Petroleum	6.0	1.9	9.0	5.6	10.7	8.3	12.7	7.4	7.2	5.3	12.8	5.1	7.5	4.5	6.4	4.7	6.6	—
Mining	6.1	3.5	2.8	2.1	5.1	1.5	7.6	4.8	7.0	1.8	8.2	3.9	6.9	6.2	7.0	12.7	5.2	—

Source: United Nations Center on Transnational Corporations 1985. Data reprinted with permission.
U.S.: domestic operations.
O/S: overseas operations.
1. Industry classification is the same for the United States and overseas, except as follows: iron and steel plus nonferrous metals for the United States (primary metals for overseas); fabricated metals for the United States (fabricated metals plus instruments for overseas).
2. Including solid waste.
3. Planned.
4. No data available.

Table 6.2 Investments for pollution control (millions of dollars)

	Level			Percentage change	
	1988[1]	1989	1990	1989	1990
Blast furnaces, steel works	520	725	542	39.4	−25.3
Nonferrous metals	210	213	212	1.2	0.0
Electrical machinery	200	202	203	1.1	0.4
Nonelectrical machinery	180	169	170	−6.1	0.9
Motor vehicles	370	679	802	83.6	18.1
Aircraft	110	133	131	20.6	−1.3
Fabricated metals	130	169	196	30.0	15.8
Stone, clay, and glass	200	265	274	32.7	3.2
Other durables[2]	440	440	435	0.0	−1.2
TOTAL DURABLES	2,360	2,995	2,965	26.9	−1.0
Chemicals	1,260	1,361	1,375	8.0	1.0
Paper	720	1,172	1,144	62.8	−2.4
Rubber and plastic	60	73	78	21.9	6.8
Petroleum	1,650	1,619	1,662	−1.9	2.7
Food including beverages	320	287	287	−10.4	0.1
Textiles	30	40	40	34.0	−1.7
Other nondurables	100	200	200	100.0	0.0
TOTAL NONDURABLES	4,140	4,752	4,785	14.8	0.7
ALL MANUFACTURING	6,510	7,747	7,750	19.0	0.0
Mining	180	178	178	−0.9	−0.5
Railroads	20	20	20	1.6	0.0
Air transportation	30	28	29	−8.0	5.8
Other transportation	50	44	88	−12.6	100.3
Electric utilities	1,710	2,154	2,329	26.0	8.1
Gas and other utilities	40	40	40	−0.2	−0.6
Communications[3]	100	101	102	0.8	1.2
Trade and services[4]	380	363	362	−4.4	−0.3
ALL NONMANUFACTURING	2,510	2,928	3,147	16.7	7.5
ALL BUSINESS	9,020	10,676	10,897	18.4	2.1

1. U.S. Department of Commerce, Bureau of Economic Analysis estimates.
2. Includes instruments.
3. Consists of communication; construction; social services and membership organizations; and forestry, fisheries, and agricultural services.
4. Consists of wholesale and retail trade; finance and insurance; personal business services (excluding construction); and real estate.

Source: DRI/McGraw-Hill, *22nd Annual DRI/McGraw-Hill Survey of Pollution Control Expenditures, 1988–90*, Lexington, Mass.: Data Resources, Inc., August 1989, p. 2.

as a clear deterrent in corporate strategy. This is especially noteworthy with respect to the United States. Some of the strongest environmental laws are in the United States, and this country ranks first as a recipient of foreign direct investment. This case in itself belies simple linkages between environmental laws and the location of foreign direct investments.

The record of U.S. environmental legislation presented in figure 6.2 reveals the trends in such legislation. A stable (flat) response to emerging environmental problems is evident throughout the better part of one hundred years. From 1895 to 1960 or so, environmental regulations were modest in number and scope. The surge after 1960 was accompanied by a shift in content—from technical controls to financial allocations. The Superfund Amendment of 1990, the last datum in table 6.4, was largely financial relative to the contents of earlier legislation. The surge of regulation over the past twenty years shows little sign of abatement.

By tracing legislative patterns over time—and shifts in the contents of legislation—we can infer, even predict, the types of business responses to these trends. We are likely to see more rather than less regulation of private activities at all levels. Multinational firms as well as national, state, and local enterprises will be faced with more rather than less pressure for compliance with environmental regulations and legislation. In chapter 12 we will see how similar the patterns are with respect to the scale, content, and scope of multilateral environmental treaties binding sovereign states. In chapter 15 these trends are presented in graphic form; here we note only the increasing salience of environmental legislation for corporate management.

Multinationals in Theory

Theoretical perspectives of the institutions of the multinational corporations (MNCs) can be viewed roughly through three disciplinary lenses, each reflecting different intellectual and policy traditions: (1) international relations analyses in political science, (2) market analyses in economics, and (3) organizational theory in business and management. They all reflect inherent biases, and none effectively addresses environment-investment linkages.

Table 6.3 Pollution control expenditures: air, water, and solid waste (percent of capital spending)

	1988			1989			1990		
	Air	Water	Solid waste	Air	Water	Solid waste	Air	Water	Solid waste
Blast furnaces, steel works	4.7	3.1	0.8	7.8	3.0	0.9	6.7	2.5	0.5
Nonferrous metals	4.0	2.5	1.1	3.5	2.2	1.0	3.5	2.2	1.0
Electrical machinery	0.3	0.6	0.2	0.3	0.5	0.2	0.3	0.6	0.2
Nonelectrical machinery	0.2	0.7	0.2	0.2	0.7	0.2	0.2	0.7	0.2
Motor vehicles	1.1	1.4	0.9	0.9	2.3	1.2	0.5	3.1	1.2
Aircraft	0.6	1.5	1.2	0.6	1.5	1.2	0.6	1.5	1.2
Fabricated metals	0.7	2.3	0.2	0.7	2.6	0.3	0.7	2.7	0.3
Stone, clay and glass	1.7	1.1	2.5	2.0	1.6	2.5	2.3	1.6	2.6
Other durables	1.5	1.1	0.7	0.9	1.3	0.4	0.8	1.3	0.5
TOTAL DURABLES	1.2	1.2	0.6	1.2	1.4	0.6	1.1	1.6	0.6
Chemicals	2.3	2.7	1.6	2.2	2.3	1.3	2.2	2.3	1.3
Paper	3.8	0.9	1.6	5.0	0.8	1.6	4.9	0.8	1.4
Rubber and plastic	0.8	0.8	0.3	0.5	1.1	0.1	0.8	1.2	0.2
Petroleum	3.0	4.2	1.1	3.2	4.3	1.0	3.0	4.2	1.0
Food including beverages	0.8	1.4	0.2	0.6	1.0	0.2	0.7	1.1	0.2
Textiles	0.9	0.5	0.5	0.9	0.4	0.4	1.3	0.6	0.6
Other nondurables	0.2	0.3	0.1	0.2	0.7	0.0	0.2	0.8	0.1
TOTAL NONDURABLES	1.9	2.0	0.9	2.1	1.8	0.8	2.1	1.9	0.8
ALL MANUFACTURING	1.6	1.6	0.7	1.7	1.6	0.7	1.6	1.7	0.7
Mining	0.6	0.6	0.2	0.5	0.6	0.2	0.5	0.6	0.2

Table 6.3 (continued)

	1988			1989			1990		
	Air	Water	Solid waste	Air	Water	Solid waste	Air	Water	Solid waste
Railroads	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.3	0.0
Air transportation	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.3
Other transportation	0.1	0.6	0.0	0.1	0.4	0.0	0.1	0.5	0.0
Electric utilities	3.5	1.2	0.7	3.5	1.3	1.6	3.5	1.7	1.6
Gas and other utilities	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2	0.0
Communications	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Trade and services	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1
ALL NONMANUFACTURING	0.4	0.2	0.1	0.4	0.2	0.2	0.4	0.2	0.2
ALL BUSINESS	0.8	0.7	0.4	0.9	0.7	0.4	0.8	0.8	0.4

Source: DRI/McGraw-Hill, *22nd Annual DRI/McGraw-Hill Survey of Pollution Control Expenditures, 1988–90*, Lexington, Mass.: Data Resources, Inc., August 1989, p. 7.

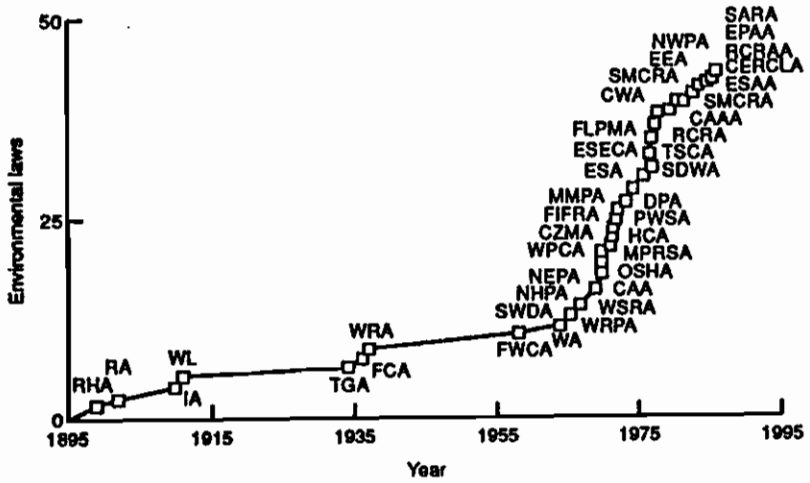

Figure 6.2
Growth in the number of U.S. environmental laws
Note: Acronyms refer to specific laws.
Source: Nazli Choucri. "The Technology Frontier: Responses to Environmental Challenges," prepared for the Dräger Foundation Malente Symposium IX: The ECO-Nomic Revolution—Challenge and Opportunity for the 21st Century, Timmendorfer Strand, Germany, November 18–20, 1991, reprinted with permission from *Technology and Environment*, edited by Jesse H. Ausubel and Hedy E. Sladovich, 1989. Washington, D.C.: National Academy Press, p. 101. Copyright by the National Academy of Sciences.

Environment in MNC Theory

Remarkable as it may be, to date case studies of the multinationals from any of the three perspectives make no reference to environmental or ecological factors or to the environmental consequences—intended and/or unintended—of corporate activities and investments. However, even if dominant theories of corporate behavior do not address environmental effects, they may help highlight environmental implications. For example, product-cycle theory might imply that developing countries may host greater pollution since they operate with older technology. So, too, the environmental factor might become central to a firm's "organizational field" (defined below), and to its priorities for research and development (R&D).

Table 6.4 Growth in the number of U.S. environmental laws

1899	River and Harbors Act (RHA)
1902	Reclamation Act (RA)
1910	Insecticide Act (IA)
1911	Weeks Law (WL)
1934	Taylor Grazing Act (TGA)
1937	Flood Control Act (FCA)
1937	Wildlife Restoration Act (WRA)
1958	Fish and Wildlife Coordination Act (FWCA)
1964	Wilderness Act (WA)
1965	Solid Waste Disposal Act (SWDA)
1965	Water Resources Planning Act (WRPA)
1966	National Historic Preservation Act (NHPA)
1968	Wild and Scenic Rivers Act (WSRA)
1969	National Environmental Policy Act (NEPA)
1970	Clean Air Act (CAA)
1970	Occupational Safety and Health Act (OSHA)
1972	Water Pollution Control Act (WPCA)
1972	Marine Protection, Research and Sanctuaries Act (MPRSA)
1972	Coastal Zone Management Act (CZMA)
1972	Home Control Act (HCA)
1972	Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
1972	Parks and Waterways Safety Act (PWSA)
1972	Marine Mammal Protection Act (MMPA)
1973	Endangered Species Act (ESA)
1974	Deepwater Port Act (DPA)
1974	Safe Drinking Water Act (SDWA)
1974	Energy Supply and Environmental Coordination Act (ESECA)
1976	Toxic Substances Control Act (TSCA)
1976	Federal Land Policy and Management Act (FLPMA)
1976	Resource Conservation and Recovery Act (RCRA)
1977	Clean Air Act Amendments (CAAA)
1977	Clean Water Act (CWA)
1977	Surface Mining Control and Reclamation Act (SMCRA)
1977	Soil and Water Resources Conservation Act (SWRCA)
1978	Endangered Species Act Amendments (ESAA)
1978	Environmental Education Act (EEA)
1980	Comprehensive Environmental Response Compensation and Liability Act (CERCLA)
1982	Nuclear Waste Policy Act (NWPA)
1984	Resource Conservation and Recovery Act Amendments (RCRAA)
1984	Environmental Programs and Assistance Act (EPAA)
1986	Safe Drinking Water Act Amendments (SDWAA)
1986	Superfund Amendments and Reorganization Act (SARA)

Note: This is an illustrative, not an exhaustive, list. Nonetheless, the basic trend is confirmed when we consider the *entire* record of environmental legislation in the United States.
Source: Reprinted with permission from *Technology and Environment*, edited by Jesse H. Ausubel and Hedy E. Sladovich, 1989. Washington, D.C.: National Academy Press, p. 101. Copyright by the National Academy of Sciences.

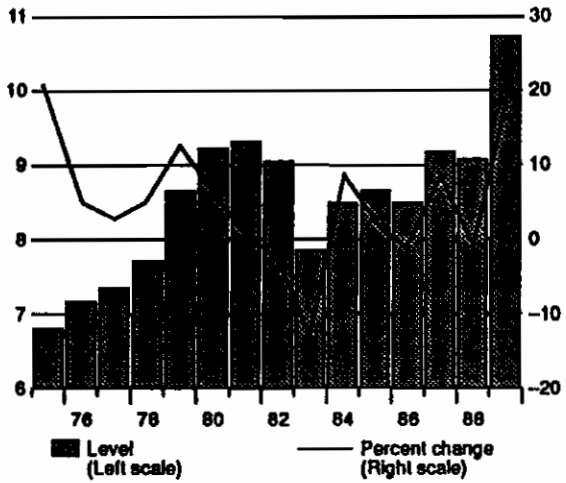

Figure 6.3
Pollution control spending by all businesses (billions of dollars)
Source: DRI/McGraw-Hill, *22nd Annual DRI/McGraw-Hill Survey of Pollution Control Expenditures, 1988–90*, Lexington, Mass.: Data Resources, Inc., August 1989, p. 1.

It is a historical and intellectual fact that theories of multinational corporate behavior have evolved devoid of an environmental context or concern for environmental variables. It is as if private investments and actions crossing borders are neutral relative to environmental, ecological, or atmospheric impacts—at any level of social organization. While this type of "environmental neutrality" is prominent in most forms of social theory, it is especially stark for theories addressing collectivities known as multinational corporations. To date *all* theories of the MNCs ignore the impacts of corporate activities on the natural environment and on ecological balances. Indeed, the term "natural environment" is never cited in the indexes of volumes on the multinational corporations or international political economy. (See Gilpin 1987 as an example of this typical omission.)

States and Trade

The conventional state-centric focus in the study of international relations has all but obscured international realities of contending and powerful privately owned enterprises that can exert strong influences on national behavior. Private actors tend to shape international relations in ways that cannot be well explained by resorting to theories of the state, or of international systems, or of international processes. While this limitation is generally recognized, few theoretical efforts have been made to address the practice of foreign direct investment. Efforts in that direction are largely descriptive syntheses of ideas on corporate behavior (Gilpin 1987) or case studies of contending power and influence (Rodman 1988). The MNCs are either completely ignored (in state-centric power-based theories) or are assumed to play a nebulous role at best (such as the erosion of sovereignty), to interact with internal political forces (such as colluding with anti-democratic local forces at the expense of the national economy), or to serve as instruments for enhancing dominant relations (as in structural theories of imperialism, control, and domination).

Nonetheless, at least three propositions about MNC activities emerge in the international relations literature:

First, multinationals are seen as both instruments of state behavior and as institutions shaping state actions. The influence goes both ways, so to speak, but the conditions and relative weight of directionality are underspecified. Does state legislation affect corporate action (Ausubel and Victor 1992)? Or, alternatively, can and do corporations influence state actions and legislation to "level the playing field" (Choucri 1990)?

Second, in parts of the international relations literature, multinational corporations are seen as dominating and shaping the politics of "host" countries (Gilpin 1975, 1987). A wide range of influences are posited, as are types of resulting conflicts between foreign corporations and national governments serving as hosts.

Third, multinationals shape tastes, influence preferences, and effectively create demands for new products and new processes. In this way the MNCs affect the demand side of the economic equation in host countries and help to leverage their own responses by shaping the supply side as well.

Environmental factors associated with these three factors—as causes, intervening variables, or consequences—are entirely ignored in the international relations literature.

Trade and Markets

In economics the analysis of corporate behavior is grounded in trade theory. In principle, the practice of free trade versus exchange through operations of multinational firms are posed as logical alternatives in response to market conditions. In the best of all possible worlds, free trade generates optimal exchanges for all parties. Only when exporting or licensing is not feasible (for a variety of reasons) is the decision of a firm to move production outside the jurisdiction of the country of origin considered to be a reasoned alternative. When trade is not possible, principles of efficiency are safeguarded by changes in the form, modes, and location of production (Rugman, Lecraw, and Booth 1985, 97–98). Production overseas becomes the best among the options for reaching and shaping foreign markets.

In a world of perfect competition—with differentiated markets, no barriers to trade, and costless information—trade is the only type of international exchange (Kindleberger 1969, 13).[2] From an economic perspective, however, multinationals are important because they respond to market imperfections that impede free trade, and therefore they are important economic actors. Kindleberger's work, popularly known as the "market imperfections" paradigm—focusing on imperfections in goods markets, factor markets, economies of scale, and government-imposed regulations—has been further extended and modified (Calvet 1981) in recognition of an increasingly globalized marketplace.

In this connection, MNC activities are viewed as a response to market imperfections due to four sets of factors: (1) market conditions, (2) government regulations, (3) market structure, and (4) market failure. Calvet noted that the justification and logic for the expansion of production and operations overseas increase from (1) to (4), as does the justification for the horizontal expansion of firms' organizations (Calvet 1981, 44). It is this "push" logic that provides the connection between economic and market-based theories of the firm and lateral pressure theory discussed below.

Markets and Firms

The managerial perspective of MNC behavior shifts the focus from the market and its properties to the firm and its characteristics. Recent work

on industrial organizations extends the initial focus on MNCs as economic actors by addressing their role in a global marketplace. But the shift is limited; MNCs' behavior is viewed in terms of reducing transaction costs rather than as being the result of other, more complex, mixes of incentives and pressures. And the industrial organization perspective does not consider the consequences of MNCs' responses to new incentives and pressures. Among the most pressing of such new factors are environmental considerations.

Traditionally the management literature has centered on three concerns: one was the product life-cycle type of explanation, introduced and popularized by Vernon (1966); a second emphasized the responsiveness of MNCs to local conditions—customs, legislation, tastes, and market structures; and a third focused on scale and scope in the manufacturing and distribution of goods. (See Porter 1990 and Bartlett and Ghoshal 1989). Increasingly all three concerns have been converging, largely due to the effects of either new technology and technology competition or increased competitiveness, in all aspects of the global marketplace. Recent developments in both the theory and practice of MNCs' organization and behavior focus on explanations of the type, location, and scale of activities at each stage of the production process. The notion of the globalization of business reflects this convergence and the development of new directions of corporate theory (Lessard and Antonelli 1990). But to date environmental concerns have remained singularly ignored.

Viewed from the perspective of the firm rather than the state or the market both the globalization of business and increased organizational complexity are generally explained by three requisites for effective performance—appropriability, internalization, and diversification.[3] Together they indicate why a firm chooses production (of the whole or parts of its output) outside its jurisdiction of origin rather than the use of contractual mechanisms, such as licensing or other arrangements. They are also central to explanations of firms' performance and success. To the extent that firms respond to market opportunities and/or constraints due to greater awareness of and concern for environmental factors, it will be by anchoring behavior to environment in terms of these three core requisites. Indeed, from a broader environmental per-

spective, these three factors can be framed as useful policy guides from which managers can plan for environmental factors and incorporate them into their decisions.

Decisions and Environment

Actions and decisions of individual managers determine corporate policy within the firm's "organizational field" (Fligstein 1990, 5–11). Organizational fields, defined as the policy spaces within which decisions are made about the actions of firms, are in practice determined by characteristic features of product lines, industry, and the sizes of firm. Certainly, managers (and analysts) appreciate that corporate activities cannot be seen independently of the state. The state provides "rules of the game"; and the state is a central actor, both directly and indirectly. As a direct actor the state undertakes investments—influences state-firm interactions, invests in activities, holds title and ownership, and intervenes in economic activity (i.e., via taxes and public expenditures, and so on). As an indirect actor, the state shapes the political atmosphere and the business climate.

A firm's organizational field is conditioned by the state and by "the rules by which actions in the economy are carried out" (Fligstein 1990, 8). As Fligstein notes (1990, 12), "The *state* and the *organizational field* constitute the firm's external unit." The power struggle within firms determines who controls and makes key decisions on behalf of the firm. The power struggle *between* firms determines which firms (activities, industries, economic sectors) expand, how they expand, and by how much.

Environment and environmental legislation are increasingly becoming relevant to corporate behavior, interjecting new constraints that may significantly affect both the nature and the conduct of multinational firms. Following the scheme in figure 1.1 of chapter 1, environmental legislation has become a set of parameters within which firms are expected to operate. Firms can influence these rules, or they can bypass them—or firms can move their operations to other locations that are less environmentally stringent. In the United States, for example, environmental legislation illustrates the dominance of environmental controls. These controls are stronger in the United States than in other industrial countries, and they may be forerunners of trends worldwide.

It seems increasingly evident that corporate organization and activities are becoming increasingly influenced by environmental awareness, legislation, and litigation. Since the role of knowledge and technology (both organizational and mechanical) is critical to all industries and to their operations, environment bears on considerations pertaining to appropriability, internalization, and diversification.

Lateral Pressure Theory of Corporate Behavior

When applied to the entity of the multinational corporation, the theory of lateral pressure appears to be best positioned to clarify the environmental effects of both operations and applications and thus to remedy the weaknesses of the other theoretical perspectives. Designed explicitly to integrate political, economic, and environmental factors (see chapter 1), the theory provides a "handle" on the interconnections of human decisions and ecological systems (chapter 3). Further in this chapter we refine the lateral pressure theory to address interactions between private and public entities—i.e., firms and states.

Corporate theory highlights an underlying logic of lateral pressure: the propensity of firms from one country to engage in direct outward investment—placing production outside its own national jurisdictions—will vary according to the level of development and technological capabilities of that country (Dunning 1988, 14). And as indicated earlier, different profiles of states are associated with different types and forms of effluents. The same is generally applicable to the entity of the multinational corporation (Fligstein 1990).

Growth and Expansion: Linkages between States and Firms

In specifying the sources and potential consequences of the process of growth and expansion, the theory of lateral pressure is highly complementary to paradigms of corporate growth and expansion (based on Dunning, 1988, among others). From a developmental and transformative perspective, the corporate investment and expansion paths follow a logic analogous to that embedded in the profiles of states (see chapter 3). In Dunning's terms—and consistent with the theory of lateral pressure—a sequence of corporate expansion outside the borders of the country of origin can be framed both historically and developmentally.

The sequence of corporate expansion yields a dynamic approach to corporate growth and expansion that is related to the level of growth and development of the home state. Where the theory of lateral pressure is considerably more explicit than the conventional business and management literature is with regard to the *direction* of corporate expansion and the *consequences* in terms of differentials in growth and development (and capabilities) between the home and host countries.

Drawing on MNC theory and refining lateral pressure theory, the corporate-state growth and development process can be roughly characterized in sequential terms as follows. In early phases of development a country will generate neither outward nor inward MNC activity due largely to limited technology and limited institutional and organizational capability. In essence, poor countries such as those at the bottom of Group I (in terms of the groupings in chapter 3) would have limited MNC activities, if any. As investments are made domestically and the infrastructure improves, the demand in the home country for intermediate products will grow, leading to the expansion of import demand and to active imports. The ability to import is of course contingent on the ability to pay for imports. Hence exports are essential. This is a generic aspect of the development process. However, at that stage of development the agents and organizations responsible for undertaking and for initiating trade will normally be of small size, with limited capacity. So institutional capacities will be limited, as will the ability to engage in external transactions.

Over time, as a country grows and develops sufficiently so as to generate its own corporate activities and extend its own sovereign ownership over production and operations, external activities become more common. At this stage the choice of investment and related economic activities and transactions will reflect economic conditions in the home country (prevailing factor endowments) and its profile characteristics (interactions of technology, resources, and population attributes). Gradually, through its private organizations, a country generates a wide range of cross-border activities and may even become a net outward investor.

The number of listed domestic companies for countries with "developed" and "emergent" markets in table 6.5 shows very clearly the development of internal entrepreneurial capability—with allowance made for differences in the quality and type of capability. The more

"developed" the country is, the greater are its entrepreneurial capabilities. Each of the country names is preceded by a profile designation as defined in chapter 3.

Further reference to some empirical observations will shed light on the dynamic processes described here, their implications for state profiles, and expansion and external investments as a function of growth and development. Table 6.6 shows a rough distribution of equity market indicators by developed and developing countries and their profiles.

Table 6.7 shows market capitalization by country (and profile type) from 1980 to 1988. "Developed" markets are distinguished from "emerging" markets. (This designation applies to size of equity markets, not level of economic development.)

As the advantages that led to a country's initial outward expansion become more firm-specific and less country-specific and the organizational responses of the firm become more firm-oriented and less home country-based, domestic constraints become less binding and corporate activities abroad expand significantly. Accordingly, it will be the capabilities of the firms, rather than the power and profile of the home country, that will become more significant in shaping corporate activities abroad. This means that the initial conditions that lead to the growth and development of the country in the first place and generate corporate expansion abroad improve and shape the development and expansion of the firm itself. Concurrently, then, corporations make investment decisions on the basis of broader regional, international, and even global market and strategic bases rather than on the basis of economic conditions, endowments, or the profile of the home country.

In this process the dynamics of lateral pressure of the "sovereign" entity may support and reinforce the processes of expansion abroad for corporate entities. The firm's strategies become nearly independent of the state's profile, although synergism may remain. If the level and composition of environmental discharges are concomitant with the type and extent of economic activity, then economic expansions mean the spreading of effluence. At each stage of this developmental process, the country-corporate relationship changes in type and form. Whether there is an empirical relationship between state profile (Groups I–IV), on the one hand, and stages in the development of MNC activities abroad as related to the developmental level of the home country, on the other, is

Table 6.5 Number of listed domestic companies by profile group

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Developed markets									
Group I:									
South Africa	481	475	470	464	470	462	536	838	754
Group IV:									
New Zealand	—	—	—	—	237	317	339	361	297
Group V:									
Australia	1,007	982	931	930	1,009	1,028	1,162	1,528	1,303
Canada	731	771	759	808	943	912	1,034	1,147	1,145
Finland	—	—	—	48	52	50	49	49	66
Norway	117	109	112	113	140	156	149	146	130
Sweden	103	130	138	145	159	164	154	157	142
United States	6,251	6,866	6,834	7,722	7,977	8,022	8,403	7,181	6,680
Group VI:									
Austria	66	63	62	62	63	64	74	69	74
Belgium	225	218	212	204	197	192	191	192	186
Denmark	218	219	206	211	231	243	274	277	291
France	586	568	535	518	504	489	482	650	646
Germany	459	456	450	442	449	472	492	507	609
Hong Kong	137	158	—	—	—	260	248	276	282
Israel	117	136	212	258	269	267	255	283	265
Italy	134	132	138	138	143	147	184	204	211
Japan	1,402	1,412	1,427	1,441	1,444	1,829	2,549	1,912	1,571
Netherlands	214	202	216	215	263	232	219	248	232
Singapore	103	103	112	118	121	122	122	127	132
Spain	496	490	448	394	375	334	312	327	368

Table 6.5 (continued)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Switzerland	118	121	119	120	121	131	145	166	161
United Kingdom	2,655	2,403	2,279	2,217	2,171	2,116	2,106	2,135	2,054
Not ranked:									
Luxembourg	74	80	88	102	134	175	253	364	422
Subtotal	15,694	16,094	15,748	16,670	17,472	18,184	19,732	19,144	18,021
Emerging markets									
Group I:									
Argentina	278	263	248	238	236	227	217	206	186
Brazil (São Paulo)	426	477	493	505	522	541	592	590	589
Chile	265	242	212	214	208	228	231	209	205
Colombia	—	—	193	196	180	102	99	96	86
Jordan	71	72	86	95	103	104	103	101	106
Kenya	54	55	54	54	54	54	53	53	55
Peru	103	133	144	150	157	159	177	197	236
Venezuela	—	—	98	—	116	108	108	110	60
Zimbabwe	62	62	62	60	56	55	53	53	53
Group II:									
Bangladesh	22	25	28	43	56	69	78	85	101
Costa Rica	13	19	24	32	41	51	61	71	76
Egypt (Cairo)	62	64	112	154	258	317	387	430	483[1]
India	2,265	2,114	3,358	3,118	3,882	4,344	5,460	6,017	6,000
Indonesia	6	8	14	19	24	24	24	24	24
Malaysia	182	187	194	204	217	222	223	232	238
Mexico	271	240	215	174	178	188	166	233	255

Table 6.5 (continued)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Morocco	78	75	78	76	77	76	76	76	71
Nigeria	90	93	93	93	93	96	99	100	102
Pakistan	314	311	326	327	347	362	361	379	404
Philippines	195	190	200	208	149	138	130	138	141
Sri Lanka	—	—	—	—	—	171	171	168	176
Thailand	77	80	81	88	96	100	98	125	141
Turkey	—	—	314	—	373	—	40	50	50
Group III:									
Jamaica	38	36	35	36	36	38	40	43	44
Korea	352	343	334	328	336	342	355	389	502
Portugal	25	23	26	25	23	24	40	143	171
Group VI:									
Greece	116	111	113	113	114	114	114	116	119
Kuwait	—	—	—	—	—	55	70	64	65
Trinidad and Tobago	—	29	34	34	36	36	33	33	33
Not ranked:									
Taiwan, China	102	107	113	119	123	127	130	141	163
Subtotal	5,467	5,359	7,282	6,703	8,091	8,472	9,789	10,672	10,935
Total	21,161	21,453	23,030	23,373	25,563	26,656	29,521	29,816	28,956

1. Estimated.
— Not available.
Source: Adapted from International Financial Corporation 1988.
Note: Profile groups are defined in chapter 3. See table 3.1.

Table 6.6 Equity market indicators, 1987, by profile group

Country	Average market capitalization[1] (percentage of GNP)	Turnover ratio[2] (percentage of average capitalization)	Number of companies listed
High-income countries			
Group V:			
United States	58	93	7,181
Group VI:			
Japan	92	93	1,912
United Kingdom	80	72	2,135
Germany, Federal Republic of	21	161	507
France	18	56	650
Developing countries			
Group I:			
Jordan	60	15	101
Chile	27	11	209
Zimbabwe	10	4	53
Brazil	7	43	590
Venezuela	7	8	110
Colombia	3	8	96
Argentina	2	16	206
Group II:			
Mexico	8	159	233
Philippines	7	62	138
India	6[3]	19[c]	6,017
Malaysia	58	23	232
Nigeria	4	1	100
Pakistan	5	9	379
Thailand	9	114	125
Turkey	3	6	50
Group III:			
Korea, Republic of	19	111	389
Portugal	10	44	143
Group VI:			
Greece	5	18	116

1. Average market capitalization is a five-quarter average of the total value of listed stock, based on year-end data, assuming constant exponential growth during the year.
2. Turnover ratio is the value of stocks actually traded as a percentage of the average total value of listed stock.
3. Bombay exchange.
Source: Adapted from World Bank 1989, 109.
Note: Profile groups are defined in chapter 3. See table 3.1.

Table 6.7 Market capitalization (in millions of U.S. dollars) by profile group

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Developed markets									
Group I:									
South Africa	100,000	74,900	77,800	82,800	53,400	55,439	102,652	128,663	126,094
Group IV:									
New Zealand	—	—	—	—	6,161	8,761	22,215	15,713	13,200
Group V:									
Australia	59,700	54,400	41,500	59,600	49,900	59,877	94,035	171,783	183,483
Canada	118,300	105,500	103,500	140,600	134,700	147,000	166,300	218,817	241,880
Finland	—	—	2,759	4,134	4,167	5,855	11,692	19,698	30,179
Norway	3,190	3,334	2,396	4,597	5,793	10,063	10,122	11,818	14,332
Sweden	12,900	17,200	18,600	30,200	25,700	37,296	63,354	70,564	100,083
United States	1,448,120	1,333,385	1,520,167	1,898,063	1,862,945	2,324,646	2,636,598	2,588,890	2,793,816
Group VI:									
Austria	2,000	1,600	1,500	1,500	1,500	4,602	6,656	7,411	8,862
Belgium	10,000	8,400	8,500	10,800	12,200	20,871	37,337	41,377	58,920
Denmark	5,400	6,200	5,500	10,600	7,600	15,096	16,284	20,181	30,178
France	54,600	38,100	28,000	38,100	41,100	79,000	149,500	172,048	244,833
Germany	71,700	62,600	68,900	82,600	78,400	183,765	257,677	213,166	251,777
Hong Kong	39,104	38,912	18,784	17,095	23,602	34,504	53,789	54,088	74,377
Israel	4,828	6,972	15,894	5,083	6,120	7,626	9,884	12,001	5,458
Italy	25,300	24,000	19,900	20,900	25,700	58,502	140,249	119,559	135,428
Japan	370,200	417,000	417,400	545,800	644,400	910,000	1,841,785	2,802,956	3,816,908
Netherlands	29,300	23,000	25,700	33,700	31,100	59,363	83,714	86,240	113,565
Singapore	24,418	34,808	31,235	15,525	12,247	11,069	16,620	17,931	24,049
Spain	16,600	16,700	11,100	10,900	13,200	19,000	48,922	71,188	174,869
Switzerland	37,600	35,200	36,800	42,500	38,700	90,000	132,400	128,527	140,527
United Kingdom	205,200	180,600	196,200	225,800	242,700	328,000	439,500	680,721	771,206
Unranked:									
Luxembourg	4,017	4,457	4,686	5,799	6,648	12,658	26,163	38,277	44,808
Subtotal	2,642,477	2,487,268	2,656,821	3,286,696	3,327,983	4,482,993	6,367,448	7,691,617	9,398,832

Table 6.7 (continued)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Emerging markets									
Group I:									
Argentina	3,864	2,056	974	1,386	1,171	2,037	1,591	1,519	2,025
Brazil (São Paulo)	9,160	12,598	10,249	15,102	28,995	42,768	42,096	16,900	32,149
Chile	9,400	7,050	4,395	2,599	2,106	2,012	4,062	5,341	6,849
Colombia	1,605	1,399	1,322	857	762	416	822	1,255	1,145
Jordan	1,605	2,457	2,845	2,713	2,188	2,454	2,839	2,643	2,233
Kenya	—	—	—	—	—	—	—	—	24
Peru	—	1,371	685	546	397	760	2,322	831	—
Venezuela	2,657	2,441	2,415	2,792	—	1,128	1,510	2,278	1,816
Zimbabwe	1,456	—	355	265	176	360	410	718	774
Group II:									
Bangladesh	27	30	34	48	87	113	186	405	430
Costa Rica	—	—	—	118	156	195	246	—	—
Egypt (Cairo)	246	216	654	1,106	1,691	1,382	1,716	1,826	1,760
India (Bombay)	7,585	11,802[1]	11,497[1]	8,510	8,018	14,364	13,588	14,480	23,845
Indonesia	63	74	144	101	85	117	81	68	253
Malaysia	12,395	15,300	13,903	22,798	19,401	16,229	15,065	18,531	23,318
Mexico	12,994	10,100	1,719	3,004	3,661	4,163	5,952	12,674	23,630
Nigeria	3,118	3,010	1,458	2,970	3,191	2,743	1,112	974	960
Pakistan	643	864	877	1,126	1,226	1,370	1,710	1,960	2,460
Morocco	441	377	292	253	236	255	279	357	446
Philippines	3,478	1,738	1,981	1,389	834	669	2,008	2,948	4,280
Sri Lanka	—	—	—	—	—	365	421	608	471
Thailand	1,206	1,003	1,260	1,488	1,720	1,856	2,878	5,485	8,811
Turkey	477	511	952	968	956	—	935	3,221	1,135
Group III:									
Jamaica	54	127	177	113	142	266	536	631	796

Table 6.7 (continued)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Korea	3,829	4,224	4,408	4,387	6,223	7,381	13,924	32,905	94,238
Portugal	191	156	92	84	73	192	748	8,857	7,172
Group VI:									
Greece	3,016	2,266	1,923	964	766	765	1,129	4,464	4,285
Kuwait	—	—	—	—	—	—	10,108	14,196	11,836
Trinidad and Tobago	—	1,175	1,357	1,011	843	463	374	388	268
Unranked:									
Taiwan, China	6,082	5,312	5,086	7,599	9,889	10,432	15,367	48,634	120,017
Subtotal	85,592	87,657	71,054	84,297	94,993	115,255	144,015	205,097	377,426
Total	2,728,069	2,574,925	2,727,875	3,370,993	3,422,976	4,598,248	6,511,463	7,896,714	9,776,258

Source: Adapted from International Financial Corporation 1988.

Note: Profile groups are defined in chapter 3. See table 3.1.1.

1. Estimated.

— Not available.

a question with both theoretical and empirical properties. At issue are the interactions between firm and state as their respective capabilities expand.

Refining the theory of lateral pressure to explain the activities of multinational enterprises, it appears plausible that propensity to invest outward or to host the investment of others inside national jurisdictions generates a range of hypotheses about the propensity of private actors to extend their commercial activities worldwide. These bear upon the generic elements of lateral pressure inherent in the behavior of firms within their organizational fields. These elements have led to the altered global business context, creating new corporate strategies and structures, and to new modes of interaction between government and business.

Among the most compelling propositions drawn from the logic indicated above regarding trade, market, importation, and foreign operations are those pertaining to the "master variables," economic conditions, and institutional capability. Here we extract from the literature four types of propositions. These are as follows: (1) The higher the level of technology in a country, the larger will be the skilled population and the greater will be the propensities for outward corporate activities; (2) the greater the extent of market failures at home, the greater will be the propensities for expansion abroad; (3) the more advanced the level of technology in a society, the greater will be the trend toward the establishment of specialized capabilities; (4) the more specialized functions and capabilities that are developed in a country, the more likely it is that corporate activities will expand beyond the country's borders; and (5) the more developed the institutional capabilities in a country are (such as the prevailing contractual systems), the greater will be the ease with which propensities for expansion abroad are realized.

In table 6.8 is shown the distribution of direct investment flows—both outward and inward—in two paths of time, 1975–80 and 1981–85. Instructive in these figures is the complexity of directionality: Flows go "both ways," but "outward" flows are greater for developed countries and "inward" flows are greater for developing countries. These patterns are entirely consistent with what would be predicted by the lateral pressure theory of corporate activities.

These patterns are further confirmed in tables 6.9 and 6.10, which show the distribution of the world stock of direct investment abroad—outward and inward—at five points in time from 1960 to 1984. Again, both the industrial countries and their profile designations are indicated.

Implicit in these propositions are the dynamics of growth and development (of size and capability, of adjustments and of transformations). The more developed these processes are, the greater are the propensities for corporate expansion abroad. Central to these processes is the fact that patterns of industrial activities and the locations of activities represent, and are congruent with, the prevailing profile groupings. As a generic process, growth entails economic expansion; both growth and expansion have the inevitable and invariable concomitant effect of generating effluence. By contrast, development—defined in terms of profile transformation—allows for the potential decoupling of the historical trends in effluence-growth linkages and draws attention to both the need for and prospects of effluence-minimizing technological changes and institutional adjustments. Such prospects would then serve to break the close, and to date seemingly inevitable, link between growth and environmental degradation.

From a corporate perspective these connections point to the importance of incorporating (and internalizing) environmental strategy and pollution abatement policies and expenditures within the frame of the firm's own strategic mandate. As more firms—from a wider range of countries—extend their behavior laterally, the need for internalization of environmental factors increases. (This issue is discussed below.) In the longer run this reorientation of corporate concerns, such as internalizing environmental factors, may be more important by far than efforts to control or directly regulate sources of either process or product pollution.

The Environment in Three Global Industries

This section looks at the environment as a factor in the petroleum, chemical, and construction industries worldwide. These industries have been chosen for analysis here based on four criteria: First, they are central, even essential, to industrial processes everywhere—to the maintenance of industrial capacity and to the growth of new capacity—at all levels of economic development worldwide; second, activities within

Table 6.8 Distribution of international direct investment flows by major source and host countries (percentage share)

	Outward capital flows		Inward capital flows	
	1975–80	1981–85	1975–80	1981–85
All countries*	100.0	100.0	100.0	100.0
Developed countries	*98.8*	*96.6*	*75.5*	*75.2*
Group I:				
South Africa	0.5	0.4	−0.3	0.4
Group IV:				
Canada[1]	5.2	8.8	2.8	−0.5
Australia and New Zealand	0.9	3.0	5.1	4.3
Group V:				
United States[2]	44.2 a)	19.3 a)	25.8	39.5
Group VI:				
Japan[1]	5.7	11.4	0.5	0.7
Europe:	*42.3*	*53.7*	*41.6*	*30.8*
Group V:				
Sweden	1.5	2.3	0.3	0.3
Group VI:				
France[1]	4.9	6.2	7.0	4.5
Germany	8.3	7.7	3.5	2.1
Italy[1]	1.1	3.8	1.9	2.2
Netherlands[1]	7.3	8.6	3.8	2.7
Switzerland	—	2.5	—	1.1
United Kingdom	16.8	19.5	13.1	8.6
Unranked:				
Belgium-Luxembourg[1]	1.4	0.4	4.0	26.8
Other European Countries[1]	0.6	1.2	3.8	2.8
Developing countries[1]	*1.2*	*3.4*	*24.5*	*24.8*

Source: Adapted from U.S. Department of Commerce, International Trade Administration 1988.

*Profile groups are defined in chapter 3. See table 3.1.

1. Outward and inward capital flows for the countries shown, and for a number of other European and developing countries not shown separately, do not include reinvested earnings. Belgium and Luxembourg, Malaysia and Singapore do not identify reinvested earnings on direct investment separately from total investment income. The Netherlands does not collect reinvested earnings data for the banking industry. If reinvested earnings data were available for these countries, their shares would be higher.

2. Net capital inflows from U.S. direct investment in Netherlands Antilles finance affiliates for the years 1977–85 are excluded.

Table 6.9 World stock of direct outward investment abroad by region or major country of origin (billions of U.S. dollars or percentage)

	Amount					Percentage distribution					Average annual rates of growth			
	1960	1967	1973	1980	1984	1960	1967	1973	1980	1984	1960–67	1967–73	1973–80	1980–84
All countries	67.7	112.3	211.1	516.7	698.7	100.0	100.0	100.0	100.0	100.0	7.5	11.1	13.6	3.7
Developed countries	*67.0*	*109.3*	*205.0*	*503.4*	*580.4*	*99.0*	*97.3*	*97.1*	*97.4*	*97.0*	*7.2*	*11.1*	*13.7*	*3.6*
Group I:														
South Africa	1.3	2.0	2.1	5.9	3.6	1.9	1.8	1.0	1.1	0.6	6.3	0.8	15.3	−11.6
Group IV:														
Canada f)	2.5	3.7	7.8	22.6	31.6	3.7	3.3	3.7	4.4	5.3	5.8	13.2	16.4	8.7
Australia and New Zealand	0.2	0.4	1.1	2.6	5.7	0.3	0.4	0.5	0.5	0.9	10.4	18.4	13.1	21.7
Group V:														
United States[1]	31.9	56.6	101.3	220.2	236.6	47.1	50.4	48.0	42.6	39.5	8.5	10.2	11.7	1.8
Group VI:														
Japan[2,7]	0.5	1.5	10.3	19.6	37.9	0.7	1.3	4.9	3.8	6.3	17.0	37.9	9.6	17.9
Europe:	*30.6*	*45.1*	*82.4*	*232.5*	*265.0*	*45.2*	*40.2*	*39.0*	*45.0*	*44.3*	*5.7*	*10.6*	*16.0*	*3.3*
Group V:														
Sweden	0.4	1.7	3.0	7.2	11.0	0.6	1.5	1.4	1.4	1.8	23.0	9.9	13.3	11.2
Group VI:														
France[2]	4.1	6.0	8.8	20.8	31.9	6.1	5.3	4.2	4.0	5.3	5.6	6.6	13.1	11.3
Germany[3]	0.8	3.0	11.9	43.1	46.2	1.2	2.7	5.6	8.3	7.7	20.8	25.4	20.2	1.8
Italy	1.1	2.1	3.2	7.0	11.9	1.6	1.9	1.5	1.4	2.0	9.7	7.3	11.8	14.2
Netherlands[2]	7.0	11.0	15.8	42.4	40.6	10.3	9.8	7.5	8.2	6.8	6.7	6.2	15.1	−1.1
Switzerland[4]	2.3	2.5	7.1	22.4	25.5	3.4	2.2	3.4	4.3	4.2	1.2	19.0	17.8	3.3
United Kingdom[5]	12.4	15.8	27.5	80.7	85.4	18.3	14.1	13.0	15.6	14.3	3.5	9.7	16.6	1.4
Unranked:														
Belgium, Luxembourg[2]	1.3	1.3	1.8	4.8	5.5	1.9	1.2	0.9	0.9	0.9	0.0	5.6	15.0	3.5

Table 6.9 (continued)

	Amount					Percentage distribution					Average annual rates of growth			
	1960	1967	1973	1980	1984	1960	1967	1973	1980	1984	1960–67	1967–73	1973–80	1980–84
Other European countries[2]	1.2	1.7	3.3	4.1	7.0	1.8	1.5	1.6	0.8	1.2	5.1	11.7	3.1	14.3
Developing countries[2,8]	*0.7*	*3.0*	*6.1*	*13.3*	*18.2*	*1.0*	*2.7*	*2.9*	*2.6*	*3.0*	*23.1*	*12.6*	*11.8*	*9.8*

Source: Adapted from U.S. Department of Commerce, International Trade Administration 1988.

Note: Profile groups are defined in chapter 3. See table 3.1. Detail may not add to totals because of rounding. Year-end exchange rates were used to convert stocks or stock estimates valued in local currencies or SDRs into U.S. dollars.

1. Data for 1980 and 1984 exclude the negative U.S. direct investment position in the Netherlands Antilles finance industry.

2. Among developed countries, Belgium, France, Luxembourg, several other European countries not shown separately, and Japan do not collect reinvested earnings data. The Netherlands does not collect reinvested earnings data for the banking industry. Also, a number of developing countries do not collect reinvested earnings data. If reinvested earnings were included, the stocks for those countries would be higher.

3. Beginning with 1976 and for subsequent years, data used are "statistics on levels" for both primary and secondary investment as compiled and published by the Deutsche Bundesbank. Data for years prior to 1976 are commonly referred to as "special statistics" published by the Ministry of Economics.

4. Data back to 1960 have been revised by the Union Bank of Switzerland to more accurately reflect its estimates (based on sample data) of Swiss direct investment abroad.

5. Data include banking beginning with 1976. Prior to 1979, investment in insurance companies is for the United States only. Beginning with 1979, data include investment by oil companies, insurance companies, and investment in real estate, all of which were previously excluded.

6. Direct investment abroad by Canadian banks is not included.

7. Beginning with 1976 and for subsequent years, data used are direct investment external assets (which exclude reinvested earnings) as compiled and published by the Bank of Japan. Data for years prior to 1976 are "approvals basis data" from the Ministry of Finance.

8. Stock estimate for developing countries includes adjustment for Kuwait. Outward direct investment flows from Kuwait have been adjusted to 2,253 million SDRs in 1981, 506 million SDRs in 1982, and 659 million SDRs in 1984. The data for Kuwait were adjusted based on U.S. data showing direct investment capital inflows to the United States from Kuwait.

Table 6.10 World stock of direct inward investment abroad by region or major country of origin (billions of U.S. dollars or percentage)

	Amount				Percentage distribution				Average annual rates of growth		
	1967	1973	1980	1984	1967	1973	1980	1984	1967–73	1973–80	1980–84
All countries*	105.4	207.6	490.6	602.6	100.0	100.0	100.0	100.0	11.9	13.1	5.3
Developed countries	*73.2*	*153.7*	*379.9*	*448.7*	*69.4*	*74.0*	*77.4*	*74.4*	*13.2*	*13.8*	*4.2*
Group I:											
South Africa	7.2	8.1	16.4	16.0	6.8	3.9	3.3	2.7	2.0	10.6	−0.1
Group IV:											
Canada	19.2	33.0	51.6	61.9	18.2	15.9	10.5	10.3	9.4	6.6	4.7
Australia, New Zealand	4.9	10.5	15.5	19.0	4.6	5.1	3.2	3.2	13.5	5.7	5.2
Group V:											
United States	9.9	20.6	83.0	164.6	9.4	9.9	16.9	27.3	13.0	22.0	18.7
Group VI:											
Japan[1,2]	0.6	1.6	3.3	4.5	0.6	0.8	0.7	0.7	17.8	10.9	8.1
Europe:	*31.4*	*79.9*	*210.1*	*182.7*	*29.8*	*38.5*	*42.8*	*30.3*	*16.8*	*14.8*	*−3.4*
Group V:											
Sweden	0.5	1.0	1.7	1.2	0.5	0.5	0.3	0.2	12.2	7.9	−8.3
Group VI:											
France[1]	3.0	6.5	21.1	16.0	2.8	3.1	4.3	2.7	13.8	18.3	−6.7
Germany[3]	3.6	13.1	47.9	35.8	3.4	6.3	9.8	5.9	24.0	20.3	−7.0
Italy	2.6	7.8	8.9	9.3	2.5	3.8	1.8	1.5	20.0	1.9	1.1
Netherlands[1]	4.9	7.6	19.2	16.4	4.6	3.7	3.9	2.7	7.6	14.2	−3.9
Switzerland[4]	2.1	4.3	14.3	13.1	2.0	2.1	2.9	2.2	12.7	18.7	−2.2
United Kingdom[5]	7.9	24.1	60.2	47.1	7.5	11.6	12.3	7.8	20.4	14.0	−6.0
Unranked:											
Belgium, Luxembourg[1]	1.4	3.8	8.2	7.3	1.3	1.8	1.7	1.2	18.1	11.6	−2.9

Table 6.10 (continued)

	Amount				Percentage distribution				Average annual rates of growth		
	1967	1973	1980	1984	1967	1973	1980	1984	1967–73	1973–80	1980–84
Other European countries[1]	4.1	8.5	21.2	31.5	3.9	4.1	4.3	5.2	12.9	13.9	10.4
Developing countries[1,6]	*32.2*	*53.9*	*110.7*	*153.9*	*30.6*	*26.0*	*22.6*	*25.5*	*9.0*	*10.8*	*8.6*

Source: Adapted from U.S. Department of Commerce, International Trade Administration 1988.

Note: Profile groups are defined in chapter 3. See table 3.1.

Detail may not add to totals because of rounding. Year-end exchange rates were used to convert stocks or stock estimates value in local currencies or SDRs into U.S. dollars.

1. Among developed countries, Belgium, France, Luxembourg, several other European countries not shown separately, and Japan do not collect reinvested earnings data. The Netherlands does not collect reinvested earnings data for the banking industry. Also, a number of developing countries do not collect reinvested earnings data. If reinvested earnings were included, the stocks for those countries would be higher.

2. Beginning with 1976 and for subsequent years, data used are direct investment external liabilities (which exclude reinvested earnings) as compiled and published by the Bank of Japan. Data for years prior to 1976 are "approvals basis data" from the Ministry of Finance.

3. Beginning with 1976 and for subsequent years, data used are "statistics on levels" for both primary and secondary investment as compiled and published by the Deutsche Bundesbank. Data for years prior to 1976 are commonly referred to as "special statistics" published by the Ministry of Economics.

4. Data back to 1960 have been revised by the Union Bank of Switzerland to more accurately reflect its estimates (based on sample data) of Swiss direct investment abroad.

5. Data include banking beginning with 1976. Prior to 1979, investment in insurance companies is for the United States only. Beginning with 1979, data include investment by oil companies, insurance companies, and investment in real estate, all of which were previously excluded.

6. Data for inward direct investment flows to Saudi Arabia as published by the IMF for the years 1979–84 were not used in this table to estimate the stock of inward direct investment in OPEC countries in 1980 or 1984. Instead, these flows were estimated based on outward direct investment flows to Saudi Arabia from major source countries, as compiled from major source country data. Inward direct investment flows to Saudi Arabia were estimated at (in millions of SDRs) 1,662 in 1979; −2,480 in 1980; −317 in 1981; −1 in 1982; 891 in 1983; and 349 in 1984.

each industry entail both process pollution and product pollution at each phase in the respective production process; third, to a large extent these three industries are interdependent, with their respective products and processes contingent on the products and processes of the others; and fourth, all three industries represent ubiquitous processes in the modern era.

Almost overnight, global companies have confronted concerns well beyond the pale of conventional strategic planning—concerns that were certainly not the subject of traditional education in business schools or schools of management. The challenge for the MNCs is not whether to respond to the new business context, but how; it is not whether such action will reshape competition, but how fast and how effectively it will do so. This is true across the board, in all sectors and in all facets of international and, increasingly, global business. To the extent that firms act voluntarily, they will maintain the advantage of being able to choose their responses and identify their options.[4] To the extent that environmental practices become regulated, legislated, and controlled, the companies will find themselves on the defensive and their activities bounded by external conditions.

Constrained by Market Signals: Oil

For a long time the oil industry was insulated from any significant constraint on operations or on policy—either by governments or by private groups. The nearly total absence of environmental codes in overseas exploration and development, let alone transport by ship or land, gave the industry free rein. All that has begun to change. The public at large is now concerned about such mishaps as spills, which are inherent to the transport of oil given prevailing practices. In the United States alone, on the average a spill occurs each day. Reliable worldwide totals of oil and related hazardous spills are difficult to find (Mills and Graves 1986), but the evidence suggests a relative decrease of the total number of spills throughout the decade of the 1980s.

Global oil enterprises will find themselves increasingly engaged in public relations wars with potentially high legislative and regulatory stakes. The hazards to the corporate bottom lines are obvious: Higher environmental standards could well bite into profits. But what are the opportunities associated with this new reality? Exxon, Texaco, and

Chevron, among others, have charged remarkably high environmental costs against profits—a new fact of corporate life. Phillips Petroleum's token donation of $625,000 over five years to preserve wetlands in the Southwest may be illustrative of things to come, with environmental strategies including preventing damage as well as repairing it. And Conoco, a subsidiary of DuPont, recently ordered two double-hull tankers designed to reduce the extent of oil spills. These incidents all represent departures from traditional practice for this industry.

There are business opportunities well beyond those for public relations firms and clean-up technology. Such opportunities involve creating and shaping markets at the technological frontier in each phase of the oil industry—from exploration to transportation and utilization. Both on-the-shelf and beyond-the-horizon technologies are beginning to play a role—and, most particularly, technologies designed to reduce effluents, wastes, and byproducts in the extraction, production, and consumption processes. Will such moves reshape the competitive arena? In retrospect, the petroleum industry has traditionally responded well to market signals—for example, by exploring new kinds of contracts when the negotiation power of host countries has grown. In the same manner, the development of voluntary environmental codes and guidelines by the industry could preempt the most demanding legislative constraints.

The Dual Role of Technology: Chemicals

Like the oil industry, the chemical industry faces ubiquitous environmental problems, but global chemical companies are positioned more precariously than oil companies with respect to the environment. They are already subject to international regulations sanctioned by formal intergovernmental agreement. Accidents have mobilized the chemical industry. The 1984 Union Carbide blast at the Bhopal pesticide plant dramatized the potential environmental consequences of the industry. Bhopal drew attention to the wide span of hazardous chemical operations and highlighted Union Carbide's weak environmental protection policies. In a business climate already strained because of a massive 1976 chemical explosion at a factory in Seveso, Italy, that was owned by the Swiss firm Hoffmann-La Roche, Bhopal augured poorly for the whole industry. The Seveso blast, grossly mismanaged by Italian authorities, was not reported until twenty-seven hours after it happened, and then

as a "herbicide cloud." Waste disposal was contracted to a French firm. Transmission mechanisms were poorly understood or vastly understated. The toxic materials surfaced in France seven years later.

Chemical companies are essential to technological solutions of environmental problems. They are by far the most visible multinationals in ongoing international deliberations on the regulation and management of effluents. Two landmark events of international deliberation, the Basel Convention and the Montreal Protocol, are illustrative of emerging trends (see chapters 12, 13, and 14 of this volume). The Basel Convention should best be seen as a regulatory response to prevailing "free" market conditions. Against the background of rapidly growing trade in hazardous materials, the Basel Convention sought at a minimum to devise rules for transactions in hazardous wastes and byproducts. Over the past decade the number of countries that either import or export hazardous wastes has grown dramatically. About three million tons of toxic waste cross European boundaries annually.

The former West Germany exported its wastes to the former East Germany. Now the Federal Republic of Germany finds itself in the anomalous position of having to clean up these same sites. And while efforts to handle hazardous waste problems at first focused on reducing exports to developing countries from industrial nations, the transport of wastes among industrial states is also extensive. In the United States, about 80 percent of our wastes is shipped to Canada and Mexico. Great Britain has continually increased its imports of hazardous wastes—thus belying the rather simplistic view that it is always the rich countries that dump their wastes onto the territories of poor countries.

The chemical industry is now confronted with both international directives and national regulation to control and phase out the production of ozone-depleting chlorofluorocarbons (CFCs). While industrial societies are the principal consumers of CFCs, exports to developing countries are coming under scrutiny—with or without the participation or full consent of potential "buyers." It appears that the international community is no longer willing to permit the unrestricted production or diffusion of, and transactions in, materials and chemicals that are fully recognized as hazardous to natural or social environments.

The 1987 Montreal Protocol to reduce CFC use is of global significance both in recognizing a class of environmental problems and in establishing the need for worldwide efforts to resolve them. The gradual shift from adversarial to cooperative negotiation is one of the most significant aspects of the entire process. The large chemical companies played a major role in that process. Of these DuPont was clearly in the forefront (Benedick 1991). In 1990 the protocol was revised and more countries signed it, suggesting an expanded role for intergovernmental agreements of this sort.

Private nongovernmental organizations (NGOs) are more central to the ongoing process of CFC/ozone-related negotiations than they were to the deliberations leading to the Basel Convention. The participants in the informal, but critical, discussions leading to the Montreal Protocol included fifty-five states and many transnational public interest groups and scientific organizations, as well as formal regional and international institutions and chemical companies, notably DuPont. Although the formal signatories were national governments, the direct and indirect participants in the emerging bargaining, negotiation, leveraging, and counterleveraging varied in size, interest, representation, national jurisdiction, and institutional affiliation. In this respect the protocol is unprecedented in the scale, scope, and variety of the actors engaged in the bargaining process. Chemical companies could neither ignore nor control such strong alignments of interests. These alignments consisted of too many parties that in the aggregate were becoming too influential.

As the CFC/ozone issue shows, technological innovation is two-edged: It can generate both hazardous and less hazardous alternatives. For example, a joint venture between DuPont and Merck, announced in July 1990, presages business as well as environmental opportunities in the chemical industry. Merck, the world's largest pharmaceutical company, has a reputation for environmental responsiveness. DuPont and Merck could jointly develop a strategy to influence regulatory standards for the chemical industry worldwide. If they do not, others will do it for them. Whatever the outcome of efforts like that of DuPont and Merck, the prospects are improved that growing concern for codes, protocols, and environmental responsiveness could make the search for and relocation of wastes to places with lax environmental laws difficult, if not impossible. Depending on the industry, the issues, and the companies involved, the result may well be the creation of something of a "level playing field." This would mean that global companies would all be subject to

generic constraints. Under these conditions only a foolhardy CEO would limit attention to the environmental dimensions of corporate activity (Choucri 1990). Underlying these concerns is a fundamental problem. Conventional accounting methods ignore the environmental costs of resource depletion and degradation. As indicated in chapters 9, 10, and 11, good intentions are not sufficient unless corporations and consumers alike have access to more rigorous cost-benefit and inter-generational time discounting analyses applicable to natural as well as social environments. Additionally, data from such record-keeping should facilitate the search for more energy-efficient production processes, technologies, and resource uses.

Managing Built Environments: Construction

The construction industry's dilemma is in many ways even more stark than that of either the oil or the chemical industry. The problem is this: By definition, building physical structures means dislocating natural systems. All facets of the construction industry clash with nature, from the harvesting of building materials to site preparation, transportation, actual construction, and the disposal of residual materials. Dislocations cannot be avoided; at best they can be managed and minimized.

In industrial societies construction has already changed the environment in major ways. Here the challenge is to repair, upgrade, and expand structures without significantly altering the environment further. But for developing countries the problem is just beginning, and it is in these markets that the industry envisages its most extensive expansion. International environmental groups are already braced for encounters with global construction. In the confrontation between those who desire to build and those who oppose it, the governments of developing nations will be in a precarious position: They must develop their infrastructures but cannot be viewed as declaring war on nature.

These governments are already beginning to seek a way out by exploring the bargaining possibilities inherent in environmental protection. For example, a wide range of debt-for-nature swaps are reducing the burden of past financial commitments and may free resources to meet more immediate social needs. Similarly, nature-for-technology swaps may be negotiated to facilitate access to less polluting technologies. This

is especially important in the area of energy, where the potential for conservation and the development of more efficient technology is extensive. In developing countries such efforts may target the reduction of both carbon emissions and the rate of deforestation.

Still, the construction industry has yet to think seriously about the environment, remarkable as that may be in an industry whose purpose is to transform natural systems into built ones. But the environment is clearly becoming a salient factor in strategic planning for the construction industry. Like the oil industry, construction faces important opportunities for staying ahead of environmental constraints and for shaping the way in which national and international bodies address these issues. It may well be that pollution prevention would pay for itself by reducing the need for waste disposal. At a minimum it could reduce liabilities.

In sum, the crucial equation connecting business and the environment in these three industries is this: Consumer protection legislation plus emerging environmental protection ethos plus precedents for payments to pollution victims equals increased liability costs (Choucri 1991, 40).

The Environment Factor in Corporate Strategy

If a firm is to compete effectively in an increasingly competitive global market, it cannot misread the signals of the growing environmental ethos and conduct business as usual. But while governments, public interest groups, and international organizations are searching for institutional innovation and adaptation in this area, global corporations, with few exceptions, have generally failed to develop a strategy for dealing with the environment. We conclude this chapter by discussing matters of theory and practice.

New Directions in Theory

Internalizing the Globalization Process. Against a background of development in the theory of corporate behavior and the practice of corporate expansion, adjustments to environment in three industries—oil, chemicals, and construction—reveal new trends in global business. These trends have important implications for environmental policy and envi-

ronmental management. Informed in part by recent surveys of market changes (Lessard and Antonelli 1990, 15–17), trends in these three industries have contributed to new corporate responses designed to manage the hazards of enhanced environmental concerns.

First is the globalization of competition in terms of integration of markets and increased specialization of production. Driven by a global trend toward reduced barriers to trade, competition shifts to production and to all associated activities. In this context, responding to imperatives of environment (of a highly uncertain nature) constitutes both a challenge and a constraint. The quest for appropriability, internalization, and diversification extends to environmental products and pollution management technologies. Since such markets are still at early stages of development, the globalization of competition will accelerate that process of market formation.

Second is a corollary of global competition—namely, greater parity in technological capability and in environmental protection processes and procedures. A certain standardization of responses may eventually evolve as the international community seeks to develop shared understandings and shared strategies toward environmental management. Prospects for corporate flight from environmental legislation—in terms of relocating investment and production capabilities into regions, countries, or markets with weaker environmental controls—may be dampened to the extent that a degree of global environmental consensus emerges.

Third is a new, but countervailing, role for national governments. On the one hand is a trend toward decreased government investments in markets (privatization); on the other hand is a trend toward an enhanced government role in regulation (environmental legislation). The corporate community is thus confronted by both reduced constraints of one sort and increased constraints of another.

New Strategic Outlook. With the public demanding accountability and more government intervention in the offing, how will each industry manage potential embarrassments? How can firms minimize, manage, or channel government intervention? And most pressing of all, how will they take advantage of the changing business environment? First, global firms are beginning to appreciate the pressures they are under to be environmentally responsible over the long run. This environmental sensitivity may no longer be viewed solely as a posture of convenience or as a way to maximize short-run profits. This flexibility may facilitate the renegotiation of agreements and encourage international deliberation on other related environmental issues. Further, the increased acceptance of the "polluter pays principle" (PPP) in international forums puts added pressures on the multinationals. MNCs will be able to respond only if they have responsible environmental strategies that adopt a longer-term perspective, extending beyond concerns regarding the maximization of profit in the short run.

Second, the marketing challenge—once limited to identifying a product—now extends to explaining what a company will do about the environmental consequences of its activities and how it will protect the natural environment. Managing an inquisitive and possibly hostile public must be part of maintaining a positive image, but public relations without environmental action will surely backfire. Third, global corporations are beginning to appreciate the business opportunity inherent in environmental sensitivity. One case is DuPont's accelerated R&D on replacements for CFCs. This is an interim measure that will buy goodwill for DuPont for some time. In the oil industry the Norwegian firm Norsk Hydro argued that it was making a strong claim for sound environmental management. Since it also enjoyed some of the goodwill accruing to Norway for its sensitivity to the environment, such claims could translate into augmented goodwill. But at some point the company will be called upon to show evidence of performance, not simply of intent.

Fourth, firms might increasingly find it necessary to identify appropriate environmental niches. For example, World Envirotech, a U.S. subsidiary of the Kubotu Corporation of Japan, has found a niche in offering to dispose of refuse left after treating sewage. Adopting an aggressive approach to marketing waste treatment technology in the United States, World Envirotech creates opportunities and reaps goodwill. Finally, firms are shaping and will shape the creation of new markets for environmentally sensitive products and processes. How rapidly a firm understands and addresses the changing norms and values regarding the environment will in part define its competitive edge. Companies must decide whether they will impede or preempt, prevent or participate in international efforts to develop effective global environmental strategies.

New Directions in Practice

The symmetry between theory and practice is seldom perfect. Three new directions in strategy appear to be salient in corporate practices. All three are institutional in character and are therefore likely to have more long-term significance. These are (1) establishing a corporate consortium for environmental management, (2) developing financial systems for environmental investments, and (3) strengthening the "technology triangle."

Establishing a Corporate Consortium for Environmental Management. Retaining a competitive edge in an era of increasing environmental awareness will be a formidable challenge. The "soft technologies" of management need to be improved, updated, and tuned. Industry will continue to be on the defensive unless it buttresses environmental management and corporate organizational charts reflect environmental priorities. Risk assessments and contingent responses to hazards must be routine. With large multinationals uniquely positioned to frame public policy, a good offense may be the best defense. Shaping public policy is good business—providing it is done with a modicum of ethics. Unless the multinationals develop a strategy for influencing policy, they will be reduced to responding directly to outraged citizens. The legal implications are obvious, and the precedents of cross-jurisdictional litigation are numerous. Developing networks for access to specialized services in environmental products and processes may reduce both the risk and the pain for all firms. New alliances may also force governments to make regulation rational.

Under these circumstances the case for establishing a "corporate consortium on the environment" seems powerful. The goal of a consortium would be to help level the environmental playing field and keep competition where it should be: focused on energy-efficient, material-saving technology, improved management skills, and the creation and shaping of environmentally sensitive markets. In the case of environmental concerns, the shared predicaments outweigh by far the idiosyncratic risks. The rules of global investments are changing, and it is in the joint interest of global firms to make the new rules provide the best markets. Because markets function efficiently and serve social objectives only given stable and well-understood norms, corporations must strive to help steer global

deliberations toward clarity and consistency. Preserving the planet's natural assets could become sound business practice as surely as it is already excellent public relations (Choucri 1991b).

Developing Financial Systems for Environmental Investments. Numerous proposals have been put forward for financing environmental investments, for "clean-up" as well as for new facilities. The establishment of the Global Environmental Facility, an international overture involving the United Nations Environment Program, the United Nations Development Program, and the World Bank (and managed by the World Bank), is an institutional step of significant proportions. While the issue of finance is clearly crucial, equally important are the institutional mechanisms necessary to ensure the effective utilization of global funds and to guarantee fiscal and operational responsibility. Here we address such institutional requisites, leaving aside the dual issues of the true costs of environmental management and the mechanisms for securing needed finance.

Following the analysis in Lessard and Perotti (1990) of the essential features for an effective financial system at the national level, we extend their analysis by arguing that analogous logics pertain to the institutional requisites for the effective management of global funds targeted to environmental purposes. They identify five requisites. These are risk intermediation, risk diversification, risk mitigation, incentive creation, and contract enforcement. To these must be added, in our view, two other requisites that are fundamental to global financial transactions: norm development and compliance and monitoring. These factors are defined as requisites because they must be construed as processes that require behavioral and institutional adjustments (the nature of which is beyond the scope of this chapter). Even if treated as a checklist, they can help define the conditions necessary for the effective management of financial resources targeted for environmental protection.

Strengthening the Technology Triangle. If the international community's experience with large-scale science and technology enterprises has taught us anything, it is that value added can be accrued by facilitating linkages among the core institutions bearing on the generation of new knowledge for both scientific and commercial purposes. In industrial

societies these linkages are embedded in what has become known as the "technology triangle" (Choucri 1989). In developing countries both the need and the underlying requisites for establishing and marketing a "technology triangle" have been widely recognized (Ramesh and Weiss 1971, 139, 169).

The *technology triangle* refers to robust linkages between three sets of crucial actors influencing innovation and technological change: (1) government, which influences policy and public expenditures; (2) business and industry, which influence government policies and are the commercial innovators and translators of ideas into the marketplace both nationally and internationally; and (3) research institutions and universities, which are the generators of new ideas and embody both the quality and the quantity of a society's human capital (Choucri 1984; 1991).

The essence of the technology triangle is that each party assumes particular responsibilities whose effective discharge is contingent on the effectiveness of the others (Choucri 1991b). In many countries government serves as the source of large-scale financial resources for new research ventures and for sustaining existing ventures when necessary. Business is the ultimate user of ideas generated by professionals in the knowledge industry (the universities and the scientific institutions). These professionals are dependent on both—one for resources, science and technology, and research targeted to national needs; the other for access to the demand side, those that will utilize the output of the universities in terms of human capability as well as organizational and mechanical processes.

In areas in which uncertainties are legion and the risks are extensive—as in all environmental management spheres—the triangle may play an especially important role. In the United States this triangle is relatively well established. It is considered an important and legitimate mechanism of technological change and, to a large extent, desirable by all three parties. In Europe the linkages are generally weaker. In Japan the linkages are strong largely between government and industry. In developing countries neither the technology triangle nor its individual components may even be recognized as significant factors for enhancing national capability.

The logic for stressing the technology triangle as an institutional mechanism for accelerating "appropriate" technological change both nationally and internationally is embedded in the overall deployment of a country's intellectual and business assets. The closer the linkages, the greater the information transmitted and the greater the efficiency in knowledge generation, and in its application, management, and diffusion on a worldwide basis.

Notes

1. The National Reports prepared for UNCED 92 constitute important steps in the direction of unifying environmental description, assessment, and accounting.
2. To Kindleberger (1969) is due the credit for the first survey of theoretical MNCs, which focuses on the MNCs as collectivities in roles as economic actors. This focus on MNCs as economic actors is further due to Hymer's seminal theories that locate MNCs within the realm of industrial organizations rather than that of foreign direct investment. The Kindleberger-Hymer theses provide the basis of an economic theory of cross-border firm activities.
3. *Appropriability* refers to accruing return on investments associated with advancing technology. *Internalization* refers to the ability of the firm to retain the advantage of knowledge and skills. *Diversification* refers to the internalization of financial activities and transactions within the firm, driven by a recognition of imperfections in financial markets.
4. Groups such as the Business Council for Sustainable Development (BCSD) and the International Chamber of Commerce (ICC) have directed their efforts toward formulating "principles" for corporate environmental responsibility.