

Markets, Institutions, Intellectual Property Rights, and Development in a Knowledge-Based World Economy

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The phrase “intellectual property” apparently entered our lexicon in the 1950s, but many policy-makers, business people, and citizens are only in recent years learning about the policy institutions and market economics of intellectual property. The institutions of patent, trade secret, and copyright (as well as trademark) have been established by governments for some 500 years as special market interventions to encourage technological innovation and informational and cultural expression for the purpose of spurring activity that markets, left to themselves, tend to under-produce. Intellectual property institutions have been important sources of economic growth and cultural vitality whether the world economy has been based upon the hand-work of craft or upon the machine-work of manufacture. Now that the world economy is based upon the knowledge-work that informs craft, manufacture, and service, the policies of intellectual property are all the more central to economic policy regarding technological innovation, economic growth, and cultural vitality. A knowledge-based world economy

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depends upon the incentives provided by effective enforcement of intellectual property rights: copyright protection encourages producers of films, music, books, information databases, and computer software to risk expensive creation because they can expect that, though failure in the marketplace is common, success will not be misappropriated through piracy. Patent protection encourages producers of pharmaceuticals, fine chemicals, and the products of information technology to invest in technological innovation because they will be offered a limited period of market exclusivity as reward for their risk-taking. For these reasons, intellectual property has risen near the top of policy agendas around the world in recent years.

Policy-makers in developing countries will, over the coming few years, implement the Agreement on Trade-Related Aspects of Intellectual Property Rights, the "TRIPS Agreement," thereby providing in law, if not in fact, protection for intellectual property rights akin to that established in North America, Europe, and Japan as they were themselves developing into industrialized countries. Policy-makers, business people, and citizens in developing countries agree that the TRIPS Agreement is a condition of World Trade Organization membership but are not certain that enforcing these standards of intellectual property protection will further the cause of their economic, political, and cultural development. Observers frequently lament: "We don't know whether the enactment and enforcement of world-standard intellectual property policies will promote development in poor countries." Perhaps we do not know, for life must be lived forward, but much evidence from experience and scholarship exists to inform policy-makers regarding the complementary roles of markets and institutions and of the special role of the intellectual property institutions in the promotion of economic growth.

Even in our age of the Internet, knowledge is not "out there" someplace. Knowledge is embedded in institutions: know-how institutions are conventionally and rightly thought to be universities, but know-how institutions also are business enterprises. Business enterprises are deeply imbued with knowledge, which possess the organizational capabilities to turn information and know-how into commercially viable products and services. Multinational business enterprises dominate innovation and technology stock in the world economy and, thus, technological innovation and adaptation depend upon cooperation with these enterprises. Business enterprises in developing countries accumulate know-how and build their own organizational capabilities through business strategies that combine cooperation with competition with multinational firms.

This paper reviews scholarship from economics, political science, history, business management, and law for the purpose of summarizing

and synthesizing the current state of knowledge regarding intellectual property rights and development. The review proceeds by first examining the relationships among markets, institutions, and economic growth. The special role of the patent institution is studied in relation to technological innovation. The role of the copyright institution is studied in relation to informational and cultural expression. The contemporary international law and organization of intellectual property is discussed. The political economy of development is explained with emphasis upon the shift in economic development strategy that has been simultaneous with, though not caused by, the multilateral TRIPS negotiations. Research regarding intellectual property rights and the global diffusion of knowledge is reviewed. Finally, political, governmental, and judicial institutionalization is examined for its relationship not only with intellectual property rights but also for its general relationship with development.

Markets, institutions, and economic growth

Technological innovations drive long-run economic growth (Grossman and Helpman 1991). It takes new ideas, methods, and inventions to increase productivity, improve industrial processes, and introduce better products in the marketplace. However, “innovation” is only occasionally radical: most innovation is incremental and most research and development aims, most of the time, to achieve nothing more than “innovation through adaptation” (Evenson 1984). Whether incremental or radical, innovative ideas, methods, and products depend upon knowledge and human capital, upon information-rich workers with know-how and learning capacity (Rosenberg, Landau, and Mowery 1992). Innovation depends upon the capacity for the expression of information and, in this way, technologists, software writers, and database compilers are linked in important ways.

Institutions—social organizations and norms, governments and laws—are crucial in making markets function well or poorly (North 1990; Eggertsson 1990). To function properly, markets demand credible, enforceable commitments and, though game theory shows that cooperation can emerge through iterated interaction (Axelrod 1984), property rights and the contract have been institutional constructions to reduce the transaction costs of commercial activity (North 1990). The institutions of government and law influence patterns of scientific advance and technological innovation patterns across history (Cardwell 1995; Huff 1993). When effective, they establish (1) growing demand markets, (2) vigorous producer competition, and (3) risk-taking capital—necessary market conditions for innovation (Rosenberg, Landau, and Mowery 1992; Mowery and Rosenberg 1989). Innovative, globally

competitive industry sectors tend to cluster in certain countries and not in others because of characteristics of markets and institutions (Porter 1990) and thus it appears that technological innovation depends upon characteristics of a country's mix of markets and of institutions.

Growing demand in the United States provided incentive to the rising industrialists whose manufacturing management innovations (Chandler 1977) drove economic growth for nearly a century after the end of the Civil War (Nelson 1990). When nineteenth-century Belgian iron producers realized their market was too small for scale economies, their government sought a customs union with France, which was re-buffed. As a result, Belgium instead forged a 50 percent tariff-cut agreement with the German government (Landes 1969: 155). Twentieth century manufacturers such as August Thyssen in Germany and Kiichiro Toyoda in Japan aggressively marketed their products to foreign customers in order to increase sales, profits, and scale economies (McCraw 1997). But, is it "demand-pull" or "discovery-push"? It took both in the chemical industry: discovery in anticipation of demand; actual demand pulled mightily, generating rapid incremental innovation (Walsh 1984).

Does more competition lead to more innovation? Does a monopolist innovate as much as an oligopolist? Can there ever be too much competition? The answers, are (1) yes, to a point; (2) no; (3) yes, but it will not last long. Research regarding product innovation in specific industry sectors shows that market structure greatly influences innovative patterns. While monopolists and hegemonic firms tend not to be great innovators, they do tend to respond aggressively when challenged by a competitor and decisively bring to bear all their organizational capabilities to maintain their dominance. For example, after achieving market dominance in razor blades and photographic supplies respectively, neither Gillette nor Kodak introduced innovative products but both leveraged market power furiously to win back the marketplace (Scherer 1992: 48). Oligopoly markets tend to be viciously competitive and can be aggressively innovative, though capabilities beyond innovative capacity tend to determine winners and losers. In colour televisions and videocassette recorders, the American innovators (RCA in TVs and Ampex in VCRs) were unable to match the consumer marketing skills and the manufacturing process innovations deployed by Japanese competitors Matsushita and Sony and exited the market (Scherer 1992: 56). A market structure with lots of young, small firms tends to foment lots of innovative ideas. Yet, capital shortages, production inadequacies, and marketing deficiencies pose challenges that small, inexperienced firms often cannot meet and so they have trouble getting products to market. For example, some 50 American semiconductor

producers lost out to deeper-pocketed Japanese integrated electronics manufacturers in the 1980s (Methe 1991).

Financial capital fuels firm innovativeness (Boskin and Lau 1992). The lower cost of capital in Japan and Germany relative to the cost to their competitors, for example, contributed in the 1970s and 1980s to Japanese competitiveness (Bernheim and Shoven 1992; Calder 1993) and to German adaptive capacity (Zysman 1983) in manufacturing but capital market-corporate governance structures produce weaknesses as well as strengths as measured by firm performance (Fukao 1995). Corporatist capital market-corporate governance structures in countries such as Japan and Germany, including oligopolistic competition patterns in many industries including banking, equity-based capitalization that reinforces bank power, networks of firms with interlocking equity and managerial control, and bank-business-ministry-parliament cooperation, discouraged investment into risky information technology and biotechnology by constricting the fuel line (Feigenbaum 1995; Jasonoff 1985) while risk-taking venture markets produced booming new industries despite the busts in the United States (Beltz 1994).

Human capital and mobile labour markets have long been understood to be critical factors in innovation and economic growth. Nevertheless, it is the institutional organization of human capital that turns innovative potential into actuality. Science and technology are valued more by some religions, philosophies, and ideologies than by others and it is the social organization of these ideas that pass on to successive generations the commitment to the values of autonomy, diversity, and experiment characteristic of innovative societies (Skolnikoff 1993). Science progresses or retards depending upon social institutions: teaching and research organizations, publication outlets, societal value of scientists (Huff 1993). A world scientific centre from the eighth to the fourteenth centuries, the Arabic Middle East declined scientifically because education was loosely organized, professional networks of philosopher-scientists were discouraged by Koranic law, and Islamic thought valued interpretation of dogma over human reason and the questioning of authority. "The problem was not internal and scientific, but sociological and cultural. It hinged on the problem of institution-building" (Huff 1993: 212). A global technological leader before the advent of the Ming Dynasty in the fourteenth century, China declined technologically because education was organized for the examination system, organizational structures were strictly hierarchical, and Confucian thought valued social harmony over deliberative debate (Baum 1982).¹

By contrast, science advanced in Europe because of the establishment of universities, the group and individual autonomy conferred by rivalry between Church and State, and the re-emphasized Aristotelian

value placed upon observation and experiment. Science and technology grew together in Western Europe and North America, the product of markets, culture, and political and legal institutions (Cardwell 1995). The German chemical industry eclipsed that of the French in the nineteenth century due, in part, to research in German universities; the American chemical makers matched the German companies in the twentieth century with the intellectual contribution of the establishment of chemical engineering departments at MIT and the universities of Pennsylvania and Michigan (Landau and Rosenberg 1992).

A major study by the National Science Foundation (National Science Board 1996) recently provided considerable empirical data to support the claim that American technological advance in the 1980s and 1990s, which led to renewed productivity growth in the United States while productivity continued to languish in Japan and western Europe (Eaton and Kortum 1997), has been in part the result of its high-quality, broad-based, large higher-education system. American colleges and universities are know-how institutions that contribute skilled, knowledge-rich workers as well as scientific and technological knowledge to business enterprises.

Business enterprises are themselves know-how institutions but they are much more than depositories of discrete facts. Business enterprises are deeply imbued with knowledge, possessing the organizational capabilities to turn information and know-how into commercially viable products and services. Indeed, business enterprises exist because they organize knowledge better than do markets (Kogut and Zander 1992). Measured by technological indicators such as expenditures on research and development and patents, multinational business enterprises dominate innovation and own much of the world stock of technology (Patel and Pavitt 1991). The collective knowledge, know-how, and learning maintained by the enterprise, its so-called "core competency," is difficult for a competing enterprise to replicate (Prahalad and Hamel 1990), yet discrete information and know-how may be of great competitive value and must be protected through intellectual property management in order to preserve the enterprise's competitive advantage in the marketplace.

Know-how and learning capabilities tend to become institutionalized as sector-specific knowledge, organizing principles, and governance structures, and these patterns of sectoral competitiveness tend to establish their own path-dependent trajectories (Kitschelt 1991; Piore and Sable 1989). Technological innovation tends to be patterned along natural trajectories (Nelson and Winter 1982) because technological paradigms prescribe directions for further R&D and incremental innovation, excluding other possible paths (Dosi 1982). Within

these trajectories or path dependencies, technological innovations tend to fall into regular life cycles in which radical innovation disrupts and destroys markets until dominant designs and standards emerge so that innovation is again regular and incremental and market structure has evolved from highly competitive to oligopolistic or even monopolistic (Abernathy and Utterback 1978; Abernathy and Clark 1985; Utterback and Suarez 1993).

Technological innovations in transportation and communication in the late nineteenth century revolutionized the management and organization of business activity in the twentieth century.

Modern mass production and mass distribution depend on the speed, volume, and regularity in the movement of goods and messages made possible by the coming of the railroad, telegraph, and steamship . . . As the basic infrastructure came into being between the 1850s and 1880s, modern methods of mass production and distribution and the modern business enterprises that managed them made their appearance . . . The modern industrial enterprise—the archetype of today’s giant corporation—resulted from the integration of the processes of mass production with those of mass distribution within a single business firm. (Chandler 1977: 207, 285)

Transportation and communication technologies established new possibilities for production and distribution and business enterprises evolved to turn possibilities into market and institution realities, making a manufacturing-based, industrial, world economy in the process.

Late in the twentieth century, new technological innovations are changing the management and organization of business activity yet again. In little more than a generation, information technology has been revolutionized by the microchip (Malone 1995) and digital compression (Negroponte, 1995). The former put extraordinary information processing and storage capacity into offices and homes during the period from 1975 to 1995; the latter took incompatible means of computation and communication—telephony, broadcast television, cable, wireless—and made them speak the same digital language, unfolding a network era from 1995 (Bradley, Hausman, and Nolan 1993). Interactive communication now includes audio, video, and data, and the data may be described as “intelligent communication” because software computing affords speedy manipulation, processing, and analysis before transmittal. In the workplace, these revolutions are erasing whole job classifications while demanding new knowledge-workers and offering the means for Total Quality Management and other self-regulating,

de-centralizing organizational reforms (Grochow 1997; Leebaert 1995). In the marketplace, these revolutions are providing new opportunities for electronic commerce and digital distribution of information-based goods and services (Leebaert 1998).

In the world economy, the structure of world production is changing: in 1980, the year after the conclusion of the GATT Tokyo Round, manufacturing represented 23 percent of world production, while services had expanded to 53 percent. By the end of the GATT Uruguay Round in 1994, manufacturing represented 21 percent of world production and services expanded still more to 63 percent (World Bank 1997: 237). Knowledge and intellectual property-intensive products and services increasingly dominate the world economy.

Sector-specific research indicates that high-innovation knowledge-oriented industries tend to cluster in certain geographic spaces (Almeida and Kogut 1996)—the “Silicon Valley” phenomenon. Small, highly innovative firms especially benefit from the local knowledge networks that characterize knowledge-intensive districts (Almeida and Kogut 1997). Foreign multinational firms deliberately seek American “knowledge-intensive districts” as the geographic spaces within which to carry out their direct investment and joint venture strategies (Almeida 1996). Thus, through recruitment of labour and cooperative research, business enterprises and universities compose institutionalized networks of knowledge.

In short, market-shaping government policies regarding demand, competition, and capital spurred industrial innovation and growth in twentieth century Germany (Katzenstein 1989), the United States (Sklar 1988), and Japan (Johnson 1982; Okimoto 1989): modern capitalism evolved the product of corporate organization and government institution (McCraw 1997).

Technological innovation and the patent institution

A patent system provides incentives to innovate inventions and new processes under circumstances when the costs of developing new product and processes are high while the costs of product imitation (or outright theft) are low, a circumstance that economists call the “appropriability problem” (Dam 1994; Kitch 1977; Meinhardt 1946). Invention is expensive and costs must be recouped to provide incentives for the investment. If others can appropriate the innovation, calling it their own without having made the investment of time, energy, and resources, then a potential innovator may determine that the regular incentives of market opportunity are insufficient to tolerate a free-riding competitor. Government intervenes by extending to the inventor rights of patent. Granted through process of investigation for novelty and

utility by public administrators, with limitations of duration and of scope or breadth, governments with patent systems confer to inventors rights of exclusive appropriation of their innovation.

According to section 101 of the 1952 U.S. Patent Act, “whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent.” In order to earn the patent, inventors must apply to the patent office, where an examiner will determine whether the invention meets the statutory demands of patent law as interpreted in the courts. To receive a patent the invention must be new and the American decision rests upon the test for novelty and nonobviousness. According to American law, “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art,” then the invention is really not new after all and cannot receive a patent. The examiner searches the relevant prior art to determine what a “person having ordinary skill in the art” knows and then makes a decision regarding the claim. Decisions may be appealed when an applicant fails; competitors may challenge the validity of the patent in court if they think the patent was granted by the patent office in error.

The patent right conferred by the government is the granting of the exclusive right to make, manufacture, distribute, and license to distribute the invention. Nevertheless, the patent right is limited in duration to about 20 years in most legal jurisdictions and is further limited by definition of its scope or breadth. Scope involves the actual breadth of the claim of patent. “The scope of the claims of a patent determines the ability of competitors to produce substitutes without fear of infringement suits, and hence the real ‘monopoly power’ of the patent holder” (Merges and Nelson 1994: 1). With the policy goal of preventing patent systems from becoming anti-competitive and, hence, discouraging innovation rather than encouraging it, legislatures and courts have through the years attempted to balance the incentive of exclusivity against the incentive of competition when setting the proper scope, or breadth, of patent (Merges and Nelson 1990). Conflicts between competitors (so-called “interference suits”) are common and are usually settled “out-of-court” by way of cross-license agreements that make collaborative partners out of them (Lerner 1995; Adelman and Baldia 1996).

Since a patent confers exclusive rights in the marketplace over a product or process, albeit with limitations of time and scope, patent law demands full, public disclosure of the know-how of the innovation when the patent is granted. Policy-makers establish that the inventor

enters into a contract with the public such that the inventor receives limited exclusivity as a reward for skill and effort applied to innovate some new invention or process and, in return, the innovator teaches others “skilled in the art” how to do it by way of publication in the patent gazette of the patent claim. The stock of publicly available knowledge grows and thus diffusion of technology is institutionalized into the patent system for the encouragement of yet newer innovations (Ordover 1991).

Searches of current patents yield commercially valuable information regarding the state of technology in a given area, the level of R&D activity in a given area, the names of researchers working in a given field, and the technological competencies of, and R&D paths being taken by, competitors. Patent practitioners point out that most of the information disclosed in patent documents is not revealed anywhere else and, in frequent contrast to scientific and technical journal articles, the information in patent documents is commercially valuable. Competitors are encouraged to learn from the information provided in the patent and even to “design around” the patent if they can. The patent offices of the industrialized countries possess vast treasures of technology and much of what is contained is of real commercial value or the inventors would not have invested the time and attorney’s fees in the application and maintenance of patent rights. Patent data provide some of the best evidence of innovative activity: large data-sets covering many decades are available for the industrialized countries and increasingly substantial data-sets are available in countries such as Korea, Brazil, and China. The data may be studied for geographic, country, industry-sector, and firm patterns. Citation patterns afford the tracing of innovation networks and these patterns can be related to variables such as R&D spending, science and technology education, and trade and foreign direct investment flows (Griliches 1990).

Information technology firms such as IBM, Canon, NEC, Motorola, and Fujitsu annually earn the world’s biggest shares of patents but, according to research based upon patent renewal investments, the industries most vulnerable to the appropriability problem and most dependent on patent protection are pharmaceuticals and speciality chemicals (Pakes and Simpson 1989) and senior management surveys (Mansfield 1986). A drug maker or agricultural chemical company manufactures a chemical compound that can be duplicated with a modest knowledge of chemistry and manufacturing capability; an information technology maker manufactures a system-based product and the system imposes substantial barriers to entry and to piracy. Some policy makers and commentators who are critical of the policy utility of a patent system demonstrate no grasp of the industry sector-specific nature of the appropriability problem in

the innovation process. Economic studies similarly rejecting the policy utility of patent systems have been conducted with research designs wholly ignorant of the industry sector-specific nature of the appropriability problem (Kondo 1995; Thurow 1997).

Policy-makers, commentators, and scholars also frequently misunderstand the nature of the market “exclusivity” provided by the patent system. Some economists argue—with models but without evidence of real technology competitions—that “patents reward the winner of a race when teams are engaged in parallel research” and that the patent “monopoly” renders fruitless the parallel research (Dasgupta 1988).² These viewpoints frequently demonstrate no understanding of the notion of patent scope and breadth or of interference-suit litigation and cross-licensing agreements in the real-world. Though apparently aware that patents granted in mechanical and information technology product areas rarely provide market-dominating exclusivity, many policy-makers commonly believe that patent exclusivity grants one or another pharmaceutical maker a monopoly within the marketplace of a particular therapeutic category.

The know-how contained in a patent becomes diffused by the publication of the patent claim but the new technologies protected under patent become diffused beyond their owners through licensing contracts. Licensing of technology has been increasing by about 10 percent per year in the United States and by about 18 percent per year internationally (Kotabe 1996: 73). Licenses typically are either vertical or horizontal with respect to the marketplace. An owner licenses vertically when it provides the patented know-how to firms that may then use and market the invention. Thus, vertical licensing generally intends to carry out a product-distribution strategy. An owner licenses horizontally when it provides the patented know-how to firms that will collaborate in the development of products. Thus, horizontal licensing generally intends to carry out a product-development strategy. Technology licensing, once thought by managers to be most fruitful during the mature technology phase of the product life-cycle as a way to free-up production capacity for new, higher value-added uses or as a mode of entry into foreign markets, is, in the present era of technology parity and hyper-competitive market conditions, considered and carried-out at all phases of the product life cycle. Extensive horizontal licensing has changed the world economy (Cowhey and Aronson 1993).

Inventors, nevertheless, need not disclose their know-how to the world through application and granting of patent for they may simply keep the know-how to themselves, protecting the information under the law of trade secrecy. The inventor who decides to protect an innovation through trade secrecy simply does not disclose the know-how

associated with the invention and does so for the competitive advantages conferred by exclusivity, information opaqueness, and unlimited duration. The trade secret, which has been specified in the institutions of magic and shaman-priests in pre-literate societies (Suchman 1989), is intellectually rooted in notions of respect for individual liberty, confidentiality of relationships, common morality, and fair competition (Paine 1991). The law of trade secret involves more the notions of contract, trust, and equity than of property, for the relationships at issue are often between employer and employee or between firms, whether collaborators or competitors. Trade secrecy protection, however, confers few rights and offers weak protections since a competitor is only contravened from illicitly obtaining trade secrets. Furthermore, because of the essential nature of trade secret protection—nondisclosure of information—it is poorly suited for collaborative, sharing-through-negotiation licensing strategies, so licensing relationships typically are based upon patent ownership rights.

Informational and cultural expression and the copyright institution

Students of informational and cultural expression explain that the “appropriability problem” familiar to the patent institution is at work as well with the copyright institution (Johnson 1985; Landes and Posner 1989). Writing a book, composing a tune, producing a film, and compiling a database are expensive propositions, yet can be appropriated or pirated quite easily in many cases. Government, motivated by the goal of encouraging the free expression of ideas, provides a period of distribution exclusivity (often 75 to 100 years) to the copyright owner to encourage the effort. The copyright protects the *expression* of ideas but not the ideas themselves, thereby aiming to encourage creativity in arts and letters rather than the monopolization of ideas.

According to section 102 of the U.S. Copyright Act of 1976, expressions may be copyrighted when “original works of authorship fixed in any medium of tangible expression.” Being “original” means that an expression product must pass the so-called “originality test” established by court decision: “All that is needed to satisfy both the Constitution and the statute is that the author contributed something more than ‘merely trivial’ variation, something recognizably his own” (Joyce *et al.* 1994: 66). Originality, elaborated the court, “means little more than a prohibition of actual copying.” The copyright originality test demands a considerably lower standard than the “novelty/nonobviousness tests” of patent law and this is for the reason that mere ways of expression are being protected by copyrights not inventions, as is the purpose of patent institution.

In the United States, to preserve copyrights works may be (though need not be) registered with the Copyright Office, a unit of the Library of Congress. "Registration" is nothing more than the word implies: there is neither search nor examination in the copyright field as there is in the patent field. The owner of a copyright, according to section 106 of the 1976 Act has the exclusive right to (1) reproduce the copyrighted work, (2) prepare derivative works based upon the copyrighted work, (3) distribute it to the public by sale, lease, or lending, (4) perform works publicly, and (5) display works publicly.

Government limits the scope of the copyright through the so-called "idea-expression dichotomy": only the expression of the ideas but not the ideas themselves may be protected by the copyright. That is, no one may copy verbatim a short story and distribute it as the author's own work but a story-writer is free to take plot-lines from another story. Government also limits the scope of the copyright by allowing the public "fair use" of the work—a verbatim copy made for one's own use, quotation rights for criticism and scholarship purposes, and uses similarly in keeping with the policy motivation to encourage public and competitive access to expressions.

Being "fixed in a tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device" includes at least the following: (1) literary works, (2) musical works, including any accompanying words, (3) dramatic works, including any accompanying music, (4) pantomimes and choreographic works, (5) pictorial, graphic, and sculptural works, (6) motion pictures and other audiovisual works, (7) sound recordings, (8) architectural works, (9) database compilations, and (10) computer software. A comparative study of international competition in computer software concluded that stronger copyright protections in the United States were important early sources of global competitive advantage for American software makers over their European and Japanese competitors (Mowery 1996: 4–11). Nevertheless, the extension of copyright to computer software had its critics at the time and has them today, including those who oppose copyright protection for software as a matter of principle and those who accept the principle of it but contend that the policy needs some refinement.

A computer software application that has had significant effect upon the information management capabilities of organizations private and public is database software. During the 1980s, a number of database compilation and management products became available and in the 1990s they have become increasingly popular with those who need to manage long lists of numbers (telephone and otherwise),

names, addresses, and the like. The proliferation of quality database compilation and management products has expanded the market in recent years for the compilation of data by companies substantially or exclusively in that business (the “information industry”) as well as by a wide variety of financial institutions, brokerage houses, credit raters, marketing firms, and other enterprises possessing information of commercial value. These information database proprietors have an “appropriability problem,” for the investment when creating a database is often substantial—purchasing database software, gathering the data, organizing the information for users—but pirated copies on paper or computer diskette or CD-ROM can be widely and inexpensively distributed with relative ease. Thus, many possessors of information databases followed the practice that had been long established by publishers of information in the United States since Noah Webster and his dictionary in the early days of the American republic: they registered the compilations as copyrighted works, thereby obtaining the protections conferred by the copyright institution.

The international law and organization of intellectual property

The World Intellectual Property Organization (WIPO) is the international governmental organization that administers the world’s key treaties regarding intellectual property, with the exception of the Agreement regarding Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is administered by the World Trade Organization. WIPO administers a number of intellectual property treaties, including the following:

(1) The *Paris Convention for the Protection of Industrial Property* was signed in 1883 and periodically amended in the twentieth century. Each Paris Union member is free to offer any standard of patent protection it wishes. However, the convention does demand that members not discriminate against foreign property owners, an obligation known as national treatment. The convention bears the marks of a modest agreement among generally like-minded industrial countries. Even if they disagreed on particulars, the Paris Union agreed that the patent institution was important for industrial innovation. The convention also establishes basic obligations regarding the protection of trademarks.

(2) The *Patent Cooperation Treaty* (PCT), signed in Washington in 1970 and later amended, makes it possible to seek patent protection simultaneously in each of a large number of countries by filing an international patent application through the PCT secretariat housed at the

WIPO headquarters in Geneva. The PCT provides innovators an efficient way of applying to multiple national authorities but does not provide an institutional means of obtaining an international patent (for no international patent exists).

(3) The *International Convention for the Protection of New Varieties of Plants* (the UPOV Convention), signed in 1971 and amended in 1991, establishes a union of contracting parties who agree to confer “breeder’s rights” on those who discover or develop new varieties of plants, provided that the variety is “new, distinct, uniform, and stable.”

(4) The *Berne Convention for the Protection of Literary and Artistic Works* was signed in 1886 and has been amended many times. The convention provides that signatory countries provide national treatment to authors, including exclusive rights to authorize reproduction of their works.

These WIPO-administered treaties are augmented under public international law by TRIPS agreement administered under authority of the World Trade Organization.

Protection of intellectual property varies from being generally effective and enforceable in the industrialized countries to being generally ineffective and unenforceable in developing countries (Gadbaw and Richards 1988). The 1994 GATT Uruguay Round Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) produced international obligations regarding patents, copyrights, trademarks, integrated circuits, industrial designs, plant varieties, and trade secrets. Regarding patents, the agreement offers patents on products and processes in all fields of technology, limits compulsory licensing, provides a 20-year patent term from date of application filing and obligates compliance with other terms of the Paris Convention. Regarding copyright, the text protects computer programs and databases, generally establishes a 50-year term minimum, grants owners of computer software and sound recordings the right to authorize or prohibit rental of their products, and obligates compliance with the Berne Convention. Key provisions regarding trademarks include the enhancement of protection for internationally well-known marks and the prohibition of compulsory licensing of marks. A considerable length of text in the TRIPS agreement is devoted to infringement of intellectual property and enforcement of rights, including obligations regarding transparency, expeditiousness, fairness, and remedies. Since the agreement establishing the new World Trade Organization, GATT’s successor organization, requires member states to accept all WTO agreements, most developing countries will be party to the TRIPS agreement.

During the period of these multilateral negotiations from 1986 to 1994 and under continuing bilateral pressure from the American government, some developing countries reformed their intellectual property protection laws. In the late 1980s, five governments reformed their patent laws, two their trademark laws, and nine their copyright laws. In the early 1990s, intellectual property reforms proliferated widely as 29 countries reformed their patent laws, three reformed trade-secret laws, 12 reformed trademark laws, and 33 reformed copyright laws (United States Trade Representative, various years).

Nevertheless, many other developing countries maintain that they agreed to TRIPS reluctantly, especially in the case of pharmaceuticals, and only because it was a “linkage bargain” deal associated with the creation of the new WTO and reformed international trade dispute settlement procedures. One scholar contends that intellectual property laws in developing countries have been changed in response to American pressure but that minds have not been changed.

In nearly every instance the targeted countries have engaged in foot dragging and chosen not to implement and enforce the new policies. The continued monitoring and repeated threats of renewed Section 301 action in the absence of satisfactory enforcement of the new policies suggest that the trend toward greater protection of intellectual property is not being as ardently embraced as the United States would wish. The targeted states acquiesce on paper and do just enough to free themselves of U.S. pressure—but no more. While these countries have changed their policies, they have not changed their minds about the merits of intellectual property protection. Even when the United States carried out its threats by imposing sanctions on Brazil, India, Mexico, and Thailand, the targeted countries did not comply. Free riding on others’ intellectual property and the profits of piracy still outweigh the liberal norm of respect for property rights (Sell 1995: 332).

Indeed, when TRIPS was concluded, 25 developing countries offered no patent protection to pharmaceuticals (13 did not even confer patent protection to chemicals), and 57 did not offer copyrights for computer software (Primo Braga 1995b: 396). However, it is less clear whether opposition to intellectual property laws as a matter of economic development strategy is universal. Some minds in developing countries may be changing as new strategies are being adopted to encourage investment, licensing, and indigenous innovation and expression. “The positive role of intellectual property in national economic development is

not yet well appreciated, notwithstanding that many individuals in most countries are frustrated by inadequate protection. This pent-up demand for better protection has not yet found a political voice, the voice of the past, as always, being louder than the voice of future” (Sherwood and Primo Braga 1996).

Policy-makers in developing countries have long tended to think differently about copyrights than they have about patents. The utility of the copyright has been acknowledged by many developing countries, while the utility of the patent has been controversial. Brazil has had copyright law for a generation and India for two generations, although neither has always effectively enforced the laws against pirates. The institutional histories of patent and copyright in the third world are characterized by a philosophical tension between natural property rights and incentives for risky investment in innovation and expression. This tension results in a tendency to confer legitimacy on the copyright because it appears to protect the “moral rights” of (local) authors and to deny the “economic rights” of (foreign) firms. Yet, despite the opposition to intellectual property law reforms, especially of patent policies, the context in which development strategy is formulated in the era of TRIPS implementation is very different from the context in any previous era.

Economic development strategies: from import-substitution industrialization to emerging market

Whether born of revolution (e.g., Mexico in 1917), de-colonization (e.g., India in 1947), or civil war (e.g., China in 1949), developing countries in the twentieth century typically adopted state-led models of development, investing public resources into the organization of production and establishing state-owned enterprises to lead industrialization and energy creation—Mexico by the 1930s, India and China by the 1950s. These new regimes, led by Cardenas, Nehru, and Mao as well as by leaders such as Ataturk and Nasser, mistrusted their own business interests as much as they mistrusted multinational business enterprises, identified high barriers to entry in these industry sectors as compelling rationales for public enterprise, and seem to have genuinely believed that state-owned enterprises would achieve national goals (Waterbury 1993).

The developing countries adopted an import-substitution industrialization (ISI) model of economic development strategy, thereby rejecting the liberal, free-trade ideology that the industrialized countries institutionalized into the GATT regime after World War II. The industrialized countries had entangled them into economic crises (the Great Depression) and political crises (World War II) not of their own making,

exploited their natural resources, denied them international sovereignty, and undermined the domestic political independence of their governments (Biersteker 1987; Haggard 1990).

The *dependencia school*, headquartered at the United Nations Economic Commission on Latin America under the leadership of economist Raul Prebisch, charged in the 1950s that the world economy was structured to ensure that developing countries were burdened with over-dependence on exports of raw material exports, which tended toward price volatility; maldistribution of national income, which created elite preferences for imported foreign luxury goods; investments in manufacturing by multinational corporations that destroyed local production. The *dependencia school* also contended that trade with the industrialized countries promoted excessive reliance on foreign capital while facilitating foreign domination of local capital markets, introduced technology inappropriate to local skills, created an international division of labor, prevented indigenous, self-sustaining technological development, and distorted the local labour market because multinational corporations paid higher wages than local firms could afford to pay, and promoted reliance on foreign capital (Gilpin 1987: 263–305). They contended that greater independence would be achieved if domestically produced goods and services were substituted for imported goods and services and if governments in the third world imposed restrictions on imports and foreign direct investment restrictions. Thus, the political leaders imposed high tariffs and demanded license approval for imports, restricted foreign direct investment by demanding joint equity ownership and local managerial control and by rejecting foreign direct investment outright in some cases. Some governments even expropriated assets of foreign multinational enterprises, thereby earning the enmity of multinational managers and their government representatives, who demanded from developing country governments prompt, adequate, and effective compensation under authority of public international law regarding foreign direct investment (Lipson 1985).

Developing countries presented proposals for restructuring the world political economy at the first United Nations Conference on Trade and Development (UNCTAD) in 1964. They requested trade preferences for their manufacturing goods, commodity price stabilization, resource and technology transfers, reductions in freight and service charges, debt rescheduling and reductions, and a new forum to replace the GATT (Cutahar 1984). Creating an economic strategy to mirror the security strategy of the nonaligned movement and inspired by the success of the OPEC oil cartel, in 1974 the Group of 77 developing countries used their numbers in the United Nations (in which one-nation, one-vote decision-making afforded them power they did not

have in the weighted-voting International Monetary Fund and World Bank and the rarely voting GATT) to pass a Declaration on the Establishment of the New International Economic Order (NIEO). The NIEO reiterated the UNCTAD demands and asserted the right to nationalize foreign enterprises, create commodity cartels, and regulate multinational corporations (Bhattacharya 1976). Thus, the G-77 used the UNCTAD forum to establish raw materials and agricultural cartels—the Commodity Common Fund—intended to monitor and manage supply, demand, and therefore prices. The Commodity Common Fund managed supply by amassing stocks of the commodities, much as the OPEC cartel managed the supply of oil (Finlayson and Zacher 1990). It was an era in which third world governments weakened intellectual property policies, as India did with its changes in patent policy in 1972 (Gadbaw and Richards 1988: 200).

The GATT initiatives in the 1960s to help solve the economic problems of the developing countries were feeble except for the tariff-cutting offered by the Generalized System of Preferences, which were trade preferences valuable to exporters in developing countries even if critics charged that importers manipulated the system for their own benefit (Wilson 1992: 44). Neither the Kennedy Round negotiations nor the subsequent Tokyo Round contributed much to development. If anything, they compounded the problems with antidumping and subsidy-countervailing duty agreements and the Multifiber Agreement that worked against the interests of developing countries (Hudec 1987).

Nevertheless, whether the measure is economic growth rates, current account balances, or income distribution, the economic development strategy of import substitution industrialization performed poorly. The Commodity Common Fund achieved some success in stabilizing, then, raising prices but turned out to be fool's gold; oil is the only exception to the rule that commodities are substitutable with alternatives (Krasner 1974). Furthermore, the oil shocks of the 1970s increased the dollar needs of the developing countries that were not oil producers and falsely raised the hopes of the oil-producing developing countries. The banks of the industrialized countries recycled petro-dollars through the developing countries and the outcomes were levels of national debt that contributed to a "debt crisis" in 1982 (Kahler 1986).

The Group of 77 lacked the power in the world political economy to achieve the New International Economic Order and by the end of the 1980s their proposal was dead; UNCTAD mattered little in the world economy; import substitution industrialization had come to be seen as a failed strategy. ISI failed, however, neither because of greedy foreign

banks nor because of the structure of world power but because the strategy itself was flawed. It depended on markets that were too small to provide economies of scale, on demand conditions that were too isolated to produce globally competitive industries, and typically resulted in inefficient production and bad products by insulated state-owned and private enterprises. Perhaps only crisis could sufficiently alter political dynamics within Latin American and African developing countries (Nelson 1990) so they would be willing to adopt a new development strategy.

The International Monetary Fund used its power as source of capital and guarantor to other public and private lenders to lend to developing countries on the condition that they adjust their economic policies to follow liberal-tending, market-oriented prescriptions (Kahler 1986; Williamson 1983). Perhaps as important, developing countries had a new economic development model in the strategies of South Korea and Taiwan. Both countries had adopted import substitution policies after the end of Japanese colonialism and during the era of American protection and had been heavily dependent upon American aid until they were met with the demands of the Eisenhower Administration that they wean themselves from that aid. South Korean and Taiwanese government leaders initiated transitions toward export-led economic development strategies in order to achieve balance of payments equilibrium and earn foreign exchange for domestic development (Cheng 1990). The regimes in South Korea and Taiwan faced serious external threats that motivated industrialization of the economy, not predation of it for the benefit of wealthy elites.

South Korea and Taiwan are "late industrializers" and late industrializers are good learners (Amsden 1989). They visit international trade expositions, attend international professional and academic conferences, tour foreign production plants, consult foreign buyers and suppliers, hire foreign experts, and beg, borrow, buy, and occasionally steal foreign product designs and know-how. They imitate innovations in order to learn until their knowledge results in innovations of their own making, as Korean information technology companies have done (Kim 1997). The South Korean and Taiwanese strategies involved a great deal of planning and intervention by government; high levels of investment in key industries, more investment than would have occurred without government intervention; the exposure of industries to international competition in foreign, though typically not in domestic, markets (Wade 1990). The governments intervened in the markets through land redistribution, financial system controls to put industrial production ahead of consumer spending, price controls, undervalued foreign exchange rates, wage controls (and repression of unions), ex-

port performance rewards, foreign direct investment controls, foreign technology acquisition, and sector-specific subsidies and export promotion assistance. They did it all with great success, for, by the late 1980s, the Korean foreign ministry was planning admission into the OECD (achieved in late 1996) and Taiwan, though diplomatically isolated, was by then even richer than Korea. Thus, propelled by chronic poverty, dilapidated infrastructure, deadening stagnation, and punishing debt and motivated by the examples of countries doing better, the political leaders of developing countries have been dropping their ISI strategies and articulating strategies that call for fuller engagement in the world economy, including export promotion and (qualified) liberalization of import and direct investment policies. In so doing, they have acquired the label “emerging markets” (Garten 1997).

Until 1978, China’s economic development strategy had been an especially autarkic import substitution strategy (Lardy 1992): “self-reliance” was more than mere slogan in Mao’s China. Domestic production was state-owned, for the Chinese communists established a centralized, planned economy by the mid-1950s (Riskin 1987). This strategy resulted in chronic poverty, poor infrastructure, a widening technological gap between world standards and Chinese capabilities, and a standard-of-living gap between China and rapidly industrializing East Asian neighbors. Fearing the implications for national security of the growing technology and wealth gap, advocates for change in economic development strategy within China argued that “socialism” must not mean “egalitarianism on the basis of universal poverty” (Pearson 1991) and after a consolidation of power by Deng Xiaoping, the Chinese government announced in December 1978 a new “Open Door” policy to stimulate China’s modernization in science and technology, agriculture, and the military (Ho and Huenemann 1984). However, the economic logic of the Open Door policy was not liberalization but the adoption of Western technology and the export of manufactured goods.

Motivated by factors similar to those that confronted Mao’s political successors in China, the socialist command strategies of the Soviet Union and its eastern European satellites by the end of the 1980s underwent their own political upheaval and economic strategy shift. Socialist command placed the state in control of resource allocation through planning, with resource deployment favouring heavy manufacturing and energy sectors over light manufacturing sectors, a strategy maintained through establishment of a dyadic, asymmetrical regional economy in isolation from the world political economy (Commisso 1986). The socialist command strategy industrialized the Soviet Union and created a mighty war machine but did so at the expense of

consumers. Nevertheless, the strategy and its system might have survived had not the pace of technological advance in the West and the Chernobyl disaster de-legitimized the Soviet state. Russia (Aslund 1995), the former Soviet republics, and the eastern European states have been undergoing radical economic reform. The focus of the transitions has been on macroeconomic stabilization, liberalization, and institutionalization but have generally been unstable save for Hungary (Islam and Mandelbaum 1993).

Challenged by debt crisis, Mexico acceded to the GATT and initiated a free-trade agreement with the United States and Canada, liberalizing its trade and investment policies in the process. Developing countries have been acceding to the GATT and its WTO successor at the pace of one or two each month, so that the membership exceeds 130 countries, though the commitment to liberalization does not yet run deep (Haggard 1995). Brazil and other governments in Latin America overcame domestic political obstacles (Haggard and Kaufman 1995) to begin liberalization of trade and investment policies through free-trade agreements and customs unions (Krueger 1995). India is liberalizing its economy, though at an erratic pace; Indonesia and the other member states of the Association of Southeast Asian Nations (ASEAN) have agreed to phase in a free-trade agreement, while Vietnam has been pursuing *doi moi* marketization and liberalization reforms and has joined ASEAN. The countries of the Middle East (Chaudhry 1997) continue to be driven by the political economy of oil and petrochemicals, though Turkey, Israel, and several other Middle Eastern states lack oil and hence find incentives for other types of trade and investment. The central Asian republics have also recently been drawn into the political economy of oil and petrochemicals. The African continent offers some encouraging growth prospects, anchored in the sub-Saharan region by South Africa, but many of the governments in Africa continue to be unable to establish credible and effective institutions.

Not only are the economic *strategies* of developing countries changing but so are their economic *structures*. The World Bank (1997: 134–36) reports that, since 1980, manufacturing has been declining and services have been increasing as a percentage of Gross Domestic Product in middle-level developing countries such as Brazil, Mexico, South Korea, and Singapore (see table 1). Even in poorer developing countries, services are increasing as a percentage of Gross Domestic Product in countries such as China, India, Indonesia, Kenya, and Peru (see table 1). Whether services or manufacturing or agriculture, productive capability and competitive advantage in the contemporary world economy increasingly depends upon the capacity to learn and manage knowledge.

Table 1: Change in manufacturing and services as percentage of GDP for selected developing countries

Country	Manufacturing	Services
Brazil	33% > 24%	45% > 49%
Mexico	22% > 19%	59% > 67%
South Korea	29% > 27%	45% > 50%
Singapore	29% > 27%	61% > 64%
China		21% > 31%
India		36% > 41%
Indonesia		34% > 41%
Kenya		47% > 54%
Peru		48% > 55%

Source: The World Bank 1997: 134–36.

Global knowledge diffusion and intellectual property rights

Trade, foreign direct investment, licensing and collaborative relationships, recent research shows, are important media for the global diffusion of knowledge. A study that matches patent citation data with trade data supports the proposition that trade flows encourage knowledge flows (Sjoholm 1996). Perhaps one-half of American, and even more European, productivity growth derives from foreign technology (Eaton and Kortum 1994) acquired through trade, license, and direct investment (including joint-equity venture and wholly-owned subsidiary). Collaborative business strategies contribute essential new knowledge that cannot be obtained by reading books and journal articles or doing Internet searches. Simple product innovations can often be quickly imitated by producers in developing countries but organizational, managerial-process innovations and other forms of business know-how are substantially more difficult to learn and incorporate into routine activities. “Best practice is more fraught with difficulty than the acquisition of technologies” (Kogut 1991: 39).

A study finds that, comparing the East Asian countries with the countries of Latin America, the Asian countries show larger flows of trade, foreign direct investment, and licensing behavior, thus pointing to possible reasons for its stronger technological growth (Dahlman 1994). A study of 77 developing countries over a period of 20 years finds that “a developing country’s total factor productivity is larger the greater is its foreign R&D capital stock, the more open it is to trade

with the industrial countries, and the more educated its labour force” (Coe, Helpman, and Hoffmaister 1995). The relative contributions of trade, licensing, and direct investment to knowledge flows, however, are unclear, though may relate to other country and institutional characteristics (Pack and Saggi 1997).

Since the early 1990s, developing countries have generally been encouraging more investment by multinational business enterprises. Governments in developing countries and those making transitions from non-market economies recognize that investment, while not scarce, is limited and they are competing for it. Thus some policy-makers have been exploring the usefulness of investment incentives, including tax abatements, investment credits, subsidized loans, and performance requirements. These inducements affect the potential investor’s revenues, cost of inputs, factors of production, and profitability (Guisinger 1986). When offering incentives, states that make certain their policies are stable and that their commitments are credible do better (Murtha 1991). Nevertheless, though some of these policies may encourage inward foreign direct investment, policy incentives must be considered in the light of restrictions placed on export subsidies under the GATT. The direction of policy in the world economy has been toward multilateral agreement to restrict investment incentives because they artificially distort comparative advantages and lead states into costly bidding wars (Hufbauer 1984).

Furthermore, incentives generally matter less to multinational business enterprise managers than do political stability, asset control, earnings remittance, predictability in monetary and fiscal policy, transportation and communication infrastructures, business behaviour standards, import barriers, export quotas, and regulatory factors (Wallace 1992). Developing countries with small populations, however, do face special challenges in gaining the attention of decision-makers in multinational corporations and must overcome the perception of “marginality” in the world economy by understanding the goals, interests, and decision-making patterns of multinational managers (Goodman 1987). In general, clever incentives matter less than market and institution fundamentals: human capital, market opportunities, infrastructure, macroeconomic stability and foreign exchange, political and legal predictability.

Weak intellectual-property institutions apparently discourage precisely the kind of knowledge-intensive, knowledge-diffusing, foreign direct investment that is most desired in the countries of the emerging market. In the late 1980s and the early 1990s, while TRIPS negotiations were being conducted, research sponsored by international gov-

ernmental organizations started to demonstrate with systematically gathered evidence what anecdotal evidence had been suggesting for some years: weak protection of intellectual property discourages foreign direct investment in certain industry sectors, especially pharmaceuticals, fine (including agricultural) chemicals, and information technologies. An UNCTAD study in 1986 found that investment in new technology areas such as computer software, semiconductors, and biotechnology was influenced by intellectual property policies (UNCTAD 1986). A 1987 OECD study found weak intellectual property policies to be significant barriers to international technology licensing (OECD 1987). A study by the United Nations Commission on Transnational Corporations (UNCTC) in 1989 found that weak intellectual property protection reduced computer software investment. Another study by the UNCTC announced in 1990 that weak patent policies reduced pharmaceutical investment (UNCTC 1989, 1990). Survey research sponsored by the International Finance Corporation of the World Bank found that, with variations by sector, country, and technology, at least 25 percent of American, German, and Japanese high-technology firms refused direct investment or joint ventures in industrializing countries with weak intellectual property policies (Mansfield 1995: 2). Given scarce resources, they invested in countries where the intellectual property risks were lower. World Bank research supports the conclusions of the survey research by tracing actual patterns of American foreign direct investment and finding that countries with weak intellectual property policies do indeed have less foreign direct investment than would otherwise be expected (Primo Braga 1995a).

Thus, a growing body of evidence supports theory: weak national intellectual-property systems, it is hypothesized by transaction-cost economics (Williamson 1996), confer appropriability hazards that influence the market-entry strategies of firms (Teece 1987). Given scarce resources, they enter countries where the risk of intellectual-property leakage is lower. International technology and knowledge flows are an important new variable in the political economy of intellectual property policy. Previously, some American economists argued that intellectual property rights ought to depend on levels of development and that the least developed countries should not adopt international standards but that middle-income countries possibly should (Deardorff 1992; Maskus 1990). However, these studies may not have taken sufficient account of trade, investment, capital, and technology flows. Nevertheless, the absorptive capacity of developing countries varies considerably (Keller 1996): it depends upon the capabilities of their knowledge institutions.

Political, governmental, and judicial institutionalization

The implementation of liberal-tending economic development strategies, however, will take much better governance and public administration than that which developing countries are generally possess. Samuel Huntington explains, in words just as true today as when they were written:

The most important political distinction among countries concerns not their form of government but their degree of government . . . The differences between democracy and dictatorship are less than the differences between those countries whose politics embodies consensus, community, legitimacy, organization, effectiveness, stability, and those countries whose politics is deficient in these qualities. (Huntington 1968: 1)

Nevertheless, type of political regime matters to economic performance (Garrett and Lange 1995) and emerging market policy-makers will have to construct effective political institutions in which either inter-party or intra-party competition (Haggard and Kaufman 1995) produce development through rule-based political legislative processes managed by merit-based, Weberian, bureaucratic administration characterized by continual bargaining over societal goals and means rather than predation, in which resources are extracted at the expense of society and individual goals (especially those of an elite) take precedence over collective goals—that is, a developmental rather than a predatory state (Evans 1995).

Unfortunately, as has been well-known since the politics of post-colonial developing countries first came under study, in such countries weakly institutionalized political systems in which a single set of elites perform all the tasks of government—military, political, administrative, economic, and sometimes even religious—has been the norm (Riggs 1963, 1964). The bureaucratic elite are also the political elite and they resist competitive party and legislative institutionalization. The rules of the game being as they are, i.e., corrupt, “a typical Indian entrepreneur or trader must pick his way through a plethora of state and local regulations that are at best confusing and at worst contradictory. Given such conditions of great uncertainty, he is easily tempted to seek protection by using his connections and/or wealth” (Scott 1972). A durable legacy of colonialism has been a big gap between “civil servant” and “citizen” in terms of educational attainment, status, and access to information, rendering minimal the citizen’s capacity to demand service from the civil servant.

State-owned enterprises provide political and bureaucratic elites with great opportunity for patronage and corruption, discouraging privatization even though the IMF recommends it in its economic reform and restructuring advice and even though the political logic of state-owned enterprises—too many bosses, too few incentives for innovative products, processes, and services, too little information for managers (Waterbury 1993)—recommends against state-owned production. Public ownership of production through state-owned enterprises and the Ministry of Finance's authority regarding trade and investment empowered the state sectors while economic stagnation rigidified class cleavages (Frieden 1991; Evans 1987).

The states of the developing countries were granted international sovereignty but the peoples of the developing countries exchanged foreign masters for domestic masters, ranging from corporatist elitism to personal despotism: "Sovereignty gave ex-colonial peoples a legitimate voice in world affairs and membership in international organizations . . . However, it could not give them domestic political and civil rights because these are not in the gift of international society" (Jackson 1990: 159).

Courts, customs, and police are the agents of enforcement, and in many developing countries they have performed poorly and often been corrupt. Intellectual-property business interests in the United States, motivated by losses to product piracy, have undertaken a deliberate, long-term effort to improve the quality of agents of enforcement in developing countries. The annual "Special 301" recommendations of the International Intellectual Property Alliance (IIPA), the Software Publishers Association, and others detail the inadequacies of enforcement country-by-country. "Mexican criminal procedures," said IIPA in its 1997 report, "are often unfathomable, intricate, ad hoc, and seemingly random." The report also said, "Criminal elements dominate much of urban Brazil." Bulgaria is the biggest source of CD piracy in Europe because of government-owned pirate factories and exports controlled by organized crime. The courts in Pakistan are "hopelessly backlogged." Nintendo offers the assessment that "Venezuela's legal system has not evolved at the same pace as its modern economy . . . Until Venezuela addresses some of these serious deficiencies that have given their judicial system the reputation of being 'among the most corrupt in the world,' Nintendo and other U.S. intellectual property owners will continue to suffer irreparable harm and loss" (International Intellectual Property Alliance, various years; Arter & Hadden, 1996).

Competition and trade in intellectual property places on states an enforcement problem qualitatively different from that of financial capital flows and trade in real property. Enforcing policies toward financial

assets and trade are essentially problems of central government power and capacity to control its borders. Policies in developing countries regarding financial assets such as capital controls and more general macroeconomic policies have frequently been subject to change at the behest of IMF bankers, and their implementation challenges the power of the central government to act contrary to the demands of domestic interest groups. Trade policy commitments made through international treaty, as illustrated by the Uruguay Round agreements, tend to fall into three categories: customs and border measures, subsidies and “un-fair” trade practices, and product regulations and standards testing. As with the IMF’s “conditionality-imposed” policy changes, implementing the GATT-imposed trade policy changes challenges the power of the central government to resist the demands of domestic interest groups and to control border flows of traded goods. By contrast, the enforcement of intellectual property rights additionally depends upon the government’s capacity to enforce policies at local levels when localized corruption and cronyism are ways of life in many developing countries. For this reason and in large measure due to pressure from business interests in the United States dependent upon intellectual property, the TRIPS agreement imposes extensive obligations upon signatory states regarding enforcement, adjudication, remedy, and appeal under both civil and criminal law.

Legal scholars hypothesize that institutionalization of effective judiciaries depends upon fidelity to legal discourse and democratic accountability (Mattli and Slaughter 1998). The World Bank has undertaken a study of judicial institutionalization in developing countries and its preliminary finding is that judicial independence and competence are the key attributes of effective dispute settlement and enforcement (Dakolias 1995). Judicial independence means detachment from interest groups, the executive and legislature, practising attorneys, and even fellow judges. It means rendering adjudicatory decisions according to law rather than the interests of politics or commerce. Judicial independence is apparently achieved through appointment procedures based upon merit to ensure highly qualified and respected judges; frequent participation by judges in professional development education so they can stay current of legal knowledge; and evaluation procedures that ensure ethical conduct. Governments need to ensure that judges are insulated from political and commercial pressures through secure judicial terms, adequate salaries, and control over case assignment and court scheduling. In order to be effective, courts must have adequate staffing and capable administrators to aid the timely disposition of cases, i.e., administrative capacity. The World Bank study finds that corruption may as often be the product of over-

burdened courts whose delays cause frustrated litigants to pay bribes to get their cases heard as it is the product of corrupt judges who will swing adjudicatory outcomes in one direction or the other for a price or of powerful litigants who demand preferred outcomes from fearful judges. Thus, it appears that democratic accountability, judicial independence and competence, and administrative capacity may be crucial determinants of effective commercial dispute settlement and judicial institutionalization.

The essence of the state is its capacity to enforce policy as well as to make it. Concomitant with the pursuit of profits and of anti-Communist containment of the Soviet bloc and its supposed revolutionary ideology, American multinational corporations and foreign policy-makers have long been accused of propping up authoritarian regimes in developing countries with little regard for local rule of law (Kwitny 1984; Gaddis 1982; Krasner 1978). American business and government insistence in the TRIPS negotiations that the final agreement impose obligations to reform judiciaries and build enforcement capabilities is generally little recognized and its potential impact under-appreciated by scholarly and policy communities. The TRIPS agreement may ultimately be seen as a seminal act international law and organization for this achievement alone. However, neither the laws of intellectual property protection nor the judicial reforms necessary for their effective enforcement will be easily implemented in developing countries.

Conclusion

The institutionalization and enforcement of world-standard protection of intellectual property rights in developing countries will in the coming years contribute to the transformation of their economies, polities, and societies. Experience from the industrialization era of Western Europe, North America, and Japan suggests that adoption of world-standard intellectual property policies will promote technological innovation and adaptation, economic growth, informational diversity, and cultural vitality in developing countries. When the world political economy was cleaved South and North, East and West, and when the South and the East were pursuing economic development strategies that sought as much as possible to go their own, independent way, opportunities for sustained economic growth in these regions were foregone. The debt crisis in the South and economic failure in the East provide new opportunities for economic development but we can expect that the highest growth rates and most dynamic economies will be achieved in countries where the governments ensure the right mixes of markets and institutions.

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Notes

- 1 Stated with the precision of the specialist, Chinese cultural traditions possess five distinctive patterns that have discouraged scientific advance: cognitive formalism, narrow empiricism, dogmatic scientism, feudal bureaucratism, and compulsive ritualism (Baum 1982).
- 2 Partha Dasgupta has frequently written studies with Joseph Stiglitz, presently chief economist at the World Bank.

References

- Abernathy, William J., and Kim B. Clark (1985). Innovation: Mapping the Winds of Creative Destruction. *Research Policy* 14:3–22.
- Abernathy, William J., and James M. Utterback (1978). Patterns of Innovation in Technology. *Technology Review* 80, 7: 40–47.
- Adelman, Martin J., and Sonia Baldia (1996). Prospects and Limits of the Patent Provision in the TRIPS Agreement: The Case of India. *Vanderbilt Journal of Transnational Law* 29: 507–33.
- Almeida, Paul (1996). Knowledge Sourcing by Foreign Multinationals: Patent Citation Analysis in the U.S. Semiconductor Industry. *Strategic Management Journal* 17: 155–65.
- Almeida, Paul, and Bruce Kogut (1996). Technology and Geography: The Localization of Knowledge and the Mobility of Patent Holders. Working Paper. Philadelphia, PA: The Huntsman Center for Global Competition and Innovation; The Wharton School of the University of Pennsylvania.
- Almeida, Paul, and Bruce Kogut (1997). The Exploration of Technological Diversity and the Geographic Localization of Innovation. *Small Business Economics* 9: 21–31.
- Amsden, Alice (1989). *Asia's Next Giant: South Korea and Late Industrialization*. New York: Oxford University Press.
- Argote, Linda (1999). *Organizational Learning: Creating, Retaining and Transferring Knowledge*. Norwell, MA: Kluwer Academic Publishers.
- Arter & Hadden (1996). *Special 301 Comments on Video Game Piracy*. Washington, DC.
- Ascher, William (1983). New Development Approaches and the Adaptability of International Agencies: The Case of the World Bank. *International Organization* 37: 415–39.

- Aslund, Anders (1995). *How Russia Became a Market Economy*. Washington, DC: Brookings Institution Press.
- Ayres, Robert L. (1983). *Banking on the Poor: The World Bank and World Poverty*. Cambridge, MA: MIT Press.
- Axelrod, Robert (1984). *The Evolution of Cooperation*. New York: Basic Books.
- Baum, Richard (1982). Science and Culture in Contemporary China: The Roots of Retarded Modernization. *Asian Survey* 22: 1166–86.
- Beltz, Cynthia A. (1994). *Financing Entrepreneurs*. Washington, DC: American Enterprise Institute.
- Bernheim, B. Douglas, and J.B. Shoven (1992). Comparing the Cost of Capital in the United States and Japan. In Nathan Rosenberg, Ralph Landau, and David C. Mowery (eds.), *Technology and the Wealth of Nations* (Stanford, CA: Stanford University Press): 151–74.
- Bhattacharya, Anindya K. (1976). The Influence of the International Secretariat: UNCTAD and Generalized Tariff Preferences. *International Organization* 30: 76–90.
- Biersteker, Thomas J. (1987). *Multinationals, the State, and Control of the Nigerian Economy*. Princeton, NJ: Princeton University Press.
- Boskin, Michael J., and Lawrence J. Lau (1992). Capital, Technology, and Economic Growth. In Nathan Rosenberg, Ralph Landau, and David C. Mowery (eds.), *Technology and the Wealth of Nations* (Stanford, CA: Stanford University Press): 17–56.
- Bradley, Stephen P., Jerry A. Hausman, and Richard L. Nolan, eds. (1993). *Globalization, Technology, and Competition: The Fusion of Computers and Telecommunications in the 1990s*. Boston, MA: Harvard Business School.
- Burkhart, Ross E., and Michael S. Lewis-Beck (1994). Comparative Democracy: The Economic Development Thesis. *American Political Science Review* 88: 903–10.
- Buscaglia, Edgardo, and Maria Dakolias (1999). An Analysis of the Causes of Corruption in the Judiciary. *Law and Policy in International Business* 30: 95–116.
- Calder, Kent E. (1993). *Strategic Capitalism: Private Business and Public Purpose in Japanese Industrial Finance*. Princeton, NJ: Princeton University Press.
- Cardwell, Donald (1995). *The Norton History of Technology*. New York: Norton.
- Chandler, Alfred D. (1977). *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Harvard University Press.
- Chaudhry, Kiren Aziz (1997). *The Price of Wealth: Economies and Institutions in the Middle East*. Ithaca, NY: Cornell University Press.
- Cheng, Tun-jen (1990). Political Regimes and Development Strategies: South Korea and Taiwan. In Gary Gereffi and Donald L. Wyman (eds.), *Manufacturing Miracles: Paths of Industrialization in Latin America and East Asia* (Princeton, NJ: Princeton University Press): 138–78.
- Coe, David T., Elhanan Helpman, and Alexander W. Hoffmeister (1995). North-South R&D Spillovers. Working Paper. Boston, MA: National Bureau of Economic Research.
- Commisso, Ellen (1986). State Structures, Political Processes, and Collective Choice in CMEA States. *International Organization* 40:195–238.

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- Cooper, Frederick, and Randall Packard, eds. (1997). *International Development and the Social Sciences: Essays on the History and Politics of Knowledge*. Berkeley, CA: University of California Press.
- Cowhey, Peter F., and Jonathan D. Aronson (1993). *Managing the World Economy: The Consequences of Corporate Alliances*. New York: Council on Foreign Relations.
- Cox, Robert W. (1973). The Executive Head: An Essay on Leadership in International Organization. In Leland M. Goodrich and David A. Kay (eds.), *International Organization: Politics and Processes* (Madison, WI: University of Wisconsin Press): 155–80.
- Cox, Robert W., Harold K. Jacobson, et al. (1974). *The Anatomy of Influence: Decision Making in International Organization*. New Haven, CT: Yale University Press.
- Cutahar, Michael Zammit, ed. (1984). *UNCTAD and the South-North Dialogue: The First Twenty Years*. New York: Pergamon.
- Dahlman, Carl J. (1994). Technology Strategy in East Asian Developing Economies. *Journal of Asian Economics* 5: 541–72.
- Dakolias, Maria (1995). A Strategy for Judicial Reform: The Experience in Latin America. *Virginia Journal of International Law* 36:167–232.
- Dam, Kenneth (1994). The Economic Underpinnings of Patent Law. *Journal of Legal Studies* 23: 247–71.
- Dasgupta, Partha (1988). Patents, Priority, and Imitation, or, the Economics of Races and Waiting Games. *The Economic Journal* 98: 66–80.
- Deardorff, Alan V. (1992). Should Patent Protection Be Extended to All Developing Countries? *World Economy* 13: 497–08.
- Diwan, Ishac, and Dani Rodrik (1991). Patents, Appropriate Technology, and North-South Trade. *Journal of International Economics* 30: 27–47.
- Dornbusch, Rudiger, and F. Leslie C.H. Helmers, eds. (1988). *The Open Economy: Tools for Policymakers in Developing Countries*. New York: Oxford University Press.
- Dosi, Giovanni (1982). Technological Paradigms and Technological Trajectories. *Research Policy* 11: 147–62.
- Eaton, Jonathan, and Samuel Kortum (1994). International Patenting and Technology Diffusion. Working Paper. Boston, MA: National Bureau of Economic Research.
- (1997). Engines of Growth: Domestic and Foreign Sources of Innovation. *Japan and the World Economy* 9: 235–59.
- Escobar, Arturo (1995). *Encountering Development: The Making and Unmaking of the Third World*. Princeton, NJ: Princeton University Press.
- Eggertsson, Thrain (1990). *Economic Behavior and Institutions*. New York: Cambridge University Press.
- Evans, Peter (1987). Class, State, and Dependence in East Asia: Lessons for Latin Americanists. In Frederic C. Deyo (ed.), *The Political Economy of the New Asian Industrialism* (Ithaca, NY: Cornell University Press): 203–26.
- (1995). *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.

- Evenson, Robert E. (1984). International Invention: Implications for Technology Market Analysis. In Zvi Griliches, (ed.), *R&D, Patents, and Productivity* (Chicago, IL: University of Chicago Press): 89–123.
- (1993). Patents, R&D, and Invention Potential : International Evidence. *AEA Papers & Proceedings*: 463–68.
- Feigenbaum, Edward A. (1995). Where's the Walkman in Japan's Software Future? In Derek Leebaert (ed.), *The Future of Software* (Cambridge, MA: MIT Press): 215–26.
- Finlayson, Jock A., and Mark W. Zacher (1990). *Managing International Markets: Developing Countries and the Commodity Trade Regime*. New York: Columbia University Press.
- Firmin-Sellers, Kathryn (1995). The Politics of Property Rights. *American Political Science Review* 89: 867–81.
- Frieden, Jeffrey A. (1991). *Debt, Development, and Democracy: Modern Political Economy and Latin America, 1965-1985*. Princeton, NJ: Princeton University Press.
- Fukao, Mitsuhiro (1995). *Financial Integration, Corporate Governance, and the Performance of Multinational Companies*. Washington, DC: Brookings Institution Press.
- Gadbaw, R. Michael, and Timothy Richards, eds. (1988). *Intellectual Property: Global Consensus, Global Conflict?* Boulder, CO: Westview.
- Gaddis, John Lewis (1982). *Strategies of Containment: A Critical Appraisal of Post-war American National Security Policy*. New York: Oxford University Press.
- Garrett, Geoffrey, and Peter Lange (1995). Internationalization, Institutions, and Political Change. *International Organization* 49: 627–56.
- Garten, Jeffrey E. (1997). *The Big Ten: The Big Emerging Markets and How They Will Change Our Lives*. New York: Basic Books.
- Gilpin, Robert (1987). *The Political Economy of International Relations*. Princeton, NJ: Princeton University Press.
- Ginsburg, Jane C. (1990). Creation and Commercial Value: Copyright Protection of Works of Information. *Columbia Law Review* 90 :1865–938.
- (1992). No “Sweat”? Copyright and Other Protection of Works of Information After *Feist v. Rural Telephone*. *Columbia Law Review* 92: 338–88.
- Goldstein, Judith, and Robert O. Keohane, eds. (1993). *Ideas and Foreign Policy: Beliefs, Institutions, and Political Change*. Ithaca, NY: Cornell University Press.
- Goodman, Louis M. (1987). *Small Nations, Giant Firms*. New York: Holmes & Meier.
- Gorman, Robert A. (1992). The Feist Case: Reflections on a Pathbreaking Copyright Decision. *Rutgers Computer and Technology Law Journal* 18: 73–172.
- Griliches, Zvi (1990). Patent Statistics as Economic Indicators: A Survey. *Journal of Economic Literature* 28: 1661–707.
- Grochow, Jerrold M. (1997). *Information Overload! Creating Value with New Information Systems Technology*. Upper Saddle River, NJ: Prentice Hall.
- Grossman, Gene, and Elhanan Helpman (1991). *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.

- Guisinger, Stephen (1986). Host-Country Policies to Attract and Control Foreign Investment. In Theodore H. Moran (ed.), *Investing in Development: New Roles of Private Capital* (New Brunswick, NJ: Transaction Books): 157–72.
- Haggard, Stephan (1990). *Pathways from the Periphery: The Politics of Growth in the Newly Industrializing Countries*. Ithaca, NY: Cornell University Press.
- (1995). *Developing Nations and the Politics of Global Integration*. Washington, DC: Brookings Institution Press.
- Haggard, Stephan, and Robert Kaufman (1995). *The Political Economy of Democratic Transitions*. Princeton, NJ: Princeton University Press.
- Hamel, Gary, and C.K. Prahalad (1989). Collaborate with Your Competitors— and Win. *Harvard Business Review* 63, 4: 149–58.
- Hirschman, Albert O. (1958). *Strategy of Economic Development*. New Haven, CT: Yale University Press.
- Ho, Samuel P.S., and Ralpy W. Huenemann (1984). *China's Open Door Policy: The Quest for Foreign Technology and Capital. A Study of China's Special Trade*. Vancouver: University of British Columbia Press.
- Hudec, Robert E. (1987). *Developing Countries in the GATT Legal System*. Brookfield, VT: Gower Publishing.
- Hufbauer, Gary C. (1984). *Subsidies in International Trade*. Washington, DC: Institute for International Economics.
- Huff, Toby E. (1993). *The Rise of Early Modern Science: Islam, China, and the West*. New York: Cambridge University Press
- Huntington, Samuel P. (1968). *Political Order in Changing Societies*. New Haven, CT: Yale University Press.
- International Intellectual Property Alliance (various years). *Special 301 Recommendations*. Washington, DC: IIPA.
- Islam, Shafiqul, and Michael Mandelbaum (1993). *Making Markets: Economic Transformation in Eastern Europe and the Post-Soviet States*. New York: Council on Foreign Relations.
- Jackson, Robert H. (1990). *Quasi-States: Sovereignty, International Relations, and the Third World*. New York: Cambridge University Press.
- Jacobson, Harold K. (1984). *Networks of Interdependence: International Organizations and the Global Political System*. New York: Alfred A. Knopf.
- Jasonoff, Sheila. (1985). Technological Innovation in a Corporatist State: The Case of Biotechnology in the Federal Republic of Germany. *Research Policy* 14: 23–38.
- Johnson, Chalmers (1982). *MITI and the Japanese Miracle*. Stanford, CA: Stanford University Press.
- Johnson, William R. (1985). The Economics of Copying. *Journal of Political Economy* 93: 158–74.
- Joyce, Craig, et al. (1994). *Copyright Law*. 3rd edition. New York: Matthew Bender.
- Kahler, Miles, ed. (1986). *The Politics of International Debt*. Ithaca, NY: Cornell University Press.
- Katzenstein, Peter J., ed. (1989). *Industry and Politics in West Germany: Toward the Third Republic*. Ithaca, NY: Cornell University Press.

- Keller, Wolfgang. (1996). Absorptive Capacity: On the Creation and Acquisition of Technology in Development. *Journal of Development Economics* 49: 199–227.
- Keen, Peter G.W. (1991). *Shaping the Future: Business Design through Information Technology*. Boston, MA: Harvard Business School Press.
- Kim, Daniel H. (1993). The Link between Individual and Organizational Learning. *Sloan Management Review* 35: 37–50.
- Kim, Linsu (1997). *Imitation to Innovation: The Dynamics of Korea's Technological Learning*. Boston, MA: Harvard Business School Press.
- Kitch, Edmund W. (1977). The Nature and Function of the Patent System. *Journal of Law and Economics* 20: 265–90.
- Kitschelt, Herbert (1991). Industrial Governance Structures, Innovation Strategies, and the Case of Japan: Sectoral or Cross-National Comparative Analysis? *International Organization* 45: 453–94.
- Kogut, Bruce (1991). Country Capabilities and the Permeability of Borders. *Strategic Management Journal* 12: 33–47.
- Kogut, Bruce, and Udo Zander (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science* 3: 383–97.
- Kondo, Edson K. (1995). The Effect of Patent Protection on Foreign Direct Investment. *Journal of World Trade* 29: 97–122.
- Kotabe, Massaki. (1996). Emerging Role of Technology Licensing in the Development of Global Product Strategy: Conceptual Framework and Research Propositions. *Journal of Marketing* 60: 73–88.
- Kraske, Jochen, et al. (1996). *Bankers with a Mission: The Presidents of the World Bank, 1946–91*. New York: Oxford University Press.
- Krasner, Stephen D. (1974). Oil Is the Exception. *Foreign Policy* 14: 64–85.
- (1978). *Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy*. Princeton, NJ: Princeton University Press.
- (1981). Power Structures and Regional Development Banks. *International Organization* 35: 303–28.
- Krueger, Anne O. (1995). *Trade Policies and Developing Nations*. Washington, DC: Brookings Institution Press.
- Kwitny, Jonathan (1984). *Endless Enemies: The Making of an Unfriendly World*. New York: Congdon & Weed.
- Landes, David S. (1969). *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*. New York: Cambridge University Press.
- Landes, William M., and Richard A. Posner (1989). An Economic Analysis of Copyright Law. *Journal of Legal Studies* 18: 325–63.
- Landau, Ralph, and Nathan Rosenberg (1992). Successful Commercialization in the Chemical Process Industries. In Nathan Rosenberg, Ralph Landau, and David C. Mowery, *Technology and the Wealth of Nations* (Stanford, CA: Stanford University Press): 73–120.
- Lardy, Nicholas (1992). *Foreign Trade and Economic Reform in China, 1978–1990*. New York: Cambridge University Press.

42 *Competitive Strategies for Protection of Intellectual Property*

- Leebaert, Derek, ed. (1991). *Technology 2001: The Future of Computing and Communications*. Cambridge, MA: MIT Press.
- (1995). *The Future of Software*. Cambridge, MA: MIT Press.
- (1998). *The Future of the Electronic Marketplace*. Cambridge, MA: MIT Press.
- Lerner, Josh (1995). Patenting in the Shadow of Competitors. *Journal of Law and Economics* 38: 463–95.
- Levitt, Barbara, and James G. March (1988). Organizational Learning. *Annual Review of Sociology* 14: 319–40.
- Lipson, Charles (1985). *Standing Guard: Protecting Foreign Capital in the Nineteenth and Twentieth Centuries*. Berkeley, CA: University of California Press.
- Malone, Michael S. (1995). *The Microprocessor: A Biography*. New York: Springer-Verlag.
- Mansfield, Edwin (1986). Patents and Innovation: An Empirical Study. *Management Science* 32: 173–81.
- (1995). Intellectual Property Protection, Direct Investment, and Technology Transfer: Germany, Japan, and the United States. Discussion Paper 27. Washington, DC: International Finance Corporation, World Bank. First circulated in 1992 as Unauthorized Use of Intellectual Property: Effects on Investment, Technology Transfer and Innovation. Unpublished paper. University of Pennsylvania, Philadelphia.
- Maskus, Keith (1990). Normative Concerns in the International Protection of Intellectual Property Rights. *World Economy* 13: 387–410.
- Mattli, Walter, and Anne-Marie Slaughter (1998). Revisiting the ECJ. *International Organization* 52: 177–210.
- Meinhardt, Peter (1946). *Inventions, Patents, and Monopoly*. London: Stevens & Sons.
- Merges, Robert P. (1988). Commercial Success and Patent Standards: Economic Perspectives on Innovation. *California Law Review* 76: 805–76.
- Merges, Robert P. and Richard R. Nelson (1990). On the Complicated Economics of Patent Scope. *Columbia Law Review* 90: 839–916.
- (1994). On Limiting or Encouraging Rivalry in Technical Progress: The Effect of Patent Scope Decisions. *Journal of Economic Behavior and Organizations* 25: 1–24.
- Methe, David T. (1991). *Technological Competition in Global Industries: Marketing and Planning Strategies for American Industry*. Westport, CT: Qurum Books.
- Miller, Arthur (1993). Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New since CONTU? *Harvard Law Review* 106:978–1073.
- Moran, Theodore H. (1998). *Foreign Direct Investment and Development: The New Policy Agenda for Developing Countries and Economies in Transition*. Washington, DC: Institute for International Economics.
- Mowery, David C., ed. (1996). *The International Computer Software Industry: A Comparative Study of Industry Evolution and Structure*. New York: Oxford University Press.
- Mowery, David C., and Nathan Rosenberg, eds. (1989). *Technology and the Pursuit of Economic Growth*. New York: Cambridge University Press.

- McCraw, Thomas K., ed. (1997). *Creating Modern Capitalism: How Entrepreneurs, Companies, and Countries Triumphed in Three Industrial Revolutions*. Cambridge, MA: Harvard University Press.
- Murtha, Thomas P. (1991). Surviving Industrial Targeting: State Credibility and Public Policy Contingencies in Multinational Subcontracting. *Journal of Law, Economics, and Organization* 7: 117–43.
- National Research Council and the World Bank (1995). *Marshaling Technology for Development*. Washington, DC: National Academy Press.
- National Science Board (1996). *Science and Engineering Indicators 1996*. Washington, DC: National Science Foundation.
- Negroponce, Nicholas (1995). *Being Digital*. New York: Alfred A. Knopf.
- Nelson, Joan M., ed. (1990). *Economic Crisis and Policy Choice: The Politics of Adjustment in the Third World*. Princeton, NJ: Princeton University Press.
- Nelson, Richard R., and Sidney G. Winter. (1982). *The Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
- North, Douglass C. (1989). Institutions and Economic Growth: An Historical Introduction. *World Development* 17: 1319–32.
- (1990). *Institutions, Institutional Change, and Economic Performance*. New York: Cambridge University Press.
- Okimoto, Daniel I. (1989). *Between MITI and the Market: Japanese Industrial Policy for High Technology*. Stanford, CA: Stanford University Press.
- Ordover, Janus A. (1991). A Patent System for Both Diffusion and Exclusion. *Journal of Economic Perspectives* 5: 43–60.
- Organisation for Economic Cooperation and Development [OECD] (1987). *International Technology Licensing: Survey Results*. Paris: OECD.
- Ostrom, Elinor (1995). New Horizons in Institutional Analysis. *American Political Science Review* 89: 174–78.
- Paine, Lynn Sharpe (1991). Trade Secrets and the Justification of Intellectual Property: A Comment on Hettinger. *Philosophy and Public Affairs* 20: 247–63.
- Pack, Howard, and Kamal Saggi (1997). Inflows of Foreign Technology and Indigenous Technological Development. *Review of Development Economics* 1: 81–98.
- Pakes, Ariel, and Margaret Simpson (1989). Patent Renewal Data. *Brookings Papers: Microeconomics*: 331–73. Washington, DC: Brookings Institution Press.
- Patel, Pari, and Keith Pavitt (1991). Large Firms in the Production of the World's Technology: An Important Case of "Non-Globalization." *Journal of International Business Studies* 22: 1–21.
- Pearson, Margaret M. (1991). *Joint Ventures in the People's Republic of China*. Princeton, NJ: Princeton University Press.
- Piore, Michael J., and Charles F. Sable. (1984). *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.
- Porter, Michael E. (1990). *The Competitive Advantage of Nations*. New York: Free Press.
- Prahalad, C.K., and Gary Hamel (1990). The Core Competence of the Corporation. *Harvard Business Review* 68, 6: 79–91.
- Primo Braga, Carlos A. (1995a). The Economic Justification for the Grant of Intellectual Property Rights: Patterns of Convergence and Conflict. Paper

44 *Competitive Strategies for Protection of Intellectual Property*

- presented at the Public Policy and Global Technological Integration Symposium, Kent College of Law, Illinois Institute of Technology, Chicago, IL (October 1995).
- (1995b). Trade-Related Intellectual Property Issues: The Uruguay Round Agreement and Its Economic Implications. In Will Martin and L. Alan Winters (eds.), *The Uruguay Round and the Developing Economies* (Washington, DC: World Bank): 381–411.
- Pucik, Vladimir, Noel M. Tichy, and Carole K. Barnett, eds. (1992). *Globalizing Management: Creating and Leading the Competitive Organization*. New York: John Wiley & Sons.
- Riggs, Fred W. (1963). Bureaucrats and Political Development. In Joseph LaPalombara (ed.), *Bureaucracy and Political Development* (Princeton, NJ: Princeton University Press): 120–67.
- (1964). *Administration in Developing Countries: The Theory of Prismatic Society*. Boston: Houghton Mifflin.
- Riskin, Carl (1987). *China's Political Economy: The Quest for Development since 1949*. New York: Oxford University Press.
- Rodwin, Lloyd, and Donald A. Schon, eds. (1994). *Rethinking the Development Experience: Essays Provoked by the Work of Albert O. Hirschman*. Washington, DC: Brookings Institution Press and Cambridge, MA: Lincoln Institute.
- Rosenberg, Nathan, Ralph Landau, and David C. Mowery, eds. (1992). *Technology and the Wealth of Nations*. Stanford, CA: Stanford University Press.
- Rosenberg, Nathan, and Richard R. Nelson (1994). American Universities and Technical Advance in Industry. *Research Policy* 23: 323–48.
- Samuelson, Pamela, et al. (1994). A Manifesto Concerning the Legal Protection of Computer Programs. *Columbia Law Review* 94: 2308–431.
- Scherer, F.M. (1992). *International High-Technology Competition*. Cambridge, MA: Harvard University Press.
- Scott, James C. (1972). *Comparative Political Corruption*. Englewood Cliffs, NJ: Prentice–Hall.
- Sell, Susan K. (1995). Intellectual Property Protection and Antitrust in the Developing World: Crisis, Coercion, and Choice. *International Organization* 49: 315–50.
- Shapiro, Carl, and Hal R. Varian (1999). *Information Rules: A Strategic Guide to the Network Economy*. Boston, MA: Harvard Business School Press.
- Sherwood, Robert M., and Carlos A. Primo Braga. (1996). Intellectual Property, Trade and Economic Development: A Road Map for the FTAA Negotiations. North-South Agenda Papers 21. University of Miami, Florida.
- Sjoholm, Fredrik (1996). *International Transfer of Knowledge: The Role of International Trade and Geographic Proximity*. *Weltwirtschaftliches Archiv* 132: 97–115.
- Sklar, Martin J. (1988). *The Corporate Reconstruction of American Capitalism, 1890–1916: The Market, the Law, and Politics*. New York: Cambridge University Press.
- (1992). *The United States as a Developing Country: Studies in U.S. History in the Progressive Era and the 1920s*. New York: Cambridge University Press.

- Skolnikoff, Eugene B. (1993). *The Elusive Transformation: Science, Technology, and the Evolution of International Politics*. Princeton, NJ: Princeton University Press.
- Shihata, Ibrahim F.I. (1991). *The World Bank in a Changing World: Selected Essays*. Boston, MA: Martinus Nijhoff.
- Smith, W. Rand (1993). International Economy and State Strategies: Recent Work in Comparative Political Economy. *Comparative Politics* 25: 351–72.
- Stewart, Thomas A. (1997). *Intellectual Capital: The New Wealth of Organizations*. New York: Doubleday.
- Stern, Nicholas (1989). The Economics of Development: A Survey. *Economic Journal* 99: 597–685.
- Stiglitz, Joseph E. (1974). Incentives and Risk Sharing in Sharecropping. *Review of Economic Studies* 41: 219–55.
- (1989). Markets, Market Failures, and Development. *American Economic Review* 79: 197–203.
- Stiglitz, Joseph E., and Lyn Squire (1998). International Development: Is It Possible? *Foreign Policy* 38: 138–51.
- Stiglitz, Joseph E., and Andrew Weiss (1981). Credit Rationing in Markets with Imperfect Information. *American Economic Review* 71: 393–410.
- Suchman, Marc C. (1989). Invention and Ritual: Notes on the Interrelation of Magic and Intellectual Property in Preliterate Societies. *Columbia Law Review* 89: 1264–94.
- Teece, David J. (1987). Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy. In David J. Teece (ed.), *The Competitive Challenge: Strategies for Industrial Innovation and Revival*: 185–219.
- Thurow, Lester C. (1997). Needed: A New System of Intellectual Property Rights. *Harvard Business Review* 75, 5: 94–107.
- United Nations Commission on Transnational Corporations [UNCTC] (1989). *New Issues in the Uruguay Round of Multilateral Trade Negotiations*. E.90.II.A.15. New York.
- (1990). *The Determinants of Foreign Direct Investment: A Survey of Evidence*. E.92.II.A.2. New York.
- United Nations Conference on Trade and Development [UNCTAD] (1986). Period Report 1986: Policies, Laws, and Regulations on Transfer, Application, and Development of Technology. TD/B/C.6/133. Geneva.
- United States Trade Representative (various dates). “Special 301” on Intellectual Property. Annual press releases. Washington, DC. (Note: “Special 301” is the annual review of country-by-country intellectual property policies announced by the Office of the United States Trade Representative under authority of the Section 301 trade policy. Under Special 301, the United States administration announces its bilateral and multilateral negotiation agenda for the year to follow.)
- Utterback, James M., and Fernando F. Suarez (1993). Innovation, Competition, and Industry Structure. *Research Policy* 22: 1–21.

- Valenzuela, J. Samuel, and Arturo Valenzuela (1978). Modernization and Dependency: Alternative Perspectives in the Study of Latin American Underdevelopment. *Comparative Politics* 10: 535–57.
- Valor, Josep, W. Earl Sasser, and Cate Reavis (1997). Information at the World Bank: In Search of a Technology Solution. *Harvard Business School Cases*. Boston, MA.
- von Hippel, Eric (1987). Cooperation between Rivals: Informal Know-How Trading. *Research Policy* 16: 291–302.
- Wade, Robert (1990). *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton, NJ: Princeton University Press.
- Wallace, Cynthia Day (1992). Foreign Direct Investment in the Third World. In Cynthia Day Wallace (ed.), *Foreign Direct Investment in the 1990s* (Washington, DC: Center for Strategic and International Studies).
- Walsh, Vivien (1984). Invention and Innovation in the Chemical Industry: Demand Pull or Discovery Push? *Research Policy* 13: 211–34.
- Waterbury, John (1993). *Exposed to Innumerable Delusions: Public Enterprise and State Power in Egypt, India, Mexico, and Turkey*. New York: Cambridge University Press.
- Weingast, Barry R. (1997). The Political Foundations of Democracy and the Rule of Law. *American Political Science Review* 91: 245–63.
- Williamson, John, ed. (1983). *IMF Conditionality*. Washington, DC: Institute for International Economics.
- Williamson, Oliver (1996). *The Mechanisms of Governance*. New York: Oxford University Press.
- Wilson, Dick (1992). Benefits and Beggars: The GSP Is Complicated, Unpredictable, and Controlled Essentially by Importers. *Far Eastern Economic Review* (March 19): 44.
- World Bank (1993). *The East Asian Miracle: Economic Growth and Public Policy*. New York: Oxford University Press.
- (1997). *World Development Report 1997: The State in a Changing World*. New York: Oxford University Press.
- (1998). *World Development Report 1998: Knowledge for Development*. New York: Oxford University Press.
- Ziegler, J. Nicholas (1995). Institutions, Elites, and Technological Change in France and Germany. *World Politics* 47: 341–72.
- Zysman, John (1983). *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change*. Ithaca, NY: Cornell University Press.