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INTELLECTUAL PROPERTY IN THE TWENTY-FIRST CENTURY: WILL THE DEVELOPING COUNTRIES LEAD OR FOLLOW?

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Abstract

Developing countries, particularly the BRIC countries of Brazil, Russia, India, and China, should accommodate their national systems of innovation to the worldwide intellectual property (IP) regime emerging after the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) in a way that maximizes global economic welfare in the foreseeable future. As many developed countries' experience demonstrates, badly configured, over-protectionist IP regimes stifle innovation by making inputs to future innovation too costly and too cumbersome to sustain over time. More carefully considered IP regimes, however, are an important way to protect innovative small- and medium-sized firms from predatory, larger competitors. The challenge is for emerging economies to capture the benefits of IP without importing the serious problems that developed countries have themselves failed to solve. Emerging economies can attain this balance by pursuing a policy of counter-harmonization in which they take advantage of existing exemptions in international agreements governing IP to establish regional, local, and international practices that promote more innovative, flexible uses of IP. Such practices include a research exemption for experimental uses of IP, government imposed nonexclusive licensing, anti-blocking provisions, an essential facilities doctrine, and compulsory licenses. Additional tools include an ex ante regime of compensatory liability rules for small scale innovation and sensible exceptions, particularly for science as well as general fair use provisions, to the exclusive rights of domestic copyright laws. Emerging economies will have to overcome strong economic pressure to accept more restrictive IP regimes as part of free trade agreements as well as a lack of technical expertise and internal government coordination. However, emerging economies have already accrued enough experience to be aware of the strengths and weaknesses of various IP schemes and their own ability to tailor IP to local needs. Developing countries will need to take advantage of that experience and defend innovative practices at international dispute resolution forums. Through creative, determined efforts, the developing countries can avoid other countries' IP excesses while establishing the kind of IP norms that address the real conditions of creativity and innovation in today's digitally empowered universe of scientific discourse.

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I. Introduction: Emerging Role of the BRIC Countries

The precise connection between intellectual property and economic development varies over time from country to country and region to region.[1] For example, one cannot doubt that intellectual property laws played a major role in the United States' development and economic growth over the past three decades. Yet, the moment one digs deeper, one discovers that, until 1982, the United States had one of the developed world's most pro-competitive patent laws (i.e., least protective); until 1978, it had relatively weak copyright laws; and until the 1980s, it had an aggressively interventionist competition law along with a robust doctrine of patent misuse.[2] Somehow, the U.S. economy managed to survive and thrive in this relatively low protectionist, highly competitive environment.

Similarly, Japan, India, China, Korea, Malaysia, and Brazil all managed to attain relatively high levels of economic growth without strong intellectual property rights.[3] The astounding success of the Indian pharmaceutical industry that began in the 1970s was achieved by means of a state policy that largely prohibited the patenting of medicinal products as such.[4] This phenomenon reminds us that intellectual property rights are but one component of overall economic growth; that different states have different factor endowments; and that in many countries, especially those at an early stage of development, a sound agricultural policy or a sound pro-competitive industrial policy with a supportive political and legal infrastructure are more likely to stimulate economic growth than intellectual property laws.[5]

At the same time, we may confidently agree that countries such as China, India, Brazil, Korea, Malaysia, Indonesia, Argentina, Russia, South Africa, and many other emerging economies will not reach their full economic potential without suitable intellectual property regimes.[6] For example, policymakers in most Asian countries that are already committed to becoming players in the knowledge economy clearly understand they will not reach the frontiers of that economy,[7] nor will they convert their economies' intangible, nonrivalrous outputs into tradeable knowledge goods, without articulating appropriate intellectual property laws and policies, along with a whole set of interrelated economic and political foundations that are essential to maintaining a viable post-industrial economy.[8] To this end,

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[1] See, e.g., Meir Pugatch, The Process of Intellectual Property Policy-Making in the 21st Century—Shifting from a General Welfare Model to a Multi-Dimensional One, 31 Eur. Intell. Prop. Rev. 307 (2009). See generally Keith E. Maskus, Intellectual Property Rights in the Global Economy 2–3 (2000); Meir P. Pugatch, Stockholm Network, If It Ain't Broke, Don't Fix It: A Discussion Paper on the Benefits of the Voluntary Market-Driven Approach to Innovation (2008) ("[I]nnovation both influences, and is influenced by, a number of exogenous or external factors—social, cultural and demographic trends, for example.").

[2] *See* Christopher May & Susan K. Sell, Intellectual Property Rights: A Critical History 139–42 (2006); James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, Law & Contemp. Probs., Winter/Spring 2003, at 33, 37–40; Keith E. Maskus & Jerome H. Reichman, *The Globalization of Private Knowledge Goods and the Privatization of Global Public Goods*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime (K.E. Maskus & J.H. Reichman eds., 2005); *see also* Herbert Hovenkamp, *The Intellectual Property–Antitrust Interface*, *in* 3 Issues in Competition Law and Policy 1979, 1980–86 (Wayne D. Collins ed., 2008) (examining the historic interplay between antitrust and intellectual property law and policy).

[3] See, e.g., Rochelle C. Dreyfuss, The Role of India, China, Brazil and Other Emerging Economies in Establishing Access Norms for Intellectual Property and Intellectual Property Lawmaking 2–4, 11 (Int'l Law & Justice Working Paper 2009/5, 2009), available at http://ssrn.com/abstract=1442785 (suggesting that some developing countries are now in a unique position to exercise their increasing influence to advance "pro-access views" and "contribute to the harmonization and integration" of international intellectual property norms).

[4] See, e.g., Amy Kapczynski, Harmonization and Its Discontents: A Case Study of TRIPS Implementation in India's Pharmaceutical Sector, 97 Cal. L. Rev. (forthcoming 2009).

[5] See Daniel Gervais, Of Clusters and Assumptions: Innovation as Part of a Full TRIPS Implementation, 77 Fordham L. Rev. 2353, 2371 (2009).

[6] *See, e.g.*, Dreyfuss, *supra* note 3, at 6, 11; Gervais, *supra* note 5, at 2360–61.

[7] United Nations Educ., Sci. & Cultural Org. (UNESCO), Towards Knowledge Societies 27–56 (2005) [hereinafter Towards Knowledge Societies]; *see also* Mary-Louise Kearney, UNESCO, *Research in the Knowledge Society: Global and Local Dimensions*, Concept Paper for the International Experts Workshop (Mar. 19–21, 2009), *available at* http://unesdoc.unesco.org/images/0018/001821/182189e.pdf (discussing the benefits of and obstacles to obtaining access to knowledge in developing countries).

China's third amendment of its Patent Law in 2008 expressly reflects "the needs of development of China herself," which require "the promotion of … independent innovation and the establishment of an innovation-oriented country."[9]

The moment one looks at Asia as a regional group, one is struck by how much the IP scenario has changed over the past twenty-five years, i.e., since the Organisation for Economic Cooperation and Development (OECD) countries began to press for higher, relatively harmonized worldwide IP standards under the aegis of what eventually became the TRIPS Agreement of 1994.[10] As many critics have observed, the TRIPS Agreement produced a regime that deliberately favored those OECD countries that already possessed developed national systems of innovation and whose multinational companies owned plenty of patented high-tech products to sell or manufacture around the world.[11] There was a built-in disposition to favor big companies seeking rents from existing innovations—or those in the pipeline—at the cost of making future innovations more difficult, especially for less technically advanced countries.[12]

Robert Ostergard recently described the "development dilemma" that TRIPS posed for poorer countries in the following terms:

> [I]f they open their domestic markets to trade, they face political and economic pressure to protect foreign IP; if they protect foreign IP, they create conditions that force them to abandon their goal to obtain IP as inexpensively as possible.[13]

Of course, these IP concessions were partly offset by trade concessions in other areas (side payments), such as textiles, agriculture, and traditionally manufactured goods, a calculus that worked differently for different countries.

Yet, as often happens in international law, efforts to rig a regime for short-term advantages may turn out, in the medium- and long-term, to boomerang against those who pressed hardest for its adoption. In my very first article on this subject, I warned that by reaching for high levels of international protection (that could not change in response to less-favorable domestic circumstances), technology-exporting countries risked fostering conditions that could erode their technological superiority and resulting terms of trade over time.[14] As more

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[8] *See generally* Daniel Gervais, *TRIPS and Development, in* Intellectual Property, Trade and Development 3 (Daniel J. Gervais ed., 2007); Peter Yu, *Intellectual Property, Economic Development, and the China Puzzle, in* Intellectual Property, Trade and Development, *supra*, at 173, 195.

[9] Xiaoqing Feng, The Interaction Between Enhancing the Capacity for Independent Innovation and Patent Protection: A Perspective on the Third Amendment to the Patent Law of the P.R. China, U. Pitt. J. Tech. L. & Pol'y, Spring 2009, at 1, 6; see also Andrea Wechsler, Intellectual Property in the P.R. China: A Powerful Economic Tool for Innovation and Development 42 (Max Planck Inst. for Intellectual Prop., Competition & Tax Law, Research Paper No. 09-02, 2008) ("China continues to realize the importance of both the unhampered influx of knowledge and intellectual property into China and the promotion of domestic innovation … [and] it has come to embed its IP policy into the framework of an overall pro-innovation industrial policy which protects domestic S&T innovations.").

[10] Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Legal Instruments—Results of the Uruguay Round, 33 I.L.M. 1125 (1994) [hereinafter TRIPS Agreement]. *See generally* Jerome H. Reichman, *Universal Minimum Standards of Intellectual Property Protection Under the TRIPS Component of the WTO Agreement, in* Intellectual Property and International Trade: The TRIPS Agreement 23 (Carlos M. Correa & Abdulqawi A. Yusuf eds., 2d ed. 2008).

[11] *See, e.g.*, May & Sell, *supra* note 2, at 187; Gervais, *supra* note 5, at 2357–58.

[12] *See* Peter Drahos with John Braithwaite, Information Feudalism: Who Owns the Knowledge Economy? 125–26 (2002); Jerome H. Reichman & Rochelle Cooper Dreyfuss, *Harmonization Without Consensus: Critical Reflections on Drafting a Substantive Patent Law Treaty*, 57 Duke L.J. 85, 94–96 (2007) (reasoning that high rents charged by technology exporters hamper developing countries' abilities to preserve their own comparative advantages).

[13] Robert L. Ostergard, Jr., Economic Growth and Intellectual Property Rights Protection: A Reassessment of the Conventional Wisdom, in Intellectual Property, Trade and Development, supra note 8, at 115, 155.

[14] J.H. Reichman, *Intellectual Property in International Trade: Opportunities and Risks of a GATT Connection*, 22 Vand. J. Transnat'l L. 747, 891 (1989). For evidence that this inversion is occurring within the Indian pharmaceutical industry, see Kapczynski, *supra* note 4 (noting that, instead of pushing Indian competitors out of the low-value Indian markets, multilateral pharmaceutical firms "may have also pushed Indian companies *into* the U.S. and EU markets on which their profits much more substantially rely").

technology-importing countries discovered and cultivated their own innovative strengths and capacities, they would benefit both from the worldwide system of incentives and protections that the TRIPS Agreement had established, as well as from location and other endowment factors,[15] at the expense of leading developed countries that took their own technical superiority for granted.

In short, given the "incipient transnational system of innovation"[16] that had begun to emerge from the TRIPS Agreement, there was every reason to expect that the BRIC group as a whole,[17] and many other emerging economies, would gradually become major competitors in the knowledge economy itself, with growing potential to match and challenge the advanced OECD countries' pre-existing comparative advantages in this area.[18]

That this transformation has been occurring all around us is too solidly evidenced for us to review here in detail.[19] What this Article will focus on, instead, is how those developing countries with growing technological prowess should accommodate their own national systems of innovation to the worldwide intellectual property regime emerging in the post-TRIPS period, with a view to maximizing global economic welfare in the foreseeable future.[20]

II. Avoiding Protectionist Excesses

High-protectionist visions of intellectual property law have become a kind of latter-day religion promoted by the special interests that have long dominated the political scene in the United States, the European Union (EU), and Japan.[21] The BRIC countries in particular will thus need to inoculate themselves against succumbing to these same high-protectionist delusions while there is still time.

If it remains true that a country cannot play in the knowledge economy without suitable intellectual property rights (IPRs),[22] experience in many OECD countries is demonstrating that badly configured, unbalanced, over-protectionist IP regimes gradually stifle innovation by making inputs to future innovation too costly and too cumbersome to sustain over time.[23]

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[15] *See* Yu, *supra* note 8, at 176–79.

[16] Maskus & Reichman, *supra* note 2, at 44.

[17] "BRIC" refers to those developing countries with fast-growing economies, especially Brazil, Russia, India, and China. *See* Dominic Wilson & Roopa Purushothaman, *Dreaming with BRICs: The Path to 2050*, at 3 (Goldman Sachs, Global Economics Paper No. 99, 2003), *available at* http://www2.goldmansachs.com/ideas/brics/book/99-dreaming.pdf.

[18] Maskus & Reichman, *supra* note 2, at 44; *see also* Jerome H. Reichman, *Richard Lillich Memorial Lecture: Nurturing a Transnational System of Innovation*, 16 J. Transnat'l L. & Pol'y 143, 147–48 (2007).

[19] *See* Carsten Fink & Keith E. Maskus, *Why We Study Intellectual Property Rights and What We Have Learned*, *in* Intellectual Property and Development 1, 7–8 (Carsten Fink & Keith E. Maskus eds., 2005); Wechsler, *supra* note 9 (case of China); Ricardo Machado Ruiz, Technological Leadership and Market Leadership: Expected Convergences or Structural Differences?, Paper Presented at the International Seminar INCT-PPED: Promoting Strategic Responses to Globalization, Rio de Janeiro, Brazil (Nov. 5, 2009) (case of Brazil).

[20] *See* Gervais, *supra* note 5, at 2361–71 (emphasizing adaptation problems of national systems of innovation and citing authorities).

[21] *See, e.g.*, Drahos with Braithwaite, *supra* note 12, at 11–12; Michael P. Ryan, Knowledge Diplomacy 85–89 (1998) (noting the influence of special interest groups on U.S. bilateral intellectual property diplomacy and citing specific examples). *But see generally* European Patent Office, Scenarios for the Future (2007) (evaluating four competing scenarios for the evolution of patent law regimes with very different and conflicting premises and outcomes).

[22] *See* Gervais, *supra* note 8, at 33–36; Wechsler, *supra* note 9, at 42–43 (stressing that China's new patent law was not the outcome of external pressure but was intended "to allow China's domestic firms to compete effectively with their foreign counterparts").

[23] *See* James Bessen & Michael J. Meurer, Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk 218 (2008) (describing the prohibitive costs of obtaining and litigating patents); James Boyle, The Public Domain: Enclosing the Commons of the Mind 113 (2008); Reichman & Dreyfuss, *supra* note 12, at 102–08; *see also* Jerome H. Reichman & Ruth L. Okediji, *Empowering Digitally Integrated Scientific Research: The Pivotal Role of Copyright Law's Limitations and Exceptions* 9–10 (Draft Version May 4, 2009), Paper Presented at the Fordham Conference on Intellectual Property Law and Policy, Cambridge University (Apr. 15, 2009); at the UNCTAD/ICTSD side event, Meeting of the Committee on Copyrights and Neighboring Rights, World Intellectual Property Organization, Geneva, Switzerland (May 29, 2009); and at the Meeting of the Task Force on Intellectual Property Rights and Development (IDP), University of Manchester (June 22–23, 2009).

Such regimes also enable large corporations that are sometimes slothful innovators to accumulate pools of cross-licensed patents that create barriers to entry for the truly innovative small- and medium-sized firms.[24] Properly designed IPRs do, however, protect innovative small- and medium-sized firms from the predatory practices of their larger competitors.

It is widely recognized that the patent system in the United States is emerging from a period of crisis. Among other problems, the cumulative costs of litigation generated by a plethora of weak patents that increasingly pervaded the upstream research dimension threaten to exceed the aggregate returns from patented innovation as such, especially in the field of information technologies.[25] There is still no consensus about how to reform the patent system, despite broad agreement that reforms are needed. As time passes, the demands of different industries become more contradictory and conflictual, particularly with regard to the information technology and biotechnology sectors.[26] For these and other reasons, the European Patent Office has expressed concerns about the uncertain future of the world patent system.[27]

None of these domestic tensions deterred either the United States Trade Representative (USTR) or the European Commission (EC) from demanding that the rest of the world adopt a proposed Substantive Patent Law Treaty that, at the international level, would have locked in place most of the very unsolved problems that confront the domestic system of innovation in the United States.[28] The rest of the world might logically ask which version of U.S. patent law the USTR now seeks to export, given that the U.S. Supreme Court has so profoundly changed it in a series of recent cases.[29] By the same token, one may also ask why certain Asian patent offices blindly supported these same proposals for a further upward ratcheting of international patent norms. It was as if their governments were asking the other OECD countries, “Please give us all your insoluble problems and contradictions as soon as possible, so we can undermine our own national systems of innovation, too.”[30]

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[24]*See, e.g.*, Geertrui van Overwalle, *Of Thickets, Blocks and Gaps. Designing Tools to Resolve Obstacles in the Gene Patents Landscape*, *in* Gene Patents and Collaborative Licensing Models 383 (Geertrui van Overwalle ed., 2009); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, *in* Innovation Policy and the Economy 1, 119, 130–31 (Adam B. Jaffe et al. eds., 2001).

[25]*See* Bessen & Meurer, *supra* note 23, at 218; Michael Heller, The Gridlock Economy 52–53 (2008); Adam B. Jaffe & Josh Lerner, Innovation and Its Discontents 4–5 (2004). Studies by the Federal Trade Commission and the National Academy of Sciences have also confirmed the diminishing returns that an unbalanced patent system has been producing in the United States. Heller, *supra*, at 65.

[26]Reichman & Dreyfuss, *supra* note 12, at 103–04.

[27]*See* European Patent Office, *supra* note 21, at 8–11 (evaluating four competing scenarios for the evolution of patent law regimes with very different and conflicting premises and outcomes); *see also* Paul Edward Geller, *An International Patent Utopia?*, 25 Eur. Intell. Prop. Rev. 515 (2003).

[28]*See, e.g.*, World Intell. Prop. Org. [WIPO], Standing Comm. on the Law of Patents, *Report*, at 4–5, 19–21, WIPO Doc. SCP/10/11 (June 1, 2005); WIPO, Standing Comm. on the Law of Patents, *Information on Certain Recent Developments in Relation to the Draft Substantive Patent Law Treaty (SPLT)*, at 1–3, WIPO Doc. SCP/10/8 (Mar. 17, 2004) (discussing the efforts of the standing committee to draft a Substantive Patent Law Treaty that can be quickly adopted and later supplemented once consensus is reached on controversial provisions).

[29]*See, e.g.*, Quanta Computer, Inc., v. LG Elecs., Inc., 128 S. Ct. 2109, 2122 (2008) (holding that the doctrine of patent exhaustion applies to the sale of components of a patented system); MedImmune, Inc., v. Genentech, Inc., 549 U.S. 118, 124–25 (2007) (holding that a patent licensee does not have to terminate its license agreement before it can seek a declaratory judgment that the patent is invalid); KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 426–28 (2007) (expanding the rules governing the inquiry into whether a patent claim is “obvious” in light of prior art, admonishing that such an analysis “must not be confined within a test or formulation too constrained to serve its purpose”); Microsoft Corp. v. AT&T Corp., 550 U.S. 437, 441–43 (2007) (holding that patent infringement occurs when one supplies a patented invention’s components from the United States and the product is reproduced; however, this rule does not apply to software exported but not installed overseas); eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391 (2006) (holding that the generally applicable four-factor test for permanent injunctive relief applies to disputes arising under Patent Act); *see also In re* Bilski, 545 F.3d 943, 956 (Fed. Cir. 2008) (en banc), *cert. granted sub nom.* Bilski v. Doll, 129 S. Ct. 2735 (2009) (holding the machine-or-transformation test to be the applicable test for determining patent eligibility of process claims in business method patent applications).

Of course, the more that high- and middle-income developing countries become players in the knowledge economy, the more they share some of the fears and risks that usually underlie demands for higher levels of protection by powerful sectors of the advanced technology-exporting countries. For example, Asian entrepreneurs want their own exports of knowledge goods protected in the developing countries whose markets they increasingly penetrate through foreign direct investment (FDI), licensing, or sales of high-tech products. They also want to maintain flows of FDI and market-driven technology transfer into their own countries, in order to bolster their growing technological capacities.

Yet, such concerns do not necessarily add up to a compelling case for higher levels of international intellectual property protection. On the contrary, the TRIPS Agreement itself provided an unprecedented platform of IP protection for exports after 2000,[31] and there is little evidence that this platform remains insufficient for the needs of Asian exporters, or for those of other emerging economies for the foreseeable future. Meanwhile, the relation between FDI and IPRs itself remains ambiguous, given that OECD technology exporters need entry into emerging economies as much as these economies need FDI and market-driven technology transfer from the OECD countries.[32]

In China, India, and Brazil, moreover, knowledge economy skills and capacities have apparently reached the point where the stimulating effects of IPRs will influence different sectors and stakeholders quite differently, depending on the extent to which they are still driven by imitation-related innovation or investments in basic, or at least relatively original, R&D.[33] Increasingly, tensions arise between those who demand relatively strong patent protection for, say, research-driven pharmaceuticals, and those who demand a more forgiving, pro-competitive approach favoring generic pharmaceutical producers and exporters.[34] In either case, how to protect cumulative and sequential innovation—as distinct from path-breaking innovation—becomes an ever more pressing problem as more small- and medium-sized firms acquire a taste and capacity for such innovation.[35]

A parallel set of problems that the BRIC countries and other emerging economies increasingly face is how to adjust the shifting relations between private and public goods. Education, public health, agricultural improvement, scientific research, and other important areas are still heavily dependent on the public sector in most of these countries. Yet international intellectual property rights may impede the acquisition of scientific[36] and educational materials;[37] essential medicines;[38] and seeds, stocks, and fertilizers needed for

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[30]For the view that "transnational legal culture" may link developing country patent offices into epistemic communities detached from broader policy considerations, see Kapczynski, *supra* note 4. *See also* Carolyn Deere, The Implementation Game 314–20 (2009) (studying the sources of the wide variation found in developing countries' use of TRIPS flexibilities and intellectual property enforcement in general).

[31]*See* TRIPS Agreement, *supra* note 10, art. 65.2 (setting the year 2000 as the end of the transition period for developing countries). For pharmaceuticals, the effective transition period ended in 2005. *Id.* art. 65.4. For some of the thirty-two least-developed countries, the transition period for patents in general need not end until 2013 and for pharmaceuticals, until 2016. *Id.* art. 66.1; World Trade Organization, Declaration on the TRIPS Agreement and Public Health, WT/MIN(01)/DEC/2 (Nov. 20, 2001), 41 I.L.M. 755 (2002) [hereinafter Doha Public Health Declaration]; Council for Trade-Related Aspects of Intellectual Property Rights, *Extension of the Transition Period Under Article 66.1 of the TRIPS Agreement for Least-Developed Country Members for Certain Obligations with Respect to Pharmaceutical Products*, IP/C/25 (July 1, 2002); Council for Trade-Related Aspects of Intellectual Property Rights, *Extension of the Transition Period under Article 66.1 for Least-Developed Country Members*, IP/C/40 (Nov. 30, 2005).

[32]*See* Yu, *supra* note 8, at 177–80 (emphasizing that stronger IP protection may not be necessary to attract FDI for countries that possess large and dynamic markets).

[33]*See, e.g.*, *id.* at 181–84 (discussing the relationship between FDI and IPRs in China's economic system); Kapczynski, *supra* note 4 (case of Indian pharmaceutical industries); Machado Ruiz, *supra* note 19; *see also* Pedro Nicoletti Mizukami & Ronaldo Lemos, *From Free Software to Free Culture: The Emergence of Open Business*, *in* Access to Knowledge in Brazil 25, 29–32 (Lea Shaver ed., 2008) (describing the relationship between FDI and IPRs in Brazil's economic system).

[34]See, e.g., Janice M. Mueller, The Tiger Awakens: The Tumultuous Transformation of India's Patent System and the Rise of Indian Pharmaceutical Innovation, 68 U. Pitt. L. Rev. 491, 539–41 (2007) (noting the divergent views of the pharmaceutical companies in India).

[35]*See, e.g.*, Reichman & Dreyfuss, *supra* note 12, at 118–20.

economic growth.[39] The extent to which these same types of impediments will adversely affect the development and dissemination of environmental technologies still remains to be seen.[40]

Even with regard to the role of public-sector investment in basic research, which has been crucial in the most developed countries, there remains great uncertainty about the kind of regulatory regimes needed to ensure an appropriate social return from publicly funded or publicly generated research initiatives.[41]

III. Designing Intellectual Property Laws for the Twenty-First Century

As the high- and middle-income developing countries seek to strengthen their own national systems of innovation, they must decide how to address the challenges posed by a now highly articulated worldwide intellectual property system. This task requires policy decisions affecting the growth of a knowledge economy, rather than an economy based on physical, capital, or natural resources, which have relatively little to do with intellectual property laws as such.[42]

To the extent that intellectual property laws do play an ancillary but important role, there are, roughly speaking, two different approaches on the table. One is to play it safe by sticking to time-tested IP solutions implemented in OECD countries, with perhaps a relatively greater emphasis on the flexibilities still permitted under TRIPS (and not overridden by relevant FTAs).[43] The other approach is to embark upon a more innovative

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[36]See, e.g., Reichman & Okediji, supra note 23, at 29–30 (arguing that broad exceptions for scientific uses are needed under current IP rules); J.H. Reichman & Paul F. Uhlir, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, Law & Contemp. Probs., Winter/Spring 2003, at 315, 461–62; Jacques Warcoin, *'Patent Tsunami' in the Field of Genetic Diagnostics. A Patent Practitioner's View, in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 331. *See generally* Boyle, *supra* note 23.

[37]Margaret Chon, Intellectual Property "from Below": Copyright and Capability for Education, 40 U.C. Davis L. Rev. 803, 821–29 (2007); Ruth L. Okediji, Sustainable Access to Copyrighted Digital Information Works in Developing Countries, in International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, supra note 2, at 142, 184–85.

[38]Frederick M. Abbott & Jerome H. Reichman, The Doha Round's Public Health Legacy: Strategies for the Production and Diffusion of Patented Medicines Under the Amended TRIPS Provisions, 10 J. Int'l Econ. L. 921, 928 (2007); Kevin Outterson, Pharmaceutical Arbitrage: Balancing Access and Innovation in International Prescription Drug Markets, 5 Yale J. Health Pol'y, L. & Ethics 193 (2005).

[39]Michael Blakeney, *Stimulating Agricultural Innovation, in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 367, 381; Robert E. Evenson, *Agricultural Research and Intellectual Property Rights, in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 188, 212–13; Timothy Swanson & Timo Goeschl, *Diffusion and Distribution: The Impacts on Poor Countries of Technological Enforcement Within the Biotechnology Sector, in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 669, 674–75; *see also* Michael Halewood, Agriculture and the Global Crop Commons, Paper Presented at the Task Force on Intellectual Property Rights and Development, Manchester, United Kingdom (June 23, 2009).

[40]See, e.g., Frederick M. Abbott, Innovation and Technology Transfer to Address Climate Change: Lessons from the Global Debate on Intellectual Property and Public Health 27–28 (Int'l Ctr. for Trade & Sustainable Dev., Issue Paper No. 24, 2009), available at http://ictsd.org/downloads/2009/07/innovation-and-technology-transfer-to-address-climate-change.pdf; Jerome Reichman, Arti K. Rai, Richard G. Newell & Jonathan B. Wiener, Intellectual Property and Alternatives: Strategies for Green Innovation 7–8 (Chatham House Energy, Env't & Dev. Program Paper, Preliminary Working Paper No. 08/03, 2008); Keith E. Maskus & Ruth L. Okediji, Intellectual Property Rights and International Technology Transfer to Address Climate Change: Risks, Opportunities, and Policy Options 16–17 (Nov. 2009) (unpublished manuscript, on file with Houston Law Review).

[41]*See, e.g.*, Bhaven N. Sampat, *The Bayh-Dole Model in Developing Countries: Reflections on the Indian Bill on Publicly Funded Intellectual Property* (United Nations Conference on Trade & Dev., Int'l Ctr. for Trade & Sustainable Dev., Policy Brief No. 5, 2009); Anthony D. So et al., *Is Bayh-Dole Good for Developing Countries? Lessons from the US Experience*, 6 PLoS Biology 2078, 2080–82 (2008); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, Law & Contemp. Probs., Winter/Spring 2003, at 289, 313–14 (arguing that funding agencies should be given more authority over universities to restrict patenting of publicly funded research).

[42]*See, e.g.*, Gervais, *supra* note 5, at 2361–71 (discussing strategies for research and education for the clustering or networking of centers of innovation, for steering innovation in suitable directions, for inculcating social norms conducive to innovation, and for a suitable regulatory infrastructure); Leonardo Burlamaqui, IPRs and Development Policy: From Intellectual Property to Knowledge Governance, Paper Presented at the International Seminar INCT-PPED: Promoting Strategic Responses to Globalization, Rio de Janeiro, Brazil (Nov. 5, 2009).

and even experimental path, with a view to addressing and perhaps solving the very problems that the advanced technology-exporting countries currently find so daunting.[44]

A. From "Fair Followers" to "Counter-Harmonization"[45]

Most technical assistance experts and many academics take the view that developing countries should stick to time-tested IP solutions while exploiting available exceptions and limitations recognized by developed countries. This approach affords the advantages of requiring relatively modest lawyering inputs (although it still requires more lawyering than one might think[46]); it may reduce internal debate about appropriate solutions; and it may deflect political and economic pressures from powerful countries whose own prior practices cast a comforting shadow.[47]

While this strategy seems politically expedient, Professor Dreyfuss and I remain skeptical for one main reason. At the end of the day, discreetly following in the technology-exporting countries' IP footsteps will merely bring the high- and middle-income developing countries face to face with the serious problems that the OECD countries have themselves failed to solve. It will place everyone in an equally unsatisfactory position, without having enhanced the governance skills of developing countries and without enriching the incipient transnational system of innovation with much-needed empirical evidence about alternative IP solutions to an array of apparently intractable problems. A deliberate policy of "counter-harmonization," instead, could "reduce the collective administrative costs of adopting an alternative patent regime, create a transnational 'counter-culture,' and increase the costs … of extralegal retaliation."[48]

Consider, for example, the choking and blocking effects that a proliferation of patents rooted in low nonobviousness standards increasingly produced for the software and, arguably, biotech industries in the United States and elsewhere.[49] This phenomenon elicits pressures for "quality patents" that would presumably result from higher nonobviousness standards,[50]

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[43]See Daniel J. Gervais, Epilogue: A TRIPS Implementation Toolbox, in Intellectual Property, Trade and Development, supra note 8, at 527, 529–30; J.H. Reichman, From Free Riders to Fair Followers: Global Competition Under the TRIPS Agreement, 29 N.Y.U. J. Int'l L. & Pol. 11, 13–16 (1997) (recommending strategies for developing and developed countries to implement TRIPS differently); see also Deere, supra note 30, at 2.

[44]*See* Reichman & Dreyfuss, *supra* note 12, at 93, 102–08; *see also* John F. Duffy, *Harmony and Diversity in Global Patent L*aw, 17 Berkeley Tech. L.J. 685, 691–92 (2002). The notion of nation states as conductors of experimental IP laboratories goes back to Stephen Ladas's discussion of the Paris Convention for the Protection of Industrial Property (1883). *See* 1 Stephen P. Ladas, Patents, Trademarks, and Related Rights 9–13 (1975).

[45]Professor Kapczynski has coined the felicitous term, "Counter-Harmonization," which I gratefully adopt here. *See* Kapczynski, *supra* note 4.

[46]*See* Gervais, *supra* note 43, at 529–31 (providing examples of bilateral agreements that, while adopting TRIPS norms, require nation-specific variations); Carlos M. Correa, *TRIPS and TRIPS-Plus Protection and Impacts in Latin America*, *in* Intellectual Property, Trade and Development, *supra* note 8, at 221, 225.

[47]*Cf.* Laurence R. Helfer, Karen J. Alter & M. Florencia Guerzovich, *Islands of Effective International Adjudication: Constructing an Intellectual Property Rule of Law in the Andean Community*, 103 Amer. J. Int'l L. 1, 16–36 (2009) (evidencing intense IP pressures on Latin American countries and collective response by the Andean Group); Robert C. Bird, *Developing Nations and the Compulsory License: Maximizing Access to Essential Medicines While Minimizing Investment Side Effects*, 37 J.L. Med. & Ethics 209, 219 (2009) (stressing retaliatory pressures on developing countries that adopt compulsory licensing schemes in order to maximize public health benefits under current IP regimes).

[48]Kapczynski, *supra* note 4; *see also* Reichman & Dreyfuss, *supra* note 12, at 121. Professor Gervais observes that "many developing countries also want a system that is simpler than some of the doctrines" in more technologically advanced countries, although he concedes that complexity is less of a problem for BRIC countries and other emerging economies. E-mail from Daniel Gervais, Professor of Law, Vanderbilt University Law School, to Jerome Reichman, Professor of Law, Duke University School of Law (Sept. 14, 2009) (on file with Author).

[49]*See, e.g.*, Rebecca S. Eisenberg, *Noncompliance, Nonenforcement, Nonproblem? Rethinking the Anticommons in Biomedical Research*, 45 Hous. L. Rev. 1059, 1079 (2008) (evaluating the argument that upstream patents may prevent projects in the biomedical field from getting off the ground); M.A. Heller & R.S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 Science 698, 699 (1998) (recognizing the increased cost associated with bundling patent licenses together); Arti K. Rai, John R. Allison & Bhaven N. Sampat, *University Software Ownership and Litigation: A First Examination*, 87 N.C. L. Rev. 1519, 1554 (2009) (arguing that certain university-owned patents allowed the right holders to "extract rents and perhaps even holdup development efforts"); *see also* Warcoin, *supra* note 36, at 331, 332–33.

and the U.S. Supreme Court has recently taken a first step in this direction,[51] pending further legislative reforms on the table.[52] But higher nonobviousness standards, without more, will also expose costly cumulative and sequential innovation to free-riding forms of market failure, which was the risk that induced the Federal Circuit to lower its nonobviousness standard in the first place.[53]

From this perspective, both the U.S. and foreign experiences reveal a cyclical or pendular shifting between states of under- and over-protection,[54] without policymakers ever having seriously addressed the underlying question of how appropriately to protect cumulative and sequential innovation at the core of much present-day technological progress.[55] This same question has now begun to surface in countries such as India and China.[56] For example, efforts to codify a relatively stiff standard of nonobviousness in the new Indian patent law were self-consciously aimed at freeing up space for India's thriving generic pharmaceutical industry.[57] But these same efforts elicited complaints that India's adoption of stiff eligibility standards would deprive the more research-driven pharmaceutical sector of sufficient incentives to invest in derivative applications of medicines initially developed abroad.[58]

Besides an appropriately selective nonobviousness standard, in other words, India and similarly situated developing countries need an appropriately designed domestic regime that stimulates investment in cumulative and sequential innovation. Such a regime must also avoid creating barriers to entry or unduly hindering the transformation of today's technological outputs into inputs for tomorrow's follow-on applications.[59]

Of course, the traditionalists would respond by recommending greater use of utility model laws,[60] and there has been a trend towards enacting such laws in the developing countries, including China.[61] But the limits and weaknesses of patent-like utility model laws have been well documented since the 1970s at least, as are their inherent logical and economic

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[50]*See, e.g.*, Heller, *supra* note 25, at 65 (outlining the Federal Trade Commission and National Academy of Sciences's recommendation for reforming and strengthening nonobviousness standards).

[51]*See id.* at 65–66 ("[T]he Court raised the bar for 'obviousness' … and reduced the ease with which patent holders can threaten other innovators with business-killing injunctions." (citing KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007))); *see also In re* Bilski, 545 F.3d 943, 997 (Fed. Cir. 2008) (en banc), *cert. granted sub nom.* Bilski v. Doll, 129 S. Ct. 2735 (2009) (revising eligibility criteria for business method patents).

[52]Patent Reform Act of 2009, S. 610, 111th Cong.; Patent Reform Act of 2009, H.R. 1260, 111th Cong. However, legislative efforts to further refine the nonobviousness standard are no longer apparent in the pending bills, after the Supreme Court's decision in KSR. *See generally* Jay Thomas, Keynote Address at the Seventh Annual Hot Topics in Intellectual Property Law Symposium, Duke University School of Law, Durham, North Carolina: Progressive Patent Policy in the Post-Reform Era (Feb. 29, 2008).

[53]See J.H. Reichman, Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation, 53 Vand. L. Rev. 1743, 1772–76 (2000); see also Douglas Gary Lichtman, The Economics of Innovation: Protecting Unpatentable Goods, 81 Minn. L. Rev. 693 (1997) (demonstrating difficulties of recouping development costs under current competitive conditions).

[54]J.H. Reichman, Legal Hybrids Between the Patent and Copyright Paradigms, 94 Colum. L. Rev. 2432, 2519 (1994) [hereinafter Reichman, Hybrids]; J.H. Reichman, Charting the Collapse of the Patent–Copyright Dichotomy: Premises for a Restructured International Intellectual Property System, 13 Cardozo Arts & Ent. L.J. 475, 515 (1995).

[55]See J.H. Reichman, Saving the Patent Law from Itself: Informal Remarks Concerning the Systemic Problems Afflicting Developed Intellectual Property Regimes, in Perspectives on the Properties of the Human Genome Project 289, 295–301 (F. Scott Kieff & John M. Olin eds., 2003) (suggesting that an alternative set of liability rules that requires second-comers to compensate first-comer improvers is necessary to protect cumulative innovation).

[56]Janice M. Mueller, *Biotechnology Patenting in India: Will Bio-Generics Lead a "Sunrise" Industry to Bio-Innovation?*, 76 UMKC L. Rev. 437, 446 (2007) (detailing India's efforts to promote biotechnology research through intellectual property protection, including the creation of a Biotechnology Patent Facilitating Cell aimed at facilitating the filing of patent applications); Janice M. Mueller, *Taking TRIPS to India—Novartis, Patent Law, and Access to Medicines*, 356 New Eng. J. Med. 541, 542 (2007) [hereinafter Mueller, *Taking TRIPS to India*] (highlighting increased patent protection measures taken by India since becoming a WTO member and resulting concerns); R.A. Mashelkar et al, Report of the Technical Expert Group on Patent Law Issues (2009), *available at* http://www.patentoffice.nic.in (expressing concerns that high standards for judging nonobviousness will adversely affect cumulative innovation); *see also* Yu, *supra* note 8, at 195–97 (noting that China initially overhauled its IPR system for admittance into the WTO).

[57]Mueller, *Taking TRIPS to India*, *supra* note 56, at 541.

[58]*See, e.g.*, *id.* (highlighting the controversy surrounding the Indian Patent Office's rejection of Gleevec's patent application for a leukemia drug); Mashelkar et al., *supra* note 56.

[59]*See generally* Reichman, *supra* note 53 (suggesting alternative intellectual property protection approaches that would deter free-riding appropriation of small-scale innovations without diminishing access to small-scale technical knowhow).

contradictions, even if such regimes often prove better than nothing.[62] Moreover, the Japanese experience suggests that advantages accruing from the use of utility models to surround foreign patents with tripwires of small-scale blocking effects tend to peter out once the country relying on this tactic shifts its own domestic emphasis to relatively basic research.[63] Sooner or later, utility model laws thus merely re-propose the same fundamental tensions that arise when too many patents cluster around the same rapidly developing technologies, each of which is dependent on preceding innovation and may stimulate equally dependent successive applications.[64]

In other words, the clear boundaries between property rights that are a presupposed necessary condition for efficient trading of knowledge goods have become inherently blurred and overlapping as a consequence of the patent law's struggle to keep abreast of the changing conditions of technological progress.[65] Why should the BRIC countries, for example, not address this and other related problems head on, instead of falling into the same old traps and pitfalls that undermine systems of innovation in the most developed countries?[66]

That the traditionally structured OECD innovation framework has become increasingly "brittle" over time[67] appears from even a quick review of its three main premises:

1. Upstream scientific research, primarily theoretical in nature, was to remain immune from IPRs and to be regulated by the sharing norms of Mertonian science;[68]
2. Routine innovation (largely cumulative and sequential in nature) was primarily protected as know-how by trade secret laws, which established a vast semi-commons accessible to all routine engineers willing to reverse-engineer by honest means, while also providing investors with natural lead time;[69]
3. Legal monopolies were to be bestowed only on significant inventions, beyond the reach of routine engineers, while competition rooted in legally protected lead time and other comparative advantages drove the innovation process.[70]

Today, instead, universities aggressively patent government-funded research results.[71] Many countries protect even scientific databases as such,[72] and there is no clear line between theoretical and applied research. The sharing norms of science have broken down to the point where they can only be maintained by contractually constructed scientific

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[60]*See* Reichman, *Hybrids*, *supra* note 54, at 2457–59 (explaining that utility model laws are designed to provide shorter term protection than patent laws through weaker nonobviousness standards and a narrower scope of protection); *see also* Lichtman, *supra* note 53 (advocating use of state sui generis regimes for a similar purpose).

[61]Lulin Gao, The Third Amendment of Patent Law and Its Implementation Regulations in China, Paper Presented at the Second Global Forum on Intellectual Property, Singapore Academy of Intellectual Property Law (Jan. 8–9, 2009); *see also* Feng, *supra* note 9, at 19 (stressing limited innovation ability in China and the corresponding need to encourage "invention creation" of utility models).

[62]*See* Reichman, *Hybrids*, *supra* note 54, at 2459 (citing authorities).

[63]*See id.* at 2455–59.

[64]*See* Eisenberg, *supra* note 49, 1063–64; Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 Minn. L. Rev. 917 (2005).

[65]*See* Bessen & Meurer, *supra* note 23, at 46–47; Eisenberg, *supra* note 49, at 1076–84 (discussing the possible dampening impact of patents and the accompanying due diligence on research especially in industrial settings); Reichman & Dreyfuss, *supra* note 12, at 103–04.

[66]*Cf.* Feng, *supra* note 9, at 15 (observing that one aim of China's patent laws is to "define the space where the public is free to exploit technology for invention-creations").

[67]Geoffrey Yu, Remarks at the Second Global Forum on Intellectual Property, Singapore Academy of Intellectual Property Law (Jan. 8–9, 2009).

[68]Rebecca S. Eisenberg, *Property Rights and the Norms of Science in Biotechnology Research*, 97 Yale L.J. 177, 181–84 (1987); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 Nw. U. L. Rev. 77, 89–91 (1999).

[69]Reichman, *supra* note 55, at 289, 291–93; *see also* Lichtman, *supra* note 53, at 727–28 (stressing the chronic inability of lead time to recoup R&D costs).

[70]*See* Reichman, *Hybrids*, *supra* note 54, at 2521–22.

[71]David C. Mowery et al., Ivory Tower and Industrial Innovation 92–95 (2004); So et al., *supra* note 41, at 2078–79.

commons that artfully manage legal, economic, and technical restrictions on data, materials, and information.[73] At the same time, the technical know-how underlying cumulative and sequential innovation can seldom be kept secret for very long. Hence, trade secret protection also breaks down, and investors faced with mounting front-end costs suffer from a chronic shortage of natural lead time.[74]

In response, patents, copyrights, and sui generis laws expand in all directions to absorb cumulative and sequential innovations that lack other refuges from free-riding appropriators and from the risk of market failure.[75] This trend, in turn, produces mounting thickets of rights that impede both technological progress and research, while the risk of endless litigation over uncertain legal boundaries leads to daunting litigation costs and anticompetitive, defensive patent pools held by big, but often slothful, technology distributors.[76]

B. Where Developing Country Leadership Could Make a Difference

The incipient transnational system of innovation emerging from the TRIPS Agreement will simply reproduce these same unpropitious conditions if the BRIC countries and their allies discreetly follow the models embedded in the most developed intellectual property systems. What we need instead are new models experimentally derived from bold attempts to deal directly with these and other unsolved problems.

I cannot, within the confines of this short Article, explore these problems in depth, although more and more academic attention is being focused upon them.[77] Let me instead put forward a partial list of initiatives that the BRIC countries, and other emerging economies, working perhaps within the framework of a WIPO Development Agenda,[78] could consider.

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[72]*See, e.g.*, Paul A. David, Koyaanisqatsi *in Cyberspace: The Economics of an "Out-of-Balance" Regime of Private Property Rights in Data and Information*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 81, 103 (detailing the implications of the European Union Directive on the Legal Protection of Databases); J.H. Reichman & Pamela Samuelson, *Intellectual Property Rights in Data?*, 50 Vand. L. Rev. 51, 76–77 (1997) (explaining the origins of EU's decision to allow the sui generis protection of databases). *See generally* Estelle Derclaye, The Legal Protection of Databases: A Comparative Analysis (2008).

[73]*See, e.g.*, John Wilbanks & James Boyle, Introduction to Science Commons 5 (2006), *available at* http://sciencecommons.org/wp-content/uploads/ScienceCommons_Concept_Paper.pdf (describing the launch of Science Commons, a project designed "to ease unnecessary legal and technical barriers to sharing, to promote innovation, [and] to provide easy, high quality tools that let individuals and organizations specify the terms under which they wished to share their material"); Peter Lee, *Contracting to Preserve Open Science: Consideration-Based Regulation in Patent Law*, 58 Emory L.J. 889, 940–42 (2009) [hereinafter Lee, *Contracting to Preserve*] (blaming the proliferation of patenting in university research for the decrease in sharing of research findings); Reichman & Uhlir, *supra* note 36, at 329–21 (advocating a new system of contractually created public access to scientific data as the solution to the increasing problem of hoarding); Peter Lee, *Toward a Distributive Commons in Patent Law* 33–34 (U.C. Davis Sch. of Law, Legal Studies Research Paper Series, Research Paper No. 177, 2009) [hereinafter Lee, *Distributive Commons*] (advocating a commons to solve the problems in technology distribution); Jerome H. Reichman, Tom Dedeurwaerdere & Paul F. Uhlir, Designing the Microbial Research Commons: Strategies for Accessing, Managing and Using Essential Public Knowledge Assets, ch. 2 (Oct. 9, 2009), presented at the International Symposium on Designing the Microbial Research Commons, Board on Research Data and Information, Policy and Global Affairs Division, National Academy of Sciences, Washington, D.C. (Oct. 8–9, 2009) (unpublished manuscript, on file with Author).

[74]Reichman, *supra* note 53, at 1747–48; *see also* Lichtman, *supra* note 53, at 727–28.

[75]*See, e.g.*, Reichman, *Hybrids*, *supra* note 54, at 2525, 2531–34; Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 Colum. L. Rev. 2308, 2339–40 (1994) (highlighting the necessity of legal proscription against copying in order to encourage innovation in the software industry and "cure the market failure that unconstrained copying would cause").

[76]*See* Shapiro, *supra* note 24; Eisenberg, *supra* note 49, at 1087–88 (exploring the "burden of inertia" regarding intellectual property rights and the resulting distribution of responsibility for the removal of access restrictions); *see also* Birgit Verbeure, *Patent Pooling for Gene-Based Diagnostic Testing. Conceptual Framework*, *in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 3.

[77]*See, e.g.*, Gene Patents and Collaborative Licensing Models, *supra* note 24 (discussing existing models designed to render patented genetic inventions accessible for use in research and exploring further alternatives); *supra* notes 49, 73; *see also* European Patent Office, *supra* note 21.

[78]*See, e.g.*, Jeremy de Beer, *Defining WIPO "Development Agenda," in* Implementing the World Intellectual Property Organization's Development Agenda 1, 1–2, 6–8 (Jeremy de Beer ed., 2009); Peter Yu, *A Tale of Two Development Agendas*, 35 Ohio N.U. L. Rev. 465 (2009).

The list is not meant to be exhaustive, only suggestive, but it does give an idea of the kind of initiatives that are needed.

1. Measures Concerning Patents—In 1997, I suggested that developing countries could help to accommodate international minimum standards of patent protection to their national development goals by adopting relatively stringent eligibility standards covering subject matter, novelty, nonobviousness, and disclosure.[79]

a. Eligibility Standards in BRIC Countries: The one country that has most aggressively pursued this strategy so far is India, which particularly seeks to promote its pharmaceutical industry. As Professor Kapczynski's research confirms, India's patent law denies subject-matter eligibility to new uses of known substances and new forms of known substances that do not enhance "efficacy." Its stiff nonobviousness standard requires "a technical advance" or economic significance, all with a view to discouraging "me-too" and derivative patents that would circumscribe the space in which generic producers could operate.[80] Although India cannot legally vary eligibility standards to suit the needs of different industries,[81] its generally high standards are reinforced by pre-grant and post-grant opposition procedures, and by stringent disclosure requirements,[82] which other high- and middle-income developing countries would do well to consider.

The level of nonobviousness to be established under the recently enacted third revision of the Chinese Patent Law was not clear at the time of writing. Article 22 reportedly requires "prominent substantive features" and "notable" progress (as distinct from utility models that require only "substantive features" and "progress"); but the Patent Examiner's Guidelines simply invoke the "person skilled in the art" standard used in most OECD countries without further illuminating the drafters' intent.[83]

The new Chinese law definitely adopts a broader, more absolute standard of novelty than before,[84] and it will allow a prior art defense to an infringement action that "to some extent shifts [the] validity issue of a patent from … [the examiners] to the court."[85] The Chinese law will also require disclosure of origin for genetic resources, and may invalidate a pending patent if laws and regulations pertaining to licit procurement and use of such resources have been violated.[86]

In general, it seems likely that the problems of low quality patents that recently plagued developed countries would become more pernicious if allowed to take root in high- and middle-income developing countries. In particular, low standards of nonobviousness would allow powerful foreign companies that accumulate patents on incremental innovations to

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[79]*See* Reichman, *supra* note 43, at 26–42.
[80]*See* The Patents Act, 1970, No. 39, Acts of Parliament, 1970, § 3(d)–(f), *as amended by* The Patents (Amendment) Act, 2005, No. 15, Acts of Parliament, 2005; Kapczynski, *supra* note 4.
[81]*See* TRIPS Agreement, *supra* note 10, art. 27.1 ("[P]atents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced."); Dreyfuss, *supra* note 3, at 12 (explaining how India's system adapted in order to meet the neutrality standard in TRIPS, while ensuring that the public will continue to have access to generic drugs).
[82]*See* Mueller, *supra* note 34, at 567–74; Kapczynski, *supra* note 4.
[83]*See, e.g.*, Gao, *supra* note 61; E-mail from Jia Hua, Ph.D. Candidate, The Pennsylvania State University, to Jerome Reichman, Professor of Law, Duke University School of Law (Nov. 17, 2009) (on file with Author).
[84]*See, e.g.*, Gao, *supra* note 61 (discussing pending Articles 23 and 24); *see also* Wenting Cheng, *Third Revision of Patent Law in China (Part I)*, Intell. Prop. Watch, Sept. 8, 2009, http://www.ip-watch.org/weblog/2009/09/08/third-revision-of-patent-law-in-china (discussing Article 22 of the Chinese Patent Law (as amended 2009), which extends disclosure of prior use or any other means "from domestic (relative) to international (absolute)").
[85]*Id.;* Gao, *supra* note 61 (discussing pending art. 63).
[86]*See infra* notes 316–19 and accompanying text.

block local improvers in developing countries and to maintain patent pools that could create formidable barriers to entry.

Even the United States has recently begun to elevate its eligibility standards,[87] although not as steeply as those in India. Because governments cannot discriminate against foreigners,[88] however, high standards of eligibility must apply equally to local inventors. The latter remain free to patent abroad, whatever the status of their inventions at home,[89] while "second tier" protection may be available to stimulate local investment in small-scale innovation.[90]

Needless to say, the policy space for evaluating eligibility standards against local development needs could shrink drastically if such standards were harmonized by TRIPS-plus specifications under a Substantive Patent Law Treaty (SPLT).[91] Developing countries should accordingly continue to resist such a harmonization exercise.

b. Problems on the Frontiers of Science: Another reason for resisting premature harmonization exercises is that, even in developed countries, experts remain uncertain how best to resolve problems affecting cutting-edge technologies,[92] which makes evaluation of the relevant issues even more difficult in developing countries. For example, recent studies of the seminal genomic discoveries carried out at Duke University, under a grant from the National Institutes of Health and the Department of Energy, suggest a number of recurring problems on the frontiers of science that sometimes pose unresolved problems for the patent system as a whole.[93] These include:

- Broad foundational patents that can block research and downstream applications and that produce high transaction costs for would-be users.[94] For example, polymerase chain reaction (PCR) and recombinant DNA cloning were covered by a few patents, with narrowly averted blocking effects.[95]
- An even bigger problem arises when basic research platforms are covered by multiple patents held by dispersed owners, public and private.[96]
- More generally, thickets of overlapping patents may cover a research platform or multiple components of an end product, especially in interdisciplinary research fields. This problem arises, for example, with regard to microarrays, synthetic biology (which combines life sciences, computer science, and electrical engineering), and now even nanotechnology.[97]

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[87] *See* KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 427 (2007) ("[T]he results of ordinary innovation are not the subject of exclusive rights under the patent laws."); *In re* Bilski, 545 F.3d 943, 952 (Fed. Cir. 2008) (en banc), *cert. granted sub nom.* Bilski v. Doll, 129 S. Ct. 2735 (2009).

[88] *See* TRIPS Agreement, *supra* note 10, arts. 2.1, 3–4; Paris Convention for the Protection of Industrial Property art. 2(1), Mar. 20, 1883, *revised* July 14, 1967, 21 U.S.T. 1583, 828 U.N.T.S. 305 [hereinafter Paris Convention].

[89] TRIPS Agreement, *supra* note 10, art. 2.1; Paris Convention, *supra* note 88, art. 4*bis*(1).

[90] *See supra* notes 59–66 and accompanying text; *infra* text accompanying notes 158–63.

[91] *See* Reichman & Dreyfuss, *supra* note 12, at 98–102.

[92] *See id.* at 103.

[93] Jerome H. Reichman & Jennifer Giordano Coltart, A Holistic Approach to Patents Affecting Frontier Sciences: Lessons from the Seminal Genomic Discovery Studies, Paper Presented at the CEER Retreat, Duke University Center for Genetics, Ethics & Law (Apr. 2008) and at the European Patent Forum: Inventing a Cleaner Future: Climate Change and the Opportunities for IP, Ljubljana, Slovenia (May 2008).

[94] *See* Eisenberg, *supra* note 49, at 1084–85.

[95] Reichman & Giordano Coltart, *supra* note 93, at 4–6 (discussing Cohen-Boyer patents), 5–6 (discussing PCR, which largely emerged from the private sector).

[96] *See* Frischmann, *supra* note 64, at 995–97 (asserting that competition among downstream users for exclusive licenses favors uses reasonably expected to generate appropriate returns, leaving "socially valuable research paths … fallow and unexplored"); Lee, *Contracting to Preserve*, *supra* note 73, at 903.

- With particular regard to information technology, hundreds of patents on small contributions may yield patent thickets with vague boundaries, resulting in holdups and excessive litigation.[98] A similar, if less dramatic process affects private-sector innovators in biotechnology,[99] although the extent of this problem in that sector remains controversial.[100]
- Massing of patents for defensive purposes (especially in IT) may block entry to competitors and innovators.[101]

All these problems—and the resulting transaction costs—were then worsened by the proliferation of low quality patents, especially in the United States.

These and related problems could inhibit research and keep innovators in BRIC countries and other emerging economies from realizing their full potential in the biotechnology and information industries. They increasingly deter private-sector researchers and investors in developed countries from exploring promising routes,[102] while placing universities in a delicate legal position as academics ignore patents when conducting cutting-edge research.[103] Worse, they could eventually complicate the race for innovative climate change technology if future massive government funding were to replicate problems now experienced in biotech and IT.[104]

Generally speaking, the evidence points to the emergence of complex frontier sciences that may require integrated management in their upstream dimension (and sometimes even in the applications domain).[105] A holistic approach to intellectual infrastructure may then become essential. But the patent system operates on an ad hoc, case-by-case basis that is not designed to address or govern such complex innovation systems. There results a risk of systemic conflict between the holistic needs of frontier science (with its own corresponding innovation policy) and the methodology of traditional intellectual property laws.[106]

i. Some Possible Solutions: In principle, at least five primary measures, with varying degrees of nuance, can be envisioned to address these challenges.

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[97] *See* Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 Tex. L. Rev. 1745, 1747 (2007); Mark A. Lemley, *Patenting Nanotechnology*, 58 Stan. L. Rev. 601, 618–22 (2005); Tim Lenoir & Eric Giannella, *The Emergence and Diffusion of DNA Microarray Technology*, J. Biomedical Discovery & Collaboration, Aug. 22, 2006, *available at* http://www.j-biomed-discovery.com/content/pdf/1747-5333-1-11.pdf.

[98] *See* Bessen & Meurer, *supra* note 23, at 51–54 (attributing the "poor performance of the notice function in the patent system" to "fuzzy and unpredictable" patent boundaries, the ease with which patent boundary information can be hidden from the public, the disconnect between patent rights and possession of an invention, and the failure of systemic safeguards against patent proliferation); Rai, Allison & Sampat, *supra* note 49, at 1551–54.

[99] Eisenberg, *supra* note 49, at 1072; Warcoin, *supra* note 36, at 331–32 (describing a "patent tsunami" in diagnostics and related fields).

[100] Eisenberg, *supra* note 49, at 1081–84 (summarizing studies of the experiences of research-performing institutions regarding the effects of intellectual property restrictions); John P. Walsh, Ashish Arora & Wesley M. Cohen, *Effects of Research Tool Patents and Licensing on Biomedical Innovation*, *in* Patents in the Knowledge-Based Economy 285, 292–93 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) (finding little empirical evidence of "constraints" on scientific research and considerable evidence of widespread infringement by academic scientists who ignore patents); *see also* Christopher M. Holman, *The Impact of Human Gene Patents on Innovation and Access: A Survey of Human Gene Patent Litigation*, 76 UMKC L. Rev. 295 (2007) (finding little evidence that gene patents adversely impact research and public health in contrast to biomedical patents on key pathways and patents on information technologies).

[101] *See* Shapiro, *supra* note 24, at 120–21; Verbeure, *supra* note 76, at 4–7.

[102] *See, e.g.*, Eisenberg, *supra* note 49, at 1080; Warcoin, *supra* note 36, at 331–32; *see also* Fiona Murray & Scott Stern, *Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge? An Empirical Test of the Anti-Commons Hypothesis* 25, 27 (Nat'l Bureau of Econ. Research, Working Paper No. 11465, 2005).

[103] *See, e.g.*, Walsh et al., *supra* note 100.

[104] *See* Reichman et al., *supra* note 40, at 7–8.

[105] *See* Frischmann, *supra* note 96, at 998–1003 (advocating a hybrid of various possible solutions to revive the information commons); van Overwalle, *supra* note 24, at 385–90.

[106] Reichman & Giordano Coltart, *supra* note 93, at 19.

- A broad research exemption for the experimental users of patented inventions to find new inventions, to invent around old ones, or to develop improvements;[107]
- An administrative or judicial power to require that the invention be made available on a nonexclusive license;[108]
- An anti-blocking provision, normally in the form of a compulsory license for dependent patents, that allows improvers to avoid infringing a dominant patent;[109]
- An "essential facilities" doctrine, familiar from competition law theory and practice, that would allow the pooling of overlapping patents within a platform technology;[110]
- Compulsory licensing, either for government (noncommercial) use or to enable third parties to supply the market in the public interest.[111]

In practice, the availability of these solutions, and still others that have been proposed in developed countries,[112] varies from country to country and is always somewhat problematic. Yet, nothing in the multilateral conventions prevents developing countries from implementing these and other related provisions in their domestic laws.

U.S. patent law currently lacks a bona fide research exemption, and there is little chance that legislative reform will fill this gap. The formal position in the European Union is better,[113] but actual state practice seems to have narrowed the factual availability of this exception. If so, that state of affairs would afford an obvious opportunity for "counter-harmonization"[114] where developing countries could take the lead.

The Chinese Patent Law, as amended in 2008, codifies a so-called Bolar exception, which permits generic producers to reverse-engineer patented medicines and to conduct clinical trials prior to the expiration of the patent.[115] A WTO panel upheld the legitimacy of this exception under Article 30 of the TRIPS Agreement.[116] Whether Chinese patent law will

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[107] *See, e.g.*, Convention on the Grant of European Patents art. 64(1), Oct. 5, 1973, 1065 U.N.T.S. 255, 274; Rudolph J.R. Peritz, *Freedom to Experiment: Toward a Concept of Inventor Welfare*, 90 J. Pat. & Trademark Off. Soc'y 245 (2008).

[108] *See* eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 396–97 (2006) (Kennedy, J., concurring) (explaining that in the current system, injunctions can be used as a bargaining chip to charge licensees exorbitant fees).

[109] *See* TRIPS Agreement, *supra* note 10, art. 31(*l*) (stating the conditions under which a compulsory licence for a dependent patent may be granted); Gustavo Ghidini, Intellectual Property and Competition Law 44–45 (2006) (advocating the use of compulsory licensing where the subject of an existing patent "has been developed through an entirely different and more advanced process").

[110] *See* Brett Frischmann & Spencer Weber Waller, *Revitalizing Essential Facilities*, 75 Antitrust L.J. 1, 10–21 (2008) ("Essential Facilities, Infrastructure, and Open Access"); Herbert Hovenkamp, Mark Janis & Mark A. Lemley, *Anticompetitive Settlement of Intellectual Property Disputes*, 87 Minn. L. Rev. 1719, 1744–45 (2003) (promoting the idea of cross-licenses that allow parties to use each other's technology without fear of liability); Allen Kezsbom & Alan V. Goldman, *No Shortcut to Antitrust Analysis: The Twisted Journey of the "Essential Facilities" Doctrine*, 1996 Colum. Bus. L. Rev. 1, 1–2 ("[W]hen a monopolist or near-monopolist controlling what is deemed an 'essential facility' denies an actual or potential competitor access to that facility, where the facility cannot reasonably be duplicated and where there is no valid … justification for denying access, then the doctrine is applied."). *But see* Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 410–11 (2004) (declining to recognize or repudiate the essential facilities doctrine but suggesting that it would not mandate complete cooperation between competitors even if recognized).

[111] *See* TRIPS Agreement, *supra* note 10, art. 31; Jerome H. Reichman with Catherine Hasenzahl, *Non-Voluntary Licensing of Patented Inventions: Historical Perspective Under TRIPS, and an Overview of the Practice in Canada and the USA* 10, 24 (Int'l Ctr. for Trade & Sustainable Dev., Issue Paper No. 5, 2003), *available at* http://ictsd.org/downloads/2008/06/cs_reichman_hasenzahl.pdf (chronicling the history of compulsory licenses and the situations in which such licenses can be used most effectively).

[112] *See generally* Gene Patents and Collaborative Licensing Models, *supra* note 24 (exploring proposals and experience with patent pools, clearing houses, open source models, and liability regimes).

[113] *See* Madey v. Duke Univ., 307 F.3d 1351, 1360–62 (Fed. Cir. 2002) (narrowly construing the experimental use defense to patent infringement); Peritz, *supra* note 107; Convention for the European Patent for the Common Market (Community Patent Convention), art. 31(b), 1976 O.J. (L 17) 1, 9; Agreement Relating to Community Patents, art. 27(b), 1989 O.J. (L 401) 1, 15 (not yet in force).

[114] *See supra* note 48 and accompanying text.

[115] *See* Feng, *supra* note 9, at 109 & n.190 (arguing that Article 69(5) of the Chinese Patent Law (as amended 2008) "helps to balance the relationship between the interests of the patentee and the public [] and to prevent the abuse of patent rights").

[116] Panel Report, *Canada—Patent Protection of Pharmaceutical Products*, ¶ 7.45, WT/DS114/R (Mar. 17, 2000).

maintain a broad exception for scientific research generally was not clear at the time of writing.[117]

There is no anti-blocking provision in U.S. patent law.[118] Hence, if a dominant patentee and an improver bargain to impasse, as occurs from time to time, the dominant patentee may keep a patented improvement off the market because its sale or use would infringe the former's patent.[119] While this result may suit a dominant patentee because it defends him or her from a serious threat of competition, it lessens social welfare by depriving the public of the improved product,[120] unless the government intervenes with a public interest compulsory license.

Many European countries have accordingly codified compulsory licenses for dependent patents,[121] which are perfectly compatible with the TRIPS Agreement,[122] although European patent authorities had, until recently, been reluctant to grant them in practice. Anecdotal evidence suggests that the authorities in Europe may now be more willing to grant such licenses and that, even in the past, parties in Italy, Germany, and the United Kingdom tended to bargain around the possible threat of such an anti-blocking measure, despite the fact that few such licenses were actually granted.[123]

While China will include a dependent compulsory license in its pending patent reform, its availability in other developing countries is not widely reported.[124] Here, in other words, one finds a relatively uncontroversial candidate for actual harmonization under TRIPS, rather than "counter-harmonization," that developing countries should wholeheartedly embrace.

Even in the absence of a patented improvement as such, the complexity of present-day inventions in which numerous overlapping patents may be combined makes it advisable that courts have the power to deny permanent injunctions for infringement in the public interest and to allow compensation instead, preferably in the form of reasonable royalties. This use of a liability rule, rather than a property rule, seems especially pertinent when the parties are not in head-to-head competition, or when one of them does not actually work the patents it owns, as cases following the Supreme Court's *eBay* decision[125] in the United States have increasingly recognized.[126] Professor Kapczynski, among others, rightly commends this approach to the developing countries, and she presents evidence that Indian case law has already begun to cite *eBay* with approval.[127]

At higher levels of technological development, moreover, the advent of platform technologies, often affecting upstream research tools, may arise suddenly out of a convergence of formerly separate interdisciplinary pursuits. Such a situation can present

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[117] *See, e.g.*, Feng, *supra* note 9, at 109 n.190 (noting the existence of an "exception for the purpose of scientific research and experiment" in prior law without further comment on its scope).
[118] *See* Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 Tenn. L. Rev. 75, 84–85 (1994).
[119] Ghidini, *supra* note 109, at 36–37.
[120] *Id.* at 37–41.
[121] *See* Reichman with Hasenzahl, *supra* note 111, at 12.
[122] *See* TRIPS Agreement, *supra* note 10, art. 31(*l*).
[123] Interviews with Professors Ghidini, Anderman, and Hanns Ullrich.
[124] *See* Gao, *supra* note 61. It seems likely, but not certain, that a compulsory license for a dependent patent could be justified under Article 84 of the Indian patent law as it exists. *See* Kapczynski, *supra* note 4.
[125] eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 393 (2006) (determining that a patent holder's lack of commercial activity in working a patent should not automatically preclude the granting of a permanent injunction, nor does a finding of infringement automatically entitle the holder to such an injunction).
[126] *See, e.g.*, Christopher Phelps & Assocs. v. Galloway, 492 F.3d 532, 543 (4th Cir. 2007) (applying the *eBay* holding and rejecting the plaintiff's argument that it is entitled to injunctive relief to remedy a copyright infringement).
[127] Kapczynski, *supra* note 4; Amy Kapczynski, *Innovation Policy for a New Era*, 37 J.L. Med. & Ethics 264, 267–68 (2009).

formidable holdout problems that can adversely affect both basic research and downstream applications, as occurred in the case of microarrays.[128] If nothing is done, a dominant aggregator may sometimes solve the problem by means of vertical integration, while leaving the progress of science in an uncertain state and possibly generating serious antitrust problems to boot.[129]

To solve this problem, when it arises, governments need the authority to override existing exclusive licenses and to grant nonexclusive licenses to additional or alternative parties in the public interest.[130] For example, governments must be able to pool or bundle platform technologies and to make the platform available as a whole to downstream applications when the platform becomes an essential infrastructure for future research and innovation.[131] In that case, all third parties who use the pooled technology should have to pay equitable compensation from their applications to the bundle or trust, for distribution to right holders.[132]

In principle, competition law can reach a comparable result by means of an "essential facilities" doctrine, which has sometimes been used in the European Union,[133] but remains in a semi-moribund state under existing case law in the United States.[134] Of course, a compulsory license for government use can also be invoked to address such a situation without a need to surmount the hurdles of competition law, and the United States has invoked government use licenses for similar purposes in the past.[135] Both India and China have enacted comprehensive compulsory licensing schedules that appear to clearly encompass such a power.[136]

Nevertheless, developing countries with growing technological prowess should consider fashioning at least some guidelines, if not an actual codification, that would enable the authorities to intervene under an established "essential facilities" doctrine in order to rescue a platform technology when circumstances so require.[137] Such intervention becomes

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[128] *See, e.g.*, Lenoir & Giannella, *supra* note 97; Kumar & Rai, *supra* note 97; Frischmann, *supra* note 64.

[129] *See, e.g.*, Audio tape: Suzanne Scotchmer, A Nonobvious Discussion of Patents, held by the 7th Annual Meredith and Kip Frey Lecture in Intellectual Property, Duke University Law School (Apr. 3, 2008), *available at* http://www.law.duke.edu/webcast/podcast/?match=Suzanne+Scotchmer (discussing the dominant aggregatory outcome); Frischmann & Weber Waller, *supra* note 110, at 10–28.

[130] *See, e.g.*, So et al., *supra* note 41; Peter Lee, *The Evolution of Intellectual Infrastructure*, 83 Wash. L. Rev. 39, 102–20 (2008); Reichman et al., *supra* note 40.

[131] *See, e.g.*, So et al., *supra* note 41, at 2081; Verbeure, *supra* note 76, at 16–20 (case studies), 21–29 (application to diagnostic testing); Frischmann, *supra* note 64; Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 Colum. L. Rev. 839, 890–91 (1990) (demonstrating that a government-imposed patent pool enabled the manufacture of airplanes for use in World War I).

[132] *See, e.g.*, Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, ch. 2 (proposing pooled semicommons for upstream microbial research materials, with liability rules for downstream applications); *see also* Lee, *supra* note 130, at 112–16 (showing the critical role of liability rules in preserving access to intellectual infrastructure); Arti K. Rai, Jerome H. Reichman, Paul F. Uhlir & Colin Crossman, *Pathways Across the Valley of Death: Novel Intellectual Property Strategies for Accelerated Drug Discovery*, 8 Yale J. Health Pol'y L. & Ethics 1, 20–30 (2008) (proposing the pooling of pre-competitive small molecule libraries, with liability rule option); Reichman et al., *supra* note 40, at 28–33 (identifying technical tools under the TRIPS Agreement for breaking obstacles to transfer of green technologies). *See generally* Reichman, *supra* note 53, at 1776–77 (proposing a compensatory liability regime in place of a model that favors hybrid exclusive rights).

[133] *See, e.g.*, Case T-201/04, Microsoft Corp. v. Comm'n, 2007 E.C.R. II-3601; Emanuela Arezzo, *Intellectual Property Rights at the Crossroad Between Monopolization and Abuse of Dominant Position: American and European Approaches Compared*, 24 J. Marshall J. Computer & Info. L. 455, 486–87 (2006) (noting that the European Court of Justice has never formally recognized the "essential facilities" doctrine); Rita Coco, *Antitrust Liability for Refusal to License Intellectual Property: A Comparative Analysis and the International Setting*, 12 Marq. Intell. Prop. L. Rev. 1, 14–17 (2008) (discussing the evolution of the "exceptional circumstances" doctrine as applied by the European Court of Justice to create an "essential facilities" paradigm).

[134] Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 410–11 (2004) (declining to recognize or repudiate the "essential facilities" doctrine). *But see* Frischmann & Weber Waller, *supra* note 110 (making the case for revitalizing this doctrine to promote access to intellectual infrastructure).

[135] Reichman with Hasenzahl, *supra* note 111, at 5.

[136] *See, e.g.*, Feng, *supra* note 9, at 29–31; Kapczynski, *supra* note 4; Gao, *supra* note 61.

[137] Frischmann & Weber Waller, *supra* note 110, at 17–28.

particularly necessary when holdouts elevate the prices charged for use of the platform to the point where both research and applications risk becoming casualties of deadweight loss.

Notice that, with regard to compulsory licenses for government use, which are widely invoked in the United States for multiple purposes, and not just national security, the TRIPS Agreement limits exports to 49.9% of production.[138] So it became necessary to amend TRIPS to allow back-to-back compulsory licenses, thus enabling countries with capacity to manufacture medicines to supply poor countries that needed access to generic drugs but lacked manufacturing capacity under compulsory licenses of their own.[139] Both China and India have adopted legislation enabling them to supply generic versions of patented medicines to other countries under this scheme.[140]

There is a larger principle here of considerable importance. For example, developing countries may need to assist each other with access to essential climate change technologies, and pooled procurement strategies may become advisable.[141] So this concept of back-to-back compulsory licenses for inputs of essential technology may need to be broadened, and NGOs concerned about access to green technologies have already commissioned studies of this topic.[142]

ii. Checks and Balances in the Public Funding of Research: The developing countries that are more technologically advanced should also formulate their own approach to regulating the patenting of government-funded research results, particularly those obtained by universities and other public research centers. Although the benefits of the Bayh-Dole Act[143] are well advertised, the unresolved problems it creates are also increasingly well documented, as are a growing list of needed reforms, which will be hard to enact in the United States.[144]

Recently, seven American experts published a detailed list of concerns about the effects of the Bayh-Dole Act in the United States,[145] and they recommended a number of minimum safeguards in the public interest.[146] Perhaps the most fundamental recommendation was that publicly funded university research results should not be exclusively licensed, unless such a license becomes essential for commercialization.[147] Because many research tools can be

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[138]TRIPS Agreement, *supra* note 10, art. 31(f) ("[A]ny such use shall be authorized *predominantly* for the supply of the domestic market of the Member authorizing such use." (emphasis added)); Reichman with Hasenzahl, *supra* note 111, at 5.

[139]*See* Doha Public Health Declaration, *supra* note 31, ¶ 6 ("WTO Members with insufficient or no manufacturing capacities in the pharmaceutical sector could face difficulties in making effective use of compulsory licensing under the TRIPS Agreement."); World Trade Organization, General Council Decision of 30 August 2003, *Implementation of Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health*, ¶ 2, WT/L/540 (Sept. 2, 2003); World Trade Organization, General Council Decision of 6 December 2005, *Amendment of the TRIPS Agreement*, Annex, WT/L/641 (Dec. 8, 2005) (pending ratification by Members); Abbott & Reichman, *supra* note 38, at 942 (explaining the requirements for granting compulsory licenses to exporting members under paragraph 6 of the Doha Public Health Declaration).

[140]*See* Abbott & Reichman, *supra* note 38, at 969; Feng, *supra* note 9, at 100–01 (discussing Article 50 of the Chinese Patent Law (as amended 2008)). *See generally* Jerome H. Reichman, *Compulsory Licensing of Patented Pharmaceutical Inventions: Evaluating the Options*, 37 J.L. Med. & Ethics 247 (2009) (tracing the relevant legislative history pertaining to compulsory licensing of patented pharmaceuticals and the effect of the waiver to, and amendment of, Article 31 of the TRIPS Agreement).

[141]Abbott & Reichman, *supra* note 38, at 973–79 (advocating pooled procurement strategies when seeking essential medicines under compulsory licenses enabled by the waiver to TRIPS art. 31(f)).

[142]*See* Abbott, *supra* note 40, at 26; Reichman et al., *supra* note 40, at 25–28 (suggesting cooperative methods for transfer of clean technology from developed countries to developing countries).

[143]35 U.S.C. §§ 200–12 (2006 & Supp. 2009).

[144]Rai & Eisenberg, *supra* note 41, at 310–11 (recommending reforms to the Bayh-Dole Act that would allow more latitude for funding agencies and would maximize the social value of federally funded inventions and discoveries); So et al., *supra* note 41, at 2079–80 (analyzing recent studies showing that the Bayh-Dole Act has not significantly increased revenues earned by academic institutions from patent licensing and noting the tax-like effect that the law has on institutions with licenses on the resulting patents).

[145]So et al., *supra* note 41, at 2078. Besides Anthony So, the authors included Bhaven Sampat, Arti K. Rai, Robert Cook-Deegan, Jerome H. Reichman, Robert Weissman, and Amy Kapczynski.

[146]*Id.* at 2081.

[147]Id.

used off the shelf without further downstream R&D, as was the case with the Cohen-Boyer patents in DNA sequencing,[148] an exclusive license is often unnecessary and counterproductive.

Other recommendations these authors put forward are as follows:

- The governing legislation should ensure transparency in the patenting and licensing of publicly funded research results.[149]
- Where initial licensing arrangements for publicly funded research do not achieve public interest objectives, governmental authorities must have power to override such licenses and to grant licenses to additional or alternative parties.[150]
- The government should retain an automatic right to use any invention arising from its funding.[151]
- Besides promoting commercialization of upstream research results, the government must ensure consumer access to end products on reasonable terms and conditions.[152]
- Governments should not presume that either patenting or exclusive licenses are necessarily the best options, but may instead "focus on placing by default or by strategy government-funded inventions into the public domain, creating a scientific commons, enabling collective management of intellectual property, or fostering open-source innovation."[153]
- "Where greater commercial incentives seem necessary, the benefits of nonexclusive licensing should always be weighed against the social cost of exclusive licenses."[154]

In other words, instead of simply imitating the U.S. model as it stands, the developing countries should try to formulate improved versions of the Bayh-Dole principle. Such efforts would better address both the need to ensure access to research tools for the research community and the question of abusive pricing of end products, given the extent to which relevant R&D costs were borne by taxpayers in the first instance. In this connection, developing countries need to devise their own public–private initiatives to endow venture capital funds (and perhaps related research prize contests[155]) that might emulate or improve upon the successful models currently deployed in some OECD countries.

Unfortunately, India's hurried enactment of a Bayh-Dole-like statute without due regard to these proposed safeguards does not bode well for the future.[156] Similar statutes are under consideration in numerous other countries, including South Africa,[157] and it remains to be seen whether greater caution will be exercised there than was the case in India.

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[148] *Id.* at 2079 (demonstrating that nonexclusive licensing did not deter the commercialization of the Cohen-Boyer patents for recombinant DNA, which produced $255 million in licensing revenues while reportedly contributing to 2,442 new products and $35 billion in sales).
[149] *Id.* at 2081.
[150] Id.
[151] Id.
[152] Id.
[153] *Id.* at 2082; *see also* Boyle, *supra* note 23 (chapter on Science Commons); Janet Hope, *Open Source Genetics. Conceptual Framework, in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 171; Esther van Zimmerman, *Clearinghouse Mechanisms in Genetic Diagnostics, in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 63.
[154] So et al., *supra* note 41, at 2078.
[155] *See, e.g.*, James Love & Tim Hubbard, The Big Idea: Prizes to Stimulate R&D for New Medicines 9 (2007), *available at* http://www.keionline.org/misc-docs/bigidea-prizes.pdf (discussing the development of a prize system as an alternative to exclusive marketing rights); Audio tape: Thomas Pogge, The AstraZeneca Lecture of 2008, held by the Federation of European Pharmacological Societies (July 13–17, 2008), *available at* http://www.ephar2008.org/downloads/TPoggePublicEthicsRadioLatest.pdf.

iii. Smarter Use of Second Tier Regimes: While the emerging economies as a whole should maintain relatively pro-competitive markets for innovation *vis-à-vis* the high-protectionist regimes in the United States and the European Union, this strategy does not require developing countries to sacrifice their own domestic innovators to free-riding appropriators. Rather, these countries need to outsmart the high-protectionists by fashioning intellectual property regimes that match their own needs and capacities without violating international IP norms.[158]

In particular, they could take the lead in making sensible uses of liability rules to stimulate rapid exchanges of cumulative and sequential innovation, especially for purposes of follow-on innovation,[159] while reserving strong exclusive rights for a relatively restricted class of truly nonobvious inventions. China's second amendment to its Patent Law in 2000 may have taken a step in that direction by allowing a compulsory license when utility model owners refuse to deal on reasonable terms or conditions.[160]

As previously discussed, there are several ways developing countries could achieve this different kind of balance: by enacting and implementing compulsory licenses for dependent improvements;[161] by limiting injunctions to cases that demonstrably serve the public interest, now once again a characteristic of U.S. law and practice;[162] or by codifying an *ex ante* regime of compensatory liability rules that I have elsewhere described, which might particularly benefit commercial exploitation of traditional knowledge and related resources.[163]

iv. Incentives for Promoting Public Health, the Environment, and Collaborative Research: Developing countries should take the lead in revamping increasingly obsolete approaches to the use of IPRs in the field of medicine. In no other area is there a greater need for innovative approaches, with an ever-lengthening list of potential tools that could be used to increase research outputs and to achieve better distributional outcomes as well. These include:

- Proposals for pre-competitive pooling of privately owned small molecule libraries, with a view to facilitating the upstream identification of promising target molecules through university-generated assay designs;[164]
- Proposals for public–private technology pools that would undo patent thickets and stimulate investment, while preserving revenues from downstream applications for single depositors;[165]

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[156]The Protection and Utilisation of Public Funded Intellectual Property Bill, 2008, Bill No. LXVI of 2008 (India); *see also* Sampat, *supra* note 41; Rahul Vartak & Manish Saurastri, *The Indian Version of the Bayh-Dole Act*, Intell. Asset Mgmt., Mar./Apr. 2009, at 62–64 (noting concerns that the Indian law was hastily drafted without public debate and fails to protect the public interest but insisting that the bill "is a step in the right direction").

[157]So et al., *supra* note 41, at 2078.

[158]*See* Reichman, *supra* note 53, at 1754–56 (advocating a liability rule for small-scale innovation to avoid the social costs of hybrid regimes of exclusive property rights); *see also* Lichtman, *supra* note 53.

[159]Jerome H. Reichman & Tracy Lewis, *Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge, in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 337, 356–58 (proposing a compensatory liability regime to advance the interests of developing countries without impeding follow-on innovation or creating barriers to entry).

[160]*See* Feng, *supra* note 9, at 30 (citing Articles 48 and 51 of the Chinese Patent Law 2000). Actual use of this provision was not known at the time of writing.

[161]*See supra* notes 121–22 and accompanying text.

[162]*See supra* notes 125–26 and accompanying text; Kapczynski, *supra* note 4 (discussing F. Hoffman-La Roche Ltd. v. Cipla Ltd., (2008) 642 I.A., in which the Indian tribunal referenced the U.S. Supreme Court's *eBay* decision when denying an injunction to promote access to medicine).

[163]*See supra* notes 59, 159 and accompanying text.

[164]*See* Rai et al., *supra* note 132, at 21–22.

- Proposals for government funding of clinical trial studies, with corresponding buy-ins at the international level and release of results to the worldwide scientific community;[166]
- Proposals for buy-outs and humanitarian licensing,[167] as well as for pooled procurement strategies under the amended TRIPS provisions, with a view to encouraging the distribution of essential medicines on a "high-volume, low-margin" marketing strategy;[168] and
- Proposals for prizes and other novel research inducements that would help to separate the research and marketing functions in the medical sector.[169]

Were the leading developing countries to pursue their own proactive policies in this area, precisely at a time when their medical research capacity keeps growing, it could lead to novel and perhaps breakthrough solutions of benefit to the rest of the world.

Less innovative, but still worth considering, is the possibility under Article 6 of the TRIPS Agreement[170] for any country to adopt a regime of international exhaustion, with a view to permitting parallel imports of patented products from any place where the product in question was put on the market with the patentee's authorization. China's third amendment of its Patent Law in 2008 has reportedly instituted just such a regime, with an eye to obtaining "patented medicine which China has difficulty in manufacturing or otherwise obtaining."[171] Parallel imports may also help some developing countries obtain "green technologies" at more affordable prices, although this process can also exert upward pressures on the prices generally charged in developing countries, in order to avoid arbitrage through parallel imports.[172]

"Green technologies" are, of course, another area where developing countries could supply much needed leadership. Here some recent studies suggest that IPRs have so far been playing an appropriately stimulatory role.[173] The problems elsewhere observed in regard to information technology and biotechnology have not yet seriously appeared in this sector, perhaps because it remains at an incipient stage, with many small players and with relatively few large-scale capital investments.[174] Precisely because emerging economies could participate on the ground floor of future developments in environmental technologies, it

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[165]*See* Roy Widdus, *Product Development Partnerships on 'Neglected Diseases': Intellectual Property and Improving Access to Pharmaceuticals for HIV/AIDS, Tuberculosis and Malaria*, *in* Negotiating Health: Intellectual Property and Access to Medicines 205, 211–14 (Pedro Roffe et al. eds., 2006); *see also* Carmen E. Correa, *The SARS case. IP Fragmentation and Patent Pools*, *in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 42; Verbeure, *supra* note 76 (diagnostic testing).

[166]*See* Jerome H. Reichman, *Rethinking the Role of Clinical Trial Data in International Intellectual Property Law: The Case for a Public Goods Approach*, 13 Marq. Intell. Prop. L. Rev. 1, 52–53 (2009); Tracy R. Lewis, Jerome H. Reichman & Anthony D. So, *The Case for Public Funding and Public Oversight of Clinical Trials*, Economists' Voice, Jan. 2007, at 1, 1–2, http://www.bepress.com/ev/vol4/iss1/art3.

[167]*See* Amy Kapczynski et al., *Addressing Global Health Inequities: An Open Licensing Approach for University Innovations*, 20 Berkeley Tech. L.J. 1031, 1109 (2005) (detailing a "neglected disease exemption" to advance access to biomedical technology in low- to middle-income countries); James Love, *Four Practical Measures to Enhance Access to Medical Technologies*, *in* Negotiating Health: Intellectual Property and Access to Medicines, *supra* note 165, at 241, 243 (showing that the flexibilities in the TRIPS Agreement allow for humanitarian licensing to address public health crises); Kevin Outterson, *Patent Buy-Outs for Global Disease Innovations for Low and Middle-Income Countries*, 32 Am. J.L. & Med. 159, 171 (2006).

[168]Abbott & Reichman, *supra* note 38, at 973–83.

[169]Love & Hubbard, *supra* note 155, at 2–4.

[170]TRIPS Agreement, *supra* note 10, art. 6.

[171]Feng, *supra* note 9, at 104–06 (assessing the impact of parallel import as authorized by Article 69 of the Chinese Patent Law (as amended 2008)).

[172]*See* Reichman et al., *supra* note 40, at 33–37.

[173]*See* John H. Barton, Mitigating Climate Change Through Technology Transfer: Addressing the Needs of Developing Countries 9–10 (2008), *available at* http://www.chathamhouse.org.uk/files/12357_1008barton.pdf; John H. Barton, *Intellectual Property and Access to Clean Energy Technologies in Developing Countries* 18 (Int'l Ctr. for Trade & Sustainable Dev., Issue Paper No. 2, 2007), *available at* http://www.iprsonline.org/New%202009/CC%20Barton.pdf.

[174]*See* Maskus & Okediji, *supra* note 40, at 2–3; Reichman et al., *supra* note 40, at 7–8.

behooves their governments to devise collaborative strategies to foster maximum growth and participation, without the impediments that excessive protection has caused in other sectors.[175]

Moreover, there is growing interest in new strategies to develop the so-called sharing economy, which has produced such successes as the open-source operating system and Wikipedia.[176] Considerable efforts are also underway to devise new forms of scientific cooperation that could cut through legal, technical, and economic barriers to the Mertonian sharing ethos, that could help to establish worldwide scientific networks and commons on an unprecedented scale, and that might extend "open source" methodologies to new fields of study.[177] Here, again, developing countries should participate actively in these initiatives[178] and not sit on the sidelines waiting for others to succeed.

2. Measures Concerning Copyrights and Neighboring Rights—Another task badly in need of innovative solutions is the quest for sensible exceptions to, and limitations on, the exclusive rights of domestic copyright laws that are otherwise governed by the TRIPS Agreement and the under-theorized "three-step test" it incorporated from the Berne Convention.[179] Here, major efforts are under way in both academic and government circles to rethink the question of exceptions and limitations from a more public interest perspective than was possible in the immediate aftermath of TRIPS.[180]

Much has been written lately about the excesses of recent copyright legislation in general, and the concomitant expansion of related rights, including database protection laws, which increasingly complicate and obstruct the very creativity and innovation that intellectual property rights were originally designed to promote.[181] Nowhere are these tensions so acute[182] or so likely to generate disproportionately large social costs as in the field of basic scientific research.[183] In particular, abundant evidence now shows that science-hostile intellectual property laws, in combination with the science publishers' restrictive licensing

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[175]*See* Chatham House, Changing Climates: Interdependencies on Energy and Climate Security for China and Europe 61 (2007), *available at* http://www.chathamhouse.org.uk/research/eedp/papers/view/-/id/580 (discussing the bilateral establishment of standards to encourage trade and investment between China and the European Union); Int'l Ctr. for Trade & Sustainable Dev., Geneva Annual China Dialogue: China, Trade and Climate Change 7 (2008), *available at* http://ictsd.net/downloads/2009/03/geneva-annual-china-dialogue-on-trade-and-cliamte-change-meeting-report1.pdf (summarizing different approaches to promote research on climate change in developing countries).

[176]*See, e.g.*, Yochai Benkler, The Wealth of Networks 70–71 (2006) (examining the development of Wikipedia); Boyle, *supra* note 23, at 197–98.

[177]Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, chs. 2, 5 (proposing a digitally integrated microbial research commons covering materials, literature, and data). *See generally* Reichman & Uhlir, *supra* note 36 (proposing contractually reconstructed research commons for scientific data); Jonathan M. Barnett, *Sharing in the Shadow of Property: Rational Cooperation in Innovation Markets* 57–68 (Univ. S. Cal. Ctr. in Law, Econ. & Org., Research Paper No. C08-22, 2008), *available at* http://ssrn.com/abstract=1287283 (discussing the evolution of open source software in the United States); Lee, *Distributive Commons*, *supra* note 73, at 918–19 (demonstrating that open source methods provide a model for the contractual creation of a biomedical science research commons); Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment* (Univ. of Pittsburgh Legal Studies Research Paper Series, Working Paper No. 2008-26, 2008), *available at* http://ssrn.com/abstract=1265793 (proposing a research framework for the analysis of constructed cultural commons in the context of intellectual property).

[178]*See, e.g.*, Mizukami & Lemos, *supra* note 33, at 46–47 (analyzing Brazil's *tecnobrega* industry to show that innovation can thrive without a system of intellectual property enforcement); Alessandro Octaviani, *Biotechnology in Brazil: Promoting Open Innovation*, *in* Access to Knowledge in Brazil, *supra* note 33, at 127, 134–36 (discussing the Genoma Program in Brazil to show that a decentralized network approach to biotechnology can be successful in a developing country); Minna Allarakhia, *Open Source Biopharmaceutical Innovation—A Mode of Entry for Firms in Emerging Markets*, 6 J. Bus. Chemistry 11, 11 (2009).

[179]*See, e.g.*, TRIPS Agreement, *supra* note 10, art. 13 ("Members shall confine limitations or exceptions to exclusive rights to certain special cases which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the right holder."); Berne Convention for the Protection of Literary and Artistic Works art. 9(2), Sept. 9, 1886, as revised at Paris on July 24, 1971, and amended on Sept. 28, 1979, S. Treaty Doc. No. 99-27 (1986) ("It shall be a matter for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author.").

practices, collide head-on with core advances in digitally integrated scientific research methods.[184]

a. Privatizing the Scientific Research Commons: On one hand, new information technologies and related scientific tools, especially bioinformatics, are transforming traditional scientific fields, such as molecular biology,[185] and are spawning new fields such as genomics and proteonomics, with unlimited scientific opportunities in the digital environment.[186]

The worldwide scientific community needs to develop and expand these digital opportunities, especially at public research institutes and universities, while maintaining the

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[180]*See, e.g.*, P. Bernt Hugenholtz & Ruth L. Okediji, Open Soc'y Inst., Conceiving an International Instrument on Limitations and Exceptions to Copyright 19 (2008) (emphasizing the need to ensure that copyright laws are "effectively harnessed for the public good"); Christophe Geiger et al., Max Planck Institute for Intell. Prop., Competition & Tax Law, *Declaration on a Balanced Interpretation of the "Three-Step Test" in Copyright Law*, 39 Int'l Rev. Intell. Prop. & Competition L. 707 (2008) [hereinafter *Three-Step Test*] (emphasizing the need to consider not only the interests of right holders, but also the public); Marianne Levin, *Intellectual Property Rights in Transition: Legal Structures and Concepts in Adaptation to Technological Challenges Towards an Intellectual Property System for the 21st Century*, 42 Scandinavian Stud. L. 83, 88 (2002) (highlighting the importance of safeguarding investments with public interests); Henning Grosse Ruse-Khan, *Time for a Paradigm Shift? Exploring Maximum Standards in International Intellectual Property Protection*, 1 Trade L. & Dev. 56 (2009); *see also* WIPO, *Proposal for the Establishment of a Development Agenda for WIPO*, Annex, WIPO Doc. PCDA/1/5 (Feb. 17, 2006) (noting developing countries' proposal for the adoption of a Treaty on Access to Knowledge); *infra* note 195 and accompanying text (CEC Green Paper (2008)). *See also* Rochelle Cooper Dreyfuss, *TRIPS-Round II: Should Users Strike Back?*, 71 U. Chi. L. Rev. 21, 22–27 (2004) (suggesting ways to combat the "one-way ratchet" of intellectual property protection without regard to the public interest); Jerome H. Reichman, Graeme B. Dinwoodie & Pamela Samuelson, *A Reverse Notice and Takedown Regime to Enable Public Interest Uses of Technically Protected Copyrighted Work*, 22 Berkeley Tech. L.J. 981, 984–85 (2007); Knowledge Economy Int'l, Proposal for Treaty on Access to Knowledge art. 3-1, http://www.cptech.org/a2k/a2k_treaty_may9.pdf (last visited Nov. 30, 2009) (stressing the need for limitations to copyrights when the public use value outweighs the cost to the copyright holder).

[181]*See generally* Benkler, *supra* note 176, at 470–71 (discussing the difficulty that will be involved in passing the needed reforms); Boyle, *supra* note 23, at 26; David L. Lange & H. Jefferson Powell, No Law: Intellectual Property in the Image of an Absolute First Amendment 157 (2008) (discussing the failure of copyright law to protect freedom of expression and freedom of the press); Lawrence Lessig, Free Culture: The Nature and Future of Creativity 188–94 (2005) (providing specific examples of the barriers to innovation resulting from current copyright law); James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, Law & Contemp. Probs., Winter/Spring 2003, at 33, 43–44; Paul Edward Geller, *Beyond the Copyright Crisis: Principles For Change*, 55 J. Copyright Soc'y U.S.A. 165, 168 (2008), *available at* http://ssrn.com/abstract=1114372 ("The growth of copyright law has inexorably impinged on basic interests in freedom of expression and privacy.").

[182]*See, e.g.*, Reto Hilty, *Copyright Law and Scientific Research*, *in* Copyright Law: A Handbook of Contemporary Research 315, 318 (Paul Torremans ed., 2007) [hereinafter Hilty, *Copyright Law and Scientific Research*] ("[Scientists] have suddenly become aware that copyright is not only capable of providing them with protection for their achievements, but also that under certain circumstances it can become an obstacle …."); Reto M. Hilty, *Five Lessons About Copyright in the Information Society: Reaction of the Scientific Community to Over-Protection and What Policy Makers Should Learn*, 53 J. Copyright Soc'y U.S.A. 103, 116–18 (2006) [hereinafter Hilty, *Five Lessons*]; Reichman & Uhlir, *supra* note 36, at 396–415 (evaluating social costs of a disintegrating scientific research commons); Pamela Samuelson, *Anticircumvention Rules: Threat to Science*, 293 Science 2028, 2028 (2001) ("Recent legislation in the United States and Europe whose ostensible purpose is to protect copyrighted works from pirates is being used to inhibit science and stifle academic research ….").

[183]*See, e.g.*, Paul David, *The Economic Logic of "Open Science" and the Balance Between Private Property Rights and the Public Domain in Scientific Data and Information: A Primer*, *in* The Role of Scientific and Technical Data and Information in the Public Domain 19, 27 (Julie M. Esanu & Paul F. Uhlir eds., 2003) (discussing how the proliferation of intellectual property rights is inhibiting access to information in several areas, including basic research); Maskus & Reichman, *supra* note 2, at 16–17 (discussing the difficulty of ensuring that the social benefits of current innovation are not outweighed by the social costs of deterring future innovation).

[184]*See generally* Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, ch. 3; Reichman & Okediji, *supra* note 23, at 78 (discussing the problem of data protection disciplines that "restrict access to the very facts, data, and information that are the lifeblood of basic scientific research").

[185]Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, ch. 3.

[186][T]he use of computational methodologies within the life sciences, such as bioinformatics, in the building of global collections of articles and data in microbiology, and in the integration of relevant research results makes it possible to build accumulative, field specific knowledge repositories that capture reams of relevant scientific and technical information and data about microorganisms …. [S]toring, curating, maintaining and making this huge accumulation of genomic data of interest to microbiology presents unique problems as well as unique opportunities. Once available, there is a pressing need to develop general data-mining tools for automated knowledge discovery in the chosen environment and to establish dynamically updated and flexible portals for disseminating research results.
Id. at 61 (citations omitted).

classical functions of certification and diffusion of research results inherited from the pre-digital print epoch.[187]

On the other hand, the digital revolution that created such promising opportunities for scientific research "also generated intense fears that hardcopy publishers would become vulnerable to massive infringements online and to other threats of market failure."[188] In response, publishers pushed legislatures to recast and restructure copyright law in the online environment so as to preserve business models built around the print media.[189] As Professor Okediji and I have noted before:

> In so doing, [publishers] managed to curb pre-existing limitations and exceptions (L&Es) in the online environment, including those favorable to science; to embed pay-per-use machinery into electronic fences surrounding online transmissions even of scientific articles; and, particularly in the EU and increasingly elsewhere, to add new sui generis data protection disciplines that restrict access to the very facts, data, and information that are the lifeblood of basic scientific research.[190]

As a result, thickets of rights, backed by Technological Protection Measures (TPMs) and Digital Rights Management (DRM) restrictions in the online environment, impede effective exploitation of automated knowledge discovery tools by blocking integrated access to scientific information and data scattered over a broad range of articles and databases that may or may not be available online.[191]

Scientists need, and traditionally depend on, a robust public domain, in which existing information and data become inputs to future knowledge assets that cannot be generated without them. Instead, successful special interest lobbying at both the national[192] and international levels[193] has overprotected existing knowledge goods at the expense of the public domain, while compromising digitally empowered scientific research opportunities with little regard for the social costs and burdens imposed on future creation and innovation.

High-level officials at the European Commission have publicly recognized the dangers to public science in this situation.[194] In 2008, the Commission itself issued a Green Paper, seeking to foster a debate about how to better promote the "free movement of knowledge and innovation" in the European Union's single market, with particular regard to the dissemination of research, science, and educational materials.[195]

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[187] *See id.* at 61–63.

[188] Reichman & Okediji, *supra* note 23, at 8.

[189] *See* Pamela Samuelson, *The U.S. Digital Agenda at WIPO*, 37 Va. J. Int'l L. 369, 405–06 (1997); *see also* Geller, *supra* note 181, at 166 ("Copyright law is in crisis…. [I]t has become more and more complicated and less and less reliable, while losing legitimacy.").

[190] Reichman & Okediji, *supra* note 23, at 8; *see* J.H. Reichman & Pamela Samuelson, *Intellectual Property Rights in Data?*, 50 Vand. L. Rev. 51, 95 (1997); *see also* Derclaye, *supra* note 72.

[191] *See, e.g.*, Nancy L. Maron & K. Kirby Smith, Current Models of Digital Scholarly Communication 31 (2008), *available at* http://www.arl.org/bm~doc/current-models-report.pdf; Hilty, *Copyright Law and Scientific Research*, *supra* note 182, at 315; Paul A. David, *New Moves in 'Legal Jujitsu' to Combat the Anti-commons: Mitigating IPR Constraints on Innovation thru a 'Bottom-up' Approach to Systemic Institutional Reform* (Dynamics of Insts. & Mkts. in Europe, Working Paper No. 81, 2008), *available at* http://www.dime-eu.org/files/active/0/WP81-IPR.pdf.

[192] *See, e.g.*, Digital Millennium Copyright Act, Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified as amended in scattered sections of 17 U.S.C.); Council Directive 2001/29/EC, 2001 O.J. (L 167) 4, 9 (EC); Council Directive 96/9/EC, 1996 O.J. (L 77) (EC); *see also* Hilty, *Five Lessons*, *supra* note 182, at 112 (attributing the passage of the DMCA to "sustained pressure from the entertainment industry's powerful lobbying efforts").

[193] *See, e.g.*, WIPO Copyright Treaty, *adopted* Dec. 20, 1996, S. Treaty Doc. No. 105-17 (1997) [hereinafter WCT] (an international treaty enacted in 1996 concerning digital copyright issues); WIPO Performances and Phonograms Treaty, *adopted* Dec. 20, 1996, S. Treaty Doc. No. 105-17 (1997) (international treaty enacted in 1996 governing so-called neighboring rights of performers and producers of sound recordings). Very restrictive domestic implementation of these treaties is then re-exported to developing countries by means of bilateral or regional Free Trade Agreements (FTAs). *See, e.g.*, Bryan Mercurio, *TRIPS-Plus Provisions in FTAs: Recent Trends*, *in* Regional Trade Agreements and the WTO Legal System 215, 217–19 (Lorand Bartels & Federico Ortino eds., 2006) (describing the process of enacting international agreements governing copyright issues).

Notwithstanding these initiatives, entrenched publishing interests in the European Union and the OECD countries generally have so far blocked any realistic prospects for top-down legislative reforms, despite mounting worldwide pressures for greater "access to knowledge."[196] This resistance has prodded the scientific community to make greater efforts to manage its own essential knowledge inputs by means that attempt to neutralize the impediments to upstream research that intellectual property rights increasingly spawn.[197] Some of these initiatives, particularly those spun off from the Creative Commons and Science Commons movements, have spread to developing countries, with notable success, for example, in Brazil.[198]

b. Remedial Measures Available to the BRIC Countries: Developing countries labor under intense pressures from developed countries to duplicate the very barriers to digitally integrated scientific research that have been erected in OECD countries. Instead, the BRIC countries in particular should collectively resist these pressures and self-consciously adopt limitations and exceptions to copyright and related rights laws that would digitally empower their own scientific research communities without necessarily violating the relevant international intellectual property agreements. If these countries, and other emerging economies, marshaled the political will and governance capacity to undertake such reforms, their leadership in this area might give them a comparative advantage at a time when local scientific and technical innovation has begun to flourish in many key industrial sectors.

Accordingly, two fundamental recommendations are as follows:

- First, the BRIC countries should codify the idea–expression dichotomy—now established in the TRIPS Agreement—as a central subject matter exception,[199] and they should clarify that the legislative intent is to implement this exception at least as broadly as U.S. federal appellate courts routinely do.[200]
- Second, because the "use of automated knowledge tools in general and computational science in particular, requires scientists to reproduce entire articles from scientific journals; to extract excerpts of varying lengths from them; and to incorporate large extracts of data into their digital research tools for data mining,

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[194]*See, e.g.*, Tilman Lüder, Copyright Expansion: Can We Have Too Much?, Remarks at the Second Global Forum on Intellectual Property, Singapore Academy of Intellectual Property Law (Jan. 8–9, 2009); Tilman Lüder, Remarks at the Workshop on Creation and Innovation, Seventeenth Annual Fordham Intellectual Property Law Institute Conference, Cambridge, United Kingdom (Apr. 15–16, 2009); *Commission First Evaluation of Directive 96/9/EC on the Legal Protection of Databases* 23–24 (Dec. 12, 2005), *available at* http://ec.europa.eu/internal_market/copyright/docs/databases/evaluation_report_en.pdf (last visited Nov. 20, 2009) (discussing the danger of *sui generis* protection inhibiting innovation and growth).

[195]*Commission Green Paper on Copyright in the Knowledge Economy*, at 3, COM (2008) 466/3, *available at* http://ec.europa.eu/internal_market/copyright/docs/copyright-infso/greenpaper_en.pdf.

[196]Amy Kapczynski, *The Access to Knowledge Mobilization and the New Politics of Intellectual Property*, 117 Yale L.J. 804 (2008); Amy Kapczynski, *Linking Ideas to Outcomes: A Response*, Yale L.J. Pocket Part 289, 289–90 (2008); James Love, *Risks and Opportunities for Access to Knowledge*, *in* Vision or Hallucination? 187, 189 (Soledad Bervejillo ed., 2005).

[197]*See* Minna Allarakhia, D. Marc Kilgour & J.D. Fuller, Game Models of the Defection Dilemma in Biopharmaceutical Discovery Research 7 (2008), http://orion.uwaterloo.ca/~hwolkowi/henry/reports/mitacs.d/pdf/David/pub1.pdf ("Fully disclosing knowledge facilitates future collaboration while appropriating knowledge strengthens a researcher's bargaining position for trade in knowledge."); Peter Lee, *Contracting to Preserve Open Science: Consideration-Based Regulation in Patent Law*, 58 Emory L.J. 889, 963–74 (2009); Reichman & Uhlir, *supra* note 36, at 416–60 ("A Contractually Reconstructed Research Commons for Science and Innovation"); *see also* Creative Commons, http://creativecommons.org (last visited Nov. 16, 2009) (providing free copyright licenses to various works and allowing the creator to choose among several levels of access); Science Commons, http://sciencecommons.org (last visited Nov. 16, 2009) (providing a similar service for scientific works aimed at "[i]dentifying and lowering unnecessary barriers to research"); Wilbanks & Boyle, *supra* note 73, at 5 (describing Science Commons as a project designed "to ease unnecessary legal and technical barriers to sharing, to promote innovation, [and] to provide easy, high quality tools that let individuals and organizations specify the terms under which they wished to share their material").

[198]Pedro Paranaguá, *A Comprehensive Framework for Copyright Protection and Access to Knowledge: From a Brazilian Perspective and Beyond*, *in* South Perspective - How Developing Countries Can Manage Intellectual Property Rights to Maximize Access to Knowledge 103, 106 (Carlos M. Correa & Xuan Li eds., 2009); Mizukami & Lemos, *supra* note 33, at 44–48.

[199]*See* TRIPS Agreement, *supra* note 10, art. 9.2.

[200]Reichman & Okediji, *supra* note 23, at 23–24 (citing authorities).

> virtual experiments, and other forms of digital manipulation,"[201] the BRIC countries will need a broad and sweeping exemption for scientific research uses of literature and data. The clarity of such an exemption should require no gloss, no fine print, and no elaborately contrived carve-outs.[202]

The Max Planck Institute has recently proposed that a broad and general exemption of this kind should allow use and reuse of published scientific materials for virtually any scientific purpose, with express legitimatization of storage, archiving, data extraction, linking, and the like.[203] Such a reform should further clarify that scientists remain free to subject any published articles, and any scientific work made publicly available online, to "data mining procedures, data manipulation by automated knowledge tools, including virtual scientific experimentation, without any constraint other than attribution under the norms of science."[204] Any database protection laws that the BRIC countries were unwise enough to enact (by, for example, succumbing to pressures for bilateral agreements with the European Union) would have to be similarly aligned with a broad copyright exemption for uses of scientific literature.[205]

Beyond these fundamental policy positions bearing on scientific research, the BRIC countries should revise and expand their copyright exceptions for libraries and educational institutions generally, in order to fully exploit the policy space deriving from flexibilities set out in the TRIPS Agreement and other relevant treaties, especially the WIPO Copyright Treaty of 1996.[206] In this connection, the library community has been developing a plan of action to promote access to knowledge in developing countries, with particular regard to eliminating legal barriers to cross-border flows of books, periodicals, and other information in both the print media and the online environment.[207] Cooperating countries that implemented these proposals could gradually build a contractually created space in which their domestic arrangements accommodating science, education, and libraries were given mutual and reciprocal recognition.[208] Equally essential are clear legal measures to enable the bulk purchasing of foreign educational texts on reasonable terms and conditions.[209]

The BRIC countries, together with governments in other emerging economies, should also consider the potential advantages of adopting a "fair use" provision that would enable courts to deal with fact-specific situations falling outside the codified exceptions to copyright law's exclusive rights, which invariably occur in practice. A fair use option would create a buffer

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[201] *Id.* at 28; *see, e.g.*, Victoria Stodden, *Enabling Reproducible Research: Open Licensing for Scientific Innovation*, 13 Int'l J. Comm. L. & Pol'y, Winter 2009, at 1, 24–25 ("How far the fair use exception extends into entire research compendia is not clear since the contours of fair use of copyrighted scientific material are not clearly delineated.").

[202] Reichman & Okediji, *supra* note 23, at 29–30.

[203] Reto M. Hilty et al., *Comments by the Max Planck Institute for Intellectual Property, Competition and Tax Law on the European Commission's Green Paper: Copyright in the Knowledge Economy* (Max Planck Inst. for Intellectual Prop., Competition & Tax Law, Research Paper No. 08-05, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1317730.

[204] Reichman & Okediji, *supra* note 23, at 30. For further nuances concerning derivative works and possible downstream applications to commercial products justifying use of compensatory liability rules, see *id*. at 30–32.

[205] *Id*. at 30.

[206] *See* WCT, *supra* note 193, pmbl. & art. 10. The accompanying Agreed Statement concerning Article 10 enables contracting parties "to carry forward and appropriately extend into the digital environment limitations and exceptions in their national laws which have been considered acceptable under the Berne Convention … [and] to devise new exceptions and limitations that are appropriate in the digital network environment."

[207] *See* Electronic Information for Libraries (eIFL), eIFL Handbook on Copyright and Related Issues for Libraries, http://www.eifl.net/cps/sections/services/eifl-ip/issues/handbook/handbook-e (last visited Nov. 20, 2009) (listing Recommendations for a Development Agenda in WIPO in order to foster "a greater understanding of the importance of flexibilities, especially for developing and least-developed countries, and balanced IP education to include copyright exceptions and limitations, library copyright issues, the public domain, fair model laws and pro-competitive licensing regimes").

[208] *Cf.* Grosse Ruse-Khan, *supra* note 180 (proposing ceilings on exclusive rights of authors); Reichman & Uhlir, *supra* note 36, at 429 (discussing possible "treaties" between universities to regulate the sharing of government-funded research data); Peter K. Yu, *Access to Medicines, BRIC Alliances, and Collective Action*, 34 Amer. J.L. & Med. 345, 345–87 (2008) (proposing coordination strategies for BRIC countries to increase access to medicines).

[209] *See, e.g.*, Okediji, *supra* note 37, at 178–86.

zone available when other provisions favoring research, education, and libraries appeared unclear or uncertain and yet the use in question served the larger public interest without undue harm to authors.[210]

Properly administered, a fair use provision could justify ad hoc awards of compensation to resolve apparent conflicts between private and public interests in hard cases. It would also help to attenuate potential conflicts between copyright law's exclusive rights and fundamental human rights, especially free speech, and the overriding "objectives and principles" of the TRIPS Agreement, as set out in Articles 7 and 8.[211]

However, implicit in any serious discussion of the trend toward adopting "fair use" regimes outside the English-speaking countries is the fundamental need to reconcile broad exceptions in domestic copyright laws with the three-step test governing limitations and exceptions in international copyright law,[212] as set out in Article 13 of the TRIPS Agreement,[213] and further elucidated in Article 10 of the WCT (together with the relevant Agreed Statement thereto).[214] Fortunately, the Max Planck Institute, following exhaustive discussions among some thirty experts, has prepared a Declaration on the Three-Step Test that seeks to accomplish this task.[215] Building on the WCT Preamble,[216] it would:

- Mandate that courts applying the three-step test of Article 13 in copyright cases take into account the interests of third parties, including individual and collective interests of the general public, and not just the interests of rights owners;[217]
- Avoid prioritizing any one step, or requiring that the answer to all steps should be "yes," but would instead require a judicial balancing of the different prongs, as occurs under U.S. fair use law;[218]

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[210]Reichman & Okediji, *supra* note 23, at 26.
[211]*Id.* at 26–27; Peter K. Yu, *The Objectives and Principles of the TRIPS Agreement*, 46 Hous. L. Rev. 979, 1006 (2009) (describing how these provisions may be interpreted to facilitate development and to protect the public interest).
[212]Ruth Okediji, *Toward an International Fair Use Regime*, 39 Colum. J. Transnat'l L. 75, 149 (2000).
[213]TRIPS Agreement, *supra* note 10, art. 13.
[214]WCT, *supra* note 193, art. 10 (reiterating the three-step test of TRIPS art. 13). The accompanying Agreed Statement of the diplomatic conference that adopted the WCT confirms that Article 10 allows signatories to "devise new" limitations and exceptions for the digital environment. *See supra* note 206.
[215]*Three-Step Test*, *supra* note 180, at 711–12.
[216]WCT, *supra* note 193, pmbl. ("Recognizing the need to maintain a balance between the rights of authors and the larger public interest, particularly education, research and access to information, as reflected in the Berne Convention.").
[217]*Three-Step Test*, *supra* note 180, at 712; *cf.* TRIPS Agreement, *supra* note 10, art. 30 (exceptions to exclusive rights of patentees).
[218]*Three-Step Test*, *supra* note 180, at 709, 711. U.S. copyright law provides:
In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
4. the effect of the use upon the potential market for or value of the copyrighted work.

17 U.S.C. § 107 (2006). *But see* Mihály Ficsor, The Law of Copyright and the Internet 91–92 (2002) (arguing that the legislative history of the Berne Convention prohibits this approach).

- Give particular weight to unauthorized uses that are underpinned by fundamental rights[219] and other "public interests," notably in scientific progress and cultural or economic development;[220]
- Seek to promote competition, especially in secondary markets, by a correct balancing of interests, but without making the three-step test a proxy for competition law;[221] and
- Expressly recognize that adequate compensation may be less than market pricing, where other public concerns are at stake, including third party interests or the general public interest.[222]

The BRIC countries could set an example for other developing countries by incorporating these proposals into their domestic laws, by supporting their incorporation into the WIPO Development Agenda, and, if necessary, by defending the tenets of the Declaration in WTO dispute resolution proceedings if they were challenged.[223]

Finally, no reform of the copyright laws' limitations and exceptions would be worth much in practice if the resulting provisions could not be enforced online or if publishers could simply override them by contract. In regard to the online environment, the WCT of 1996 clearly preserved a signatory state's rights to maintain all limitations and exceptions "permitted by law" when implementing international obligations to protect copyrightable works transmitted via digital networks by means of TPMs and DRMs.[224] However, the implementing legislation in the United States, i.e., the Digital Millennium Copyright Act (DMCA), declined to exercise this treaty-given power,[225] while the European Union's implementing legislation, the Infosoc Directive of 2001,[226] simply avoided the issue, which was tantamount to the same result.[227]

Developing countries should take exactly the opposite path by exercising the inherent power of WCT signatories to implement all limitations and exceptions "permitted by law" in the online environment.[228] The first step is to enact legislation that expressly applies limitations and exceptions favoring scientific research, education, and libraries to works transmitted over digital networks, irrespective of the TPMs and DRMs that otherwise regulate such transmissions. The next step is to further adopt measures that effectively enable the beneficiaries of these exceptions to enforce them despite the electronic fences and digital locks that impair access to protected works in cyberspace.[229]

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[219] *Three-Step Test*, *supra* note 180, at 712; *see* Hugenholtz & Okediji, *supra* note 180, at 21 (describing some decisions in European courts that have allowed unauthorized uses); Lange & Powell, *supra* note 181, at 126 (analyzing the tensions between the First Amendment and copyright protection); Laurence R. Helfer, *Toward a Human Rights Framework for Intellectual Property*, 40 U.C. Davis L. Rev. 971, 1017 (2007) ("In particular, there have been a number of decisions in the field of copyright in which the freedom of expression has been invoked to justify a use that is not covered by an exception provided for in the law." (quoting Christophe Geiger, *Fundamental Rights, a Safeguard for the Coherence of Intellectual Property Law?*, 35 Int'l Rev. Intell. Prop. & Competition L. 268, 277 (2004))).

[220] *Three-Step Test*, *supra* note 180, at 712; *see* Chon, *supra* note 37, at 820.

[221] *Three-Step Test*, *supra* note 180, at 709–10.

[222] *Id.* at 710.

[223] *See infra* text accompanying notes 331–34.

[224] *See* WCT, *supra* note 193, art. 11.

[225] 17 U.S.C. §§ 1201–05 (2006).

[226] Council Directive 2001/29/EC, art. 6(4), 2001 O.J. (L 167) (EC).

[227] Reichman, Dinwoodie & Samuelson, *supra* note 180, at 1042–45.

[228] WCT, *supra* note 193, art. 11.

[229] *See* Mark A. Lemley & R. Anthony Reese, *Reducing Digital Copyright Infringement Without Restricting Innovation*, 56 Stan. L. Rev. 1345 (2004) (advocating administrative measures to enforce limitations and exceptions online); Reichman, Dinwoodie & Samuelson, *supra* note 180, at 1003 (discussing the importance of a commitment to ensuring that copyright limitations and exceptions are as available when copyrighted works are protected by TPMs as when they are not).

This result can be achieved, for example, by means of a system of "electronic locks and keys" to break through the electronic fences for specified purposes,[230] or by resort to the less costly and burdensome "reverse notice and takedown" procedure that I and Professors Dinwoodie and Samuelson have proposed elsewhere.[231] The latter procedure enables would-be privileged users to oblige copyright proprietors to make relevant materials available without the users having to cross the electronic fence or enter the digitally locked gateway at all.[232]

Needless to say, neither approach will suffice if copyright proprietors can override applicable limitations and exceptions by contract, especially one-sided electronic contracts that regulate lawful access to digitally transmitted works. Hence, developing country legislators need to ensure that none of the key exceptions favoring research, education, and libraries can be waived or overridden by contract, especially in the online environment.[233]

Arguably, it is the BRIC countries, and other emerging economies, that have the greatest interest in treating access to scientific knowledge and educational materials as a domestic and global public good, one which should not be privatized beyond limits set by domestic law and policy.[234] While operating within the confines of existing international intellectual property laws, it behooves these countries—both at the domestic and regional levels—to play a leadership role in implementing and amplifying the flexibilities set out in the relevant international conventions, with a view to benefiting their own research and educational communities.

At the multilateral level, these countries should evaluate the extent to which their own needs for access to knowledge oblige them to support WIPO Development Agenda goals consonant with those needs, in opposition to the high-protectionist policies favored by the United States and the EU.[235] Bold legislative initiatives in domestic laws on these matters could thus help to set and define the international copyright law agenda for the next several decades.

3. Measures Concerning Competition Law and Misuse—There is nearly universal recognition of the need to redefine the border between intellectual property rights and competition law in a manner conducive to promoting worldwide markets for technology.[236] Here the high- and middle-income developing countries need to formulate competition laws and policies "to ensure that foreign technologies and know-how flow to local markets" under reasonable terms and conditions and at prices local entrepreneurs can afford.[237] In so

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[230]Reichman & Okediji, *supra* note 23, at 34.
[231]Reichman, Dinwoodie & Samuelson, *supra* note 180, at 1032–38 (proposing judicially enforceable measures to extract privileged matter without the user having to enter digitally locked gateways).
[232]Id.
[233]*See, e.g.*, Hilty et al., *supra* note 203, at 3; Reichman & Okediji, *supra* note 23, at 36.
[234]*See* Mario Cimoli, Giovanni Dosi & Joseph E. Stiglitz, *The Political Economy of Capabilities Accumulation: The Past and Future of Policies for Industrial Development*, *in* Industrial Policy and Development: The Political Economy of Capabilities Accumulation 1, 4–5 (Mario Cimoli et al. eds., 2009); Joseph E. Stiglitz, *Knowledge as a Global Public Good*, *in* Global Public Goods 308 (Inge Kaul et al. eds., 1999) (advocating the perspective that knowledge is a public good that should be protected by the state); *cf.* Maskus & Reichman, *supra* note 2, at 41–44.
[235]*See supra* text accompanying note 78; *infra* notes 301–03 and accompanying text.
[236]*See, e.g.*, Josef Drexl, *The Critical Role of Competition Law in Preserving Public Goods in Conflict with Intellectual Property Rights*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 709, 717–18; Eleanor M. Fox, *Can Antitrust Policy Protect the Global Commons from the Excesses of IPRs?*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 758, 767 ("In a world of global markets and world ramifications of local action, both antitrust and intellectual property law cry out for global conceptions."); *see also* Sean Flynn, Aidan Hollis & Mike Palmedo, *An Economic Justification for Open Access to Essential Medicine Patents in Developing Countries*, 37 J.L. Med. & Ethics 184, 191–93 (2009) (suggesting that developing countries adopt legal standards, especially competition law doctrines, to drive down prices in competitive markets).
[237]Reichman, *supra* note 18, at 161.

doing, they should fully exploit the competition law exceptions available under the TRIPS Agreement[238] and draw upon solutions and proposals emanating from both past and present practices in OECD countries and elsewhere, given the political will and skill to do so.

However, resorting to competition law and policy has so far proved difficult for most developing countries. In part, this reluctance may stem from the complex economic analysis, high transaction costs, and regulatory skills associated with the practice of competition law in the most developed countries.[239] Moreover, key differences between EU practice, which emphasizes measures to prevent abuse of a dominant position, and—until recently—the less aggressive stance of the U.S. authorities, who seek evidence of actual or intended monopolization,[240] may hinder clear thinking about the relevant problems in developing countries. Both the EU and U.S. regimes depend on proof of market power, although long-standing (but increasingly disfavored) common law precedents in patent law allow U.S. courts to suspend enforcement of valid patents for acts of "misuse," even in the absence of market power.[241]

Besides these technical intricacies, policymakers in developing countries that become serious about the interface between intellectual property and competition law must make high-level decisions about the goals of competition law in general, i.e., efficiency or fairness, or some combination of both.[242] They must then reconcile their versions of competition law with the incentives to innovate that flow from the exclusive rights of intellectual property laws.[243] Here again they may be deterred by prevailing tendencies in developed countries to view competition law and intellectual property law as complementary means of mutually promoting social welfare, rather than as disparate regimes in conflict with one another.[244] The latter view more readily supports doctrines that override intellectual property rights, such as the "essential facilities" doctrine, much invoked in European scholarship and much harder to obtain in practice than in theory.[245]

Although developing countries have lagged behind in this field, both India and China have recently begun to formulate competition law and policy with a view to circumscribing the exclusive rights of intellectual property laws. For example, India has adopted patent misuse provisions that limit a licensee's ability to acquire or use "any article other than the patented

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[238]TRIPS Agreement, *supra* note 10, arts. 8.2, 40. *See* Mark D. Janis, *"Minimal" Standards for Patent-Related Antitrust Law under TRIPS*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 774, 776–80; Hanns Ullrich, *Expansionist Intellectual Property Protection and Reductionist Competition Rules: A TRIPS Perspective*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 726, 730; *see also* Shubha Ghosh, *Comment II: Competitive Baselines for Intellectual Property Systems*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 793, 807–11 (concentrating on the possibilities afforded to members to limit intellectual property rights through competition law and policy indirectly under Articles 6, 13, 30, and 31 of the TRIPS Agreement).

[239]*See, e.g.*, Hovenkamp, *supra* note 2, at 1979–2007 (examining the complex historical enforcement of antitrust laws to protect intellectual property rights in the United States).

[240]*See* Arezzo, *supra* note 133, at 458–65 (analyzing the differences between EU and U.S. antitrust laws).

[241]Hovenkamp, *supra* note 2, at 1991–92 (explaining that the U.S. Supreme Court's diminishing hostility toward tying arrangements and "reduced concern about anticompetitive effects" resulted in an "increasing insisten[ce] that market power be explicitly proven"); *see* Ill. Tool Works Inc. v. Indep. Ink, Inc., 547 U.S. 28, 42–43 (2006) (replacing the presumption of illegality in a tying arrangement involving a patented product with the requirement of proof of power in the relevant market). *See generally* Thomas F. Cotter, *Misuse*, 44 Hous. L. Rev. 901 (2007) (tracing the development of the misuse doctrine).

[242]*See* Fox, *supra* note 236, at 768–69 (describing U.S. antitrust laws as being guided by efficiency rather than fairness principles and suggesting that the goals would coincide upon limiting immunities); Ullrich, *supra* note 238, at 747–48 (detailing the shift of competition law enforcement toward efficiency-based innovation).

[243]*See* Ghidini, *supra* note 109, at 114–15.

[244]*See* Drexl, *supra* note 236, at 716–17 ("In principle, IPRs and competition laws … are two complementary instruments for the establishment and preservation of competitive markets."); Fox, *supra* note 236, at 764 (asserting that many nations' antitrust laws are ineffective in policing monopolies granted by IPRs because they neither prohibit excessive pricing nor recognize the refusal to license intellectual property as an offense); Hovenkamp, *supra* note 2, at 1979 (explaining that while both IP and antitrust policy seek to promote economic welfare, they do so in different ways, causing the relation between the two to be "unstable and problematic").

[245]*See* Coco, *supra* note 133, at 20; Frischmann & Weber Waller, *supra* note 110, at 57–64 (discussing the European cases).

article" or to use "any process other than the patented process," with a view to prohibiting any form of tying.[246] Refusals to deal may also trigger the grant of compulsory licenses under India's current framework,[247] as will undersupplying the market or charging excessively high prices.[248]

Similarly, China's third amendment of its Patent Law seems to have expressly codified the power to grant compulsory licenses for abusive practices with regard to both patents and utility models. Articles 48 through 54 reportedly envision a compulsory license for abuse, including failure to work, within the purview of Paris Convention Article 5A, or for anticompetitive effects of the patent monopoly that "should be reduced or removed."[249] Such a license may also issue, under Article 54, for refusals to deal on reasonable terms or within a reasonable period of time.[250]

The measures adopted in India and China may serve to stimulate other emerging economies that have so far played virtually no formative role in this area at all. If so, developing countries may also discover needed self-help measures that competition law might afford if and when market failures of various kinds impede access to green technologies, as many fear will occur.[251]

Policymakers should accordingly consider early U.S. cases that emphasize fairness over efficiency.[252] They should also adopt both the "abuse of a dominant position" approach found in EU competition law and flexible doctrines of "patent misuse," which could reach refusals to deal, excessive prices, and undersupply of the market, without a showing of market power.[253] But such measures must be applied equally to domestic and foreign firms, without discrimination,[254] which could raise serious obstacles in many emerging economies.

C. Revitalizing a Petrified Intellectual Property System

The foregoing exercise attempted to illustrate how the BRIC countries and other emerging economies could forge needed solutions to bourgeoning intellectual property problems that developed countries have either neglected or failed to resolve. In this endeavor, BRIC countries would be motivated by the greater stake they now have in what Carolyn Deere has felicitously called the "Implementation Game,"[255] owing to steadily mounting payoffs from strategic uses of locally generated knowledge goods. By carefully reevaluating their own intellectual property needs in the light of growing technological capacities,[256] they could

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[246]Kapczynski, *supra* note 4 (quoting The Patents Act, 1970, No. 39, Acts of Parliament, 1970, § 140(iii)); Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 Harv. L. Rev. (forthcoming Dec. 2009) (rejecting efficiency claims and demonstrating how tying generally harms consumer welfare).

[247]The Patents Act, 1970, No. 39, Acts of Parliament, 1970, § 84(6)(ii), (iv), *as amended by* The Patents (Amendment) Act, 2002, No. 38, Acts of Parliament, 2002.

[248]The Patents Act, 1970, No. 39, Acts of Parliament, 1970, § 84, *as amended by* The Patents (Amendment) Act, 2002, No. 38, Acts of Parliament, 2002; Kapczynski, *supra* note 4.

[249]*See* Feng, *supra* note 9, at 99–102.

[250]*Id.* at 100.

[251]*See, e.g.*, Abbott, *supra* note 40, at 20; Maskus & Okediji, *supra* note 40, at 7–8; Reichman et al., *supra* note 40, at 28–33.

[252]*See* Fox, *supra* note 236, at 760–61.

[253]*See* Paris Convention, *supra* note 88, art. 5A; G.H.C. Bodenhausen, Guide to the Application of the Paris Convention for the Protection of Industrial Property as Revised at Stockholm in 1967, at 70–71 (1968) (pointing out flexibilities in the Paris Convention allowing nations to define and legislate against abuses which might result from the exercise of the exclusive rights conferred by a patent); Cotter, *supra* note 241, at 908–09; *see also* Reichman with Hasenzahl, *supra* note 111, at 21 (noting U.S. practice of nonenforcement, used to correct misuses of exclusive rights).

[254]*See* TRIPS Agreement, *supra* note 10, arts. 3, 4, 8.2, 40 (requiring members to accord no less favorable treatment to other members with regard to the protection of intellectual property); Paris Convention, *supra* note 88, art. 2(1) (declaring that nationals of any country of the Union shall have the same protection and legal remedy with regard to industrial property as in any of other countries of the Union).

[255]*See* Deere, *supra* note 30, at 3.

begin to overhaul and reshape an "out of balance" system driven by ideology and power politics[257] in order to address the real conditions of creativity and innovation in today's digitally empowered universe of scientific discourse.[258]

Once embarked along such a path, policymakers in these countries would discover the growing importance of publicly accessible infrastructure in the development of new and complex technological paradigms.[259] They would profit from the problem-solving capacities of liability rules, especially when applied to upstream research outputs and tools that lack clear market values and that lend themselves to multiple downstream applications of unknown or uncertain value.[260] They would strive for more fluid and balanced interchanges between public and private goods in knowledge economies driven by both heavy public investment in basic research and by private investment in translating that research into workable commercial products.[261] And they could play a unique role in developing global administrative law norms as well.[262]

In sum, the BRIC countries, pursuing their own self-interest in economic growth with suitable coordination strategies,[263] could conceivably break the maximalists' stranglehold on intellectual property lawmaking exercises, which aims mainly to preserve a "knowledge cartel's" comparative advantage in existing technological outputs at the expense of future innovation requiring more subtle forms of nurture.[264] In so doing, the BRIC countries would devise and test new approaches and solutions that could redound to the benefit of technology-exporting countries everywhere, most of which seem incapable of reforming their increasingly dysfunctional innovation systems at the present time.[265]

IV. Obstacles to Implementing "Counter-Harmonization" Initiatives

The question this optimistic portrait begs, however, is why developing countries have not already taken longer strides in this direction when implementing their responses to the

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256*See* Dreyfuss, *supra* note 3, at 7 (stressing policy space within TRIPS flexibilities to promote local creative and technological skills).

257For evidence of the Andean Community's successful efforts in this regard, see Helfer et al., *supra* note 47, at 16–36.

258*See* David, *supra* note 72, at 82 (arguing that the Hopi word *koyaanisqatsi*, meaning "life out of balance," can be used to describe the international regime of intellectual property rights due to the "dangerously altered … balance between private rights and the public domain in data and information").

259*See, e.g.*, Frischmann, *supra* note 64, at 923–26 (developing a theory that strong economic arguments exist for managing and sustaining openly accessible intellectual infrastructure); Lee, *Contracting to Preserve*, *supra* note 73, at 893–94 (suggesting that public institutions have freedom to effectuate norms favoring wide dissemination of research technologies through a new model of "consideration-based patent regulation"); Lee, *Distributive Commons*, *supra* note 73, at 21–22 (comparing health technologies to infrastructure). *See generally* Benkler, *supra* note 176, at 3 (claiming that the information economy is entering a new stage, which he calls the "networked information economy").

260*See, e.g.*, Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, ch. 2 (proposing compensatory liability regime for commercial applications of materials deposited for research purposes in culture collections); Victoria Henson-Apollonio, *The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA): The Standard Material Transfer Agreement as Implementation of a Limited Compensatory Liability Regime*, *in* Gene Patents and Collaborative Licensing Models, *supra* note 24, at 289, 289–93 (describing recent effort to facilitate the exchange of crop germplasm for commercial food and agricultural purposes through compensatory liability regimes); Rai et al., *supra* note 132, at 26 (proposing liability rule for pre-competitive pooling of small molecule libraries for high throughput screening); Reichman & Lewis, *supra* note 159, at 345–48 (proposing use of liability rules to stimulate investment in traditional knowledge). *See generally* Reichman, *supra* note 53, at 1776–77 (proposing compensatory liability regime for small-scale innovation).

261*See, e.g.*, Rai & Eisenberg, *supra* note 41, at 300–01; So et al., *supra* note 41, at 2078–82 (describing the Bayh-Dole Act of 1980 and examining the potential problems for developing countries modeling legislation on the Act); V.C. Vivekanandan, *The Public–Private Dichotomy of Intellectual Property: Recommendations for the WIPO Development Agenda*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 131, 132–34.

262Dreyfuss, *supra* note 3, at 21–25.

263*See, e.g.*, Yu, *supra* note 208, at 370–83 (stressing coordination strategies such as South-South Alliances, North-South Cooperation, and use of the WTO Dispute Settlement Process); *see also* Dreyfuss, *supra* note 3, at 17–21 (stressing importance of coordination in international lawmaking exercises concerning IPRs in general).

264Maskus & Reichman, *supra* note 2, at 3, 19.

265Reichman & Dreyfuss, *supra* note 12, at 122–29.

challenges posed after the 1994 adoption of the TRIPS Agreement. Carolyn Deere's recent efforts to answer that very question afford a bleak and cautionary picture of the obstacles that stand in the way of autonomous intellectual property reforms.[266]

She shows, for example, that strong economic pressures, including the threat of trade sanctions and other diplomatic measures, combined with offers of future trade concessions, were more likely to produce TRIPS-plus provisions in FTAs than efforts to flesh out existing flexibilities in the TRIPS Agreement.[267] High-level lobbying by specialized knowledge communities, backed by one-sided technical assistance from WIPO and government agencies in developed countries,[268] further "shap[ed] developing country perceptions of the political climate and their room for [maneuvering] within it,"[269] although countervailing efforts by NGOs, academics, and others became more effective over time.[270]

On the domestic front, a lack of technical expertise hampered many developing countries.[271] As Professor Dreyfuss observes, "Astute lawyers should be able to utilize these [TRIPS] flexibilities …. The rub, however, is the need for astute lawyering … [which in turn depends on nurturing] a legal community capable of utilizing the Agreement's flexibilities effectively."[272]

Even when the relevant expertise emerged over time, the lack of internal government coordination among agencies affected by intellectual property law and policy left too much power in the hands of national IP offices, which were more likely to share the views of their foreign counterparts, and also left non-expert government officials more vulnerable to pressures from foreign governments.[273] In many developing countries, parliamentary debate and public discussion about intellectual property issues were negligible, which delegated policy framing to "national associations of patent and trademark agents and copyright lawyers, staff of national intellectual property offices, and national legal scholars."[274] Weak governance and widespread corruption were, of course, ancillary factors in most of the developing world,[275] with some notable exceptions in the Andean Community.[276]

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[266]*See generally* Deere, *supra* note 30 (revealing the international pressures and national political dynamics which resulted in the variation of responses to TRIPS in developing countries).

[267]*Id.* at 164–67.

[268]*See, e.g.*, Sisule F. Musungu & Graham Dutfield, Multilateral Agreements and a TRIPS-Plus World: The World Intellectual Property Organisation (WIPO) 16–17 (2003), *available at* http://www.quno.org/geneva/pdf/economic/Issues/Multilateral-Agreements-in-TRIPS-plus-English.pdf.

[269]Deere, *supra* note 30, at 167–68, 180 (emphasizing ideational power as an explanation to the varying actions of developing countries and describing capacity-building as the area of clearest intersection between economic and ideational power in the TRIPS implementation game); *see also* Drahos with Braithwaite, *supra* note 12, at 90–93; Graham Dutfield, Intellectual Property Rights, Trade and Biodiversity 12 (2000) (attributing the adoption of the TRIPS Agreement, "given the ambivalent if not hostile stance of many developing countries," to the promise of favorable agreements in areas such as textiles and agriculture); Peter Drahos, *BITS and BIPS: Bilateralism in Intellectual Property*, 4 J. World Intell. Prop. 791, 803–04 (2001) (revealing the danger of developing countries "being led into a highly complex multilateral/bilateral web" that is eroding their ability to set and interpret intellectual property standards domestically).

[270]Deere, *supra* note 30, at 172–79; *see also* Laurence R. Helfer, *Regime Shifting: The TRIPs Agreement and New Dynamics of International Intellectual Property Lawmaking*, 29 Yale J. Int'l L. 1, 23–27 (2004) (observing that NGOs and developing countries began to regard TRIPS as a "coerced agreement" and describing how, in the wake of TRIPS, NGOs aided developing nations in intellectual property lawmaking).

[271]Deere, *supra* note 30, at 197. In Africa, this lack of expertise at the national level led to the delegation of intellectual property matters to regional entities that were particularly susceptible to high-protectionist pressures from WIPO and OECD countries generally. *See id.* at 219–20.

[272]Dreyfuss, *supra* note 3, at 7.

[273]*See* Deere, *supra* note 30, at 211–20; *see also* Helfer et al., *supra* note 47, at 16–32 (documenting more successful regional coordination efforts in the Andean Community).

[274]Deere, *supra* note 30, at 207. Professor Gervais points to the perception of arcane "club" rules beyond the written word of the treaties, with the risk that the intellectual property club can create distance between policy makers and their country's larger public interest. E-mail from Daniel Gervais, Professor of Law, Vanderbilt University Law School, to Jerome Reichman, Professor of Law, Duke University School of Law (Sept. 14, 2009) (on file with Author).

[275]*See* Deere, *supra* note 30, at 198 (noting the impact of weak public administration and corruption on TRIPS implementation in developing countries).

One may then ask why matters should be different in the future. The answer is largely rooted in the real economic and technological capacities being attained in countries such as India, China, Brazil, and others. Such real world experience breeds, first, greater awareness of both the strengths and weaknesses of conventional intellectual property norms and policies encountered along the way, and second, a greater confidence in the ability of local entrepreneurs and policymakers to tailor future decisions and positions in their national interest.[277]

There is, of course, a countervailing risk that greater technical capacity at the national level, especially in the BRIC countries, could breed domestic lobbying pressures favoring protectionist measures that might further distort, rather than rebalance, the international intellectual property system.[278] Also relevant is the continued ability of NGO advocacy initiatives, such as the Access to Knowledge Campaign,[279] to reach policymakers in developing country capitals, despite funding cuts due to economic recession and to pressures from high-protectionist interests on foundations previously supportive of such initiatives.

Of particular importance are the lessons to be learned from the coordination and governance strategies of those BRIC countries that have most succeeded in resisting foreign pressures for TRIPS-plus agreements and legislation while maintaining an increasingly autonomous policy of their own.[280] Here empirical evidence showing the ability of Andean Community institutions to resist attempts to influence the formation of regional intellectual property laws and policies on numerous occasions sets an impressive example.[281] But regional coordination, a key aspect of Professor Kapczynski's own "counter-harmonization" strategy,[282] is often difficult to achieve and risks becoming fragile over time.[283] Moreover, that very regional process can be captured and turned against the interests of national innovation systems needing broadened TRIPS flexibilities, as Carolyn Deere documents in the case of francophone Africa.[284]

To offset these risks, Professor Kapczynski buttresses her "counter-harmonization" thesis with supplementary strategies of "fragmentation" and "mimicry."[285] Fragmentation entails "the adoption of unique or semi-unique national variations in law that create legal 'friction,' impeding the flow of the transnational circuits" that undermine local autonomy.[286]

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[276] *See* Helfer et al., *supra* note 47, at 16–32.

[277] *See, e.g.*, Gordon C.K. Cheung, Intellectual Property Rights in China 63–82 (2009) (describing the quantitative and legal measures taken by the Chinese government to counteract rampant counterfeiting of intellectual property); Allarakhia, *supra* note 178, at 11 ("As economies in emerging markets enter the biopharmeceutical arena, it is essential that developed economies share not only technological expertise, but also their experiences regarding knowledge production and dissemination."); Mizukami & Lemos, *supra* note 33, at 44–45 (analyzing the *tecnobrega* industry in Brazil and its implications for intellectual property protection); Yu, *supra* note 208, at 346–48 (exploring how the BRIC countries can "promote access to essential medicines in the less developed world" through collaboration with other developing countries); *see also* Shamnad Basheer & Annalisa Primi, *The WIPO Development Agenda: Factoring in the "Technologically Proficient" Developing Countries*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 100, 101–04 (cautioning against a polarized view of developing countries in the context of technological capability); Pedro Paranaguá, *Strategies to Implement WIPO's Development Agenda: A Brazilian Perspective and Beyond*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 140, 140–42 (focusing on the role of NGOs in implementing the WIPO Development Agenda).

[278] I am indebted to Laurence Helfer for this cautionary note.

[279] *See, e.g.*, Kapczynski, *Access to Knowledge*, *supra* note 196; Paranaguá, *supra* note 277.

[280] *See, e.g.*, Deere, *supra* note 30, at 199, 211–18 (describing Brazil as "the country that exhibited the highest degree of coordination domestically on IP policy matters and that also achieved the greatest coordination of its external IP relations").

[281] *See* Helfer et al., *supra* note 47, at 16–32.

[282] Kapczynski, *supra* note 4; *see also* Reichman & Dreyfuss, *supra* note 12, at 177–22 (suggesting new approaches to existing IP problems rather than premature patent harmonization efforts).

[283] For example, the Andean Community has lost Venezuela and Bolivia, and may be disintegrating. *See* Helfer et al., *supra* note 47.

[284] *See, e.g.*, Deere, *supra* note 30, at 240–86 (describing experience of the African Organization for Intellectual Property (OAPI)).

[285] Kapczynski, *supra* note 4.

[286] Id.

Mimicry, in contrast, entails "a dynamic reworking" of transplanted IP norms, which is cast as a process of "sharing or borrowing."[287]

For these and other related proposals to succeed, however, at least three supporting institutional factors become relevant, if not indispensable. These are: 1) the need for interagency coordination at the national, and, ideally, regional levels; 2) the need to establish facts on the ground in the domestic laws of the emerging economies; and 3) the willingness of the relevant governments to defend national variations of TRIPS flexibilities before WTO dispute resolution tribunals.

A. Interagency Coordination of Intellectual Property Law and Policy

In the late 1990s, under a seed grant from a unit of UNDP, Ruth Okediji, Jayasharee Watal, and I argued that internal governmental coordination of intellectual property policy would be crucial to formulating appropriate domestic strategies to implement international intellectual property standards under the TRIPS Agreement.[288] Because, in our view, these new IP standards would affect all of a country's creative and industrial sectors in different ways, depending on its specific national assets and liabilities in each sector, there could be no internal "one size fits all" solutions, despite external pressures for such an approach.[289] Rather, the challenge for governments was to take stock of those same national assets and liabilities and then to fashion implementing strategies that would enable each developing country to maximize potential gains from intellectual property protection over time while minimizing the social costs.[290]

Our central recommendation was accordingly that developing country governments needed to form and staff ongoing interagency coordinating committees on intellectual property law and policy, in order to advise policymakers about the implications for economic and social welfare as a whole of every proposed legislative or administrative decision concerning compliance with the TRIPS Agreement and related issues.[291] Above all, it seemed essential that these local coordinating committees would oversee the activities of national intellectual property offices, while pooling their resources at the regional level, in order to maintain coherent and effective negotiating positions in the relevant multilateral fora, including WIPO, WTO, WHO, UNCTAD, and UNESCO.[292]

To their credit, UNCTAD sponsored a conference in Ghana at which some sixteen delegations from different countries evaluated these proposals. Notwithstanding the attending delegations' enthusiastic endorsement of these proposals, and UNCTAD's strong commitment to promoting their implementation, further UNDP funding was denied. The project was soon abandoned, in part because some high-level UNDP officials thought that developing countries should work to repeal the TRIPS Agreement rather than to comply with it, and in part—one suspects—due to pressures on UNDP from key donor countries to steer clear of controversial intellectual property matters.

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[287] *Id.; see also* Paul Edward Geller, *Legal Transplants in International Copyright: Some Problems of Method*, 13 UCLA Pac. Basin L.J. 199 (1994).

[288] *See* Jerome Reichman, Jayasharee Watal & Ruth Ghana Okediji, Flagship Project on Innovation, Culture, Biogenetic Resources, and Traditional Knowledge, U.N. Development Programme (2000) (unpublished manuscript, on file with Author).

[289] *See generally* Basheer & Primi, *supra* note 277.

[290] Reichman, Watal & Okediji, *supra* note 288; *see also* Chon, *supra* note 37, at 806–20 (probing the relationship between IP law and social justice); Maskus & Reichman, *supra* note 2, at 24 ("These countries can hardly absorb the unknown social costs of new intellectual property burdens when the real costs of the last round of legislative initiatives are still making themselves felt.").

[291] *See* Reichman, Watal & Okediji, *supra* note 288.

[292] *See* Peter K. Yu, *Building Intellectual Property Coalitions for Development*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 79, 90–93 ("Regional or pro-development fora are particularly effective means for coordinating efforts by less developed countries in the areas of public health, IP, and international trade.").

In retrospect, both Carolyn Deere's and Laurence Helfer's empirical findings demonstrate the validity of the proposals for interagency coordination that were put forward in the late 1990s and the extent to which such recommendations still remain relevant to today's counter-harmonization strategies, including efforts to implement the WIPO Development Agenda. Deere's study shows that those BRIC countries that were most successful in defining and maintaining autonomous intellectual property policies and positions over time, especially India and Brazil, despite enormous pressures from foreign governments, were precisely those countries that had highly developed interagency coordination mechanisms in place early on.[293]

In this connection, it is worth noting that China's third amendment of its Patent Law in 2008, which self-consciously seeks to balance incentives to innovate with the larger public interest, was the product of a high-level policymaking group charged with the formulation of a National Intellectual Property Strategy.[294]

Elsewhere, Professor Helfer's research team shows that the Andean Community's own intellectual property rules significantly influenced the expectations and behavior of private actors.[295] By the same token, the Andean Tribunal of Justice (ATJ) not only created the kind of procedures and standards familiar in well-functioning legal systems, it "helped to rebuff pressure by the United States and multinational corporations to circumvent Andean IP rules, leading to different behavior by national actors from what it would have been in the absence of the Andean legal system."[296]

In contrast, most other governments delegated the task of responding to TRIPS and drafting the relevant laws to a small staff of technocrats located in national intellectual property offices.[297] Carried to the regional level in Africa, for example, this meant that national intellectual property policies were largely delegated to the African Intellectual Property Organization (OAPI) and to the African Regional Intellectual Property Organization (ARIPO) (English-speaking countries). Both entities worked closely with WIPO and left few countries at the national level with sufficient "capacity … to critically review patents granted," among other policy issues.[298]

Of course, the successes attained in India, Brazil, and China were also due to the economic opportunities their large markets offered to foreign investors, irrespective of their own intellectual property laws and policies.[299] Nevertheless, it seems clear that without effective interagency coordination of these issues at the domestic level, developing countries will not attain the leadership role in intellectual property policymaking at the international level to which they otherwise could and should aspire.[300]

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[293]With the exception of a handful of countries, like Brazil and India, the prospect of tailored approaches to TRIPS implementation was curtailed by the absence of a broader policy framework setting out national needs and priorities through which reform options could be considered…. Among developing countries, Brazil stood out for having a strategic approach to TRIPS implementation based on a broad policy framework for development and associated industrial policies. India also worked to place IP issues within a broader policy framework through its five-year plans.
Deere, *supra* note 30, at 199.
[294]Feng, *supra* note 9, at 10–11.
[295]Helfer et al., *supra* note 47, at 17–32.
[296]*Id*. at 17.
[297]Deere, *supra* note 30, at 199; *see, e.g.*, Comm'n on Intell. Prop. Rights, Integrating Intellectual Property Rights and Development Policy 5 (2003), *available at* http://www.iprcommission.org/papers/pdfs/final_report/CIPRfullfinal.pdf; Carlos Correa, *Formulating Effective Pro-development National Intellectual Property Strategies*, *in* Trading Knowledge: Development Perspectives on TRIPS, Trade and Sustainability 209, 214 (Christophe Bellman et al. eds., 2003) ("Due to their limited domestic capacity, developing countries are strongly dependent on technical assistance, and rely for expert advice and commentary on new draft legislation on the [WIPO] and the [WTO], especially to conform consistency of draft legislation with international obligations.").
[298]Deere, *supra* note 30, at 219.
[299]*See* Yu, *supra* note 8, at 177–80.

B. Establishing Facts on the Ground

The Development Agenda, now officially established at WIPO[301] and analogous forums at other institutions, such as the IGWG deliberations at WHO[302] and their progeny,[303] have changed the policy climate at the international level. They elevate the concerns of developing countries, as well as the broader constituencies in developed countries that they indirectly represent, to a level of importance that cannot be ignored.[304] They make the implementation of the flexibilities set out in the TRIPS Agreement and in other intellectual property conventions as much a matter of legitimate multilateral concern as compliance with proprietors' exclusive rights.

In this respect, users' rights and other third party interests, including the larger public interest in research, education, and access to knowledge, have become an integral part of the relevant international intellectual property standards set out in these conventions.[305] Moreover, by linking the larger development component to questions of enforcing intellectual property standards at the international level, the Development Agenda and IGWG-related consultations make it mandatory for both IGOs and national delegations to take into account the countervailing demands of the human rights conventions,[306] as well as the expressly designated objectives and principles codified in Articles 7 and 8 of the TRIPS Agreement.[307]

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[300]For the view that the United States' own interagency review mechanisms no longer meet today's needs for a vibrant and effective innovation policy, see Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 Geo. Wash. L. Rev. 1, 3–8 (2008) (highlighting "certain well-established pathologies of the regulatory state").

[301]WIPO, *General Report Adopted by the Assemblies of the Member States of WIPO*, at 135–47, WIPO Doc. A/43/16 (Nov. 12, 2007), *available at* http://www.wipo.int/edocs/mdocs/govbody/en/a_43/a_43_16-main1.pdf; *see, e.g.*, Denis Borges Barbosa, Margaret Chon & Andrés Moncayo von Hase, *Slouching Towards Development in International Intellectual Property*, 2007 Mich. St. L. Rev. 71, 120–23 (addressing the purpose and constraints of the WIPO Development Agenda); de Beer, *supra* note 78, at 1–2.

[302]World Health Org. [WHO], *Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property*, WHO Doc. WHA 61.21 (May 24, 2008), *available at* http://apps.who.int/gb/ebwha/pdf_files/A61/A61_R21-en.pdf (building upon the report of the Intergovernmental Working Group on Public Health, Innovation and Intellectual Property).

[303]*See, e.g.*, WHO, *Draft Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property: Mapping the Funding for Research and Development for Neglected Diseases*, WHO Doc. A/PHI/IGWG/2/INF.DOC./2 (Aug. 28, 2007), *available at* http://apps.who.int/gb/phi/pdf/igwg2/PHI_IGWG2_ID2-en.pdf (reporting on the funding for health research and development of research related to neglected diseases); WHO, Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action 1–5 (2007), *available at* http://www.searo.who.int/LinkFiles/Health_Systems_EverybodyBusinessHSS.pdf (noting the unacceptable health outcomes across the developing world and providing a framework to strengthen health systems to reverse this trend); WHO, Equitable Access to Essential Medicines: A Framework for Collective Action 1–6 (2004), *available at* http://archives.who.int/tbs/ndp/s4962e.pdf (proposing actions for policymakers to take to improve access to existing essential medicines and vaccines).

[304]*See, e.g.*, Carolyn Deere, *Reforming Governance to Advance the WIPO Development Agenda*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 43, 43–46 (critically evaluating WIPO's governance); Xuan Li, *A Conceptual and Methodological Framework for Impact Assessment Under the WIPO Development Agenda (Cluster D)*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 34, 40; *see also* E. Richard Gold & Jean-Frédéric Morin, *From Agenda to Implementation: Working Outside the WIPO Box*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 57, 64–66 (encouraging WIPO to outsource the implementation of the Development Agenda).

[305]*See* Hugenholtz & Okediji, *supra* note 180, at 9–15 (suggesting that international harmonization of limitations and exceptions in copyright law would enhance the benefits of substantive rights harmonization); Dreyfuss, *supra* note 180, at 22 (making a case for adding explicit user rights to the TRIPS Agreement); Annette Kur & Henning Grosse Ruse-Khan, *Enough is Enough—The Notion of Binding Ceilings in International Intellectual Property Protection* 19–25 (Max Planck Inst. for Intellectual Prop., Competition & Tax Law Research Paper Series, Paper No. 09-01, 2008), *available at* http://ssrn.com/abstract=1326429; *Three-Step Test*, *supra* note 180, at 1 (observing the need for the "Three-Step Test" to be interpreted "so as to ensure a proper and balanced application of limitations and exceptions").

[306]*See* Laurence R. Helfer, *Human Rights and Intellectual Property: Conflict or Coexistence?*, 5 Minn. Intell. Prop. Rev. 47, 55–57 (2003) (discussing the "antagonistic approach to TRIPS" taken by the UN Sub-Commission on the Promotion and Protection of Human Rights in Resolution 2000/7 on Intellectual Property Rights and Human Rights); Helfer, *supra* note 219, at 1009–14; *see also* Joost Pauwelyn, Conflict of Norms in Public International Law 304–05, 309 (2003) (discussing the Vienna Convention's objective of prohibiting agreements that affect the rights or obligations of third parties, which extends to those agreements that "detract[] from substantive human rights"); Thomas Cottier, Joost Pauwelyn & Elisabeth Bürgi, *Introduction* to Human Rights and International Trade (Thomas Cottier et al. eds., 2005).

[307]TRIPS Agreement, *supra* note 10, arts. 7–8; *see generally* Yu, *supra* note 211.

Yet, nothing is cheaper than talk at IGOs. The prospects of top-down multilateral legislation mandating hard law provisions favoring the interests of developing countries are virtually nil at the present time, given the governance structure of these organizations and the hostility of the United States, European Union, and Japan to any such initiatives. Whether soft law reforms stand a better chance of approval remains to be seen,[308] including the social costs of any trade-offs that would have to be made in order to win the assent of the aforementioned developed countries.[309]

Meanwhile, secret provisions likely to be incorporated into the pending Anti-Counterfeiting Trade Agreement (ACTA) negotiations[310] could undo key provisions of the Doha Declaration on the TRIPS Agreement and Public Health.[311] EU customs officials are further undermining access to medicines by intercepting shipments of unpatented generic pharmaceuticals from India to developing countries in other continents.[312] And WIPO has hosted a major conference to convince least-developed countries, such as Haiti, that their future economic prospects depend on stronger intellectual property laws, which they are otherwise not obliged to enact until at least 2013.[313]

What must occur, instead, if the WIPO Development Agenda is to produce more than talk, [314] is that leading developing countries, especially the BRIC countries, take steps to implement model TRIPS-compliant flexibilities in their own domestic laws, while championing these same positions in the relevant international fora. China, for example, has articulated the "public order" exception to patentability under Article 27.2 of the TRIPS Agreement to exclude "any invention-creation that is contrary to the laws of the State or social morality or that is detrimental to the public interest."[315] Building on this provision, China's third revision of its Patent Law regulates access to genetic resources for the first time;[316] imposes a "prior informed consent regime" consistent with the Convention on Biological Diversity;[317] and makes disclosure of origin a precondition for the granting of any patented invention "depending on genetic resources."[318] These provisions were adopted

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[308]*See* Hugenholtz & Okediji, *supra* note 180, at 49–50 (expounding the benefits of a soft-law modality).

[309]For example, while expanded protection for Geographical Indications and perhaps some forms of traditional knowledge might become acceptable to both sides, proposals for database protection or deep patent law harmonization would almost certainly cost developing countries far more than any gains from greater recognition of so-called user rights. *See* Reichman & Dreyfuss, *supra* note 12, at 93–94.

[310]*See generally* Charles R. McManis, *The Proposed Anti-Counterfeiting Trade Agreement (ACTA): Two Tales of a Treaty*, 46 Hous. L. Rev. 1235 (2009) (describing what is known of the closed-door trade negotiations surrounding ACTA, an agreement ostensibly aimed at fighting the proliferation of counterfeit and pirated goods in international trade).

[311]*See* Doha Public Health Declaration, *supra* note 31.

[312]Posting of Tom Bollyky, *Terminology Matters: The Dispute Between India and EU over Generic Drug Transshipments*, to Global Health Policy Blog (Aug. 12, 2009), http://blogs.cgdev.org/globalhealth/2009/08/terminology-matters-the-dispute-between-india-and-eu-over-generic-drug-transshipments.php; Kaitlin Mara, *Drug Seizures in Frankfurt Spark Fears of EU-Wide Pattern*, Intell. Prop. Watch, June 5, 2009, http://www.ip-watch.org/weblog/2009/06/05/drug-seizures-in-frankfurt-spark-fears-of-eu-wide-pattern; *see also* Abbott & Reichman, *supra* note 38, at 966 (reporting that the EU had been "effectively seeking to burden" countries with "the duty to implement the terms of its Intellectual Property Enforcement Directive," by ordering provisional measures such as "the physical seizure of infringing goods").

[313]*See supra* note 31.

[314]*See* Pedro de Paranaguá Moniz, The Development Agenda for WIPO: Another Stillbirth? A Battle Between Access to Knowledge and Enclosure 41–42 (July 1, 2005) (unpublished L.L.M. thesis, Queen Mary & Westfield College), http://ssrn.com/abstract=844366 (criticizing long discussions as irrelevant to the main goals of the Development Agenda).

[315]*See* Wenting Cheng, *Third Revision of Patent Law in China (Part II)*, Intell. Prop. Watch, Oct. 1, 2009, http://ip-watch.org/weblog/2009/10/01/third-revision-of-patent-law-in-china-part-ii.

[316]*Id.* Draft regulations define "genetic resources" as any material that "is obtained from the human body, animals, plants or micro-organism, contains a genetic functional unit, and is of actual or potential value." Inventions subject to the provision "make … use of the genetic function of genetic resources." *Id.*

[317]*Id.; see* Convention on Biological Diversity arts. 1, 15–16, June 5, 1992, 1760 U.N.T.S. 79, 143 (promoting the "sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources").

[318]Cheng, *supra* note 315.

to deal with the problem of "biopiracy" and modeled on similar legislation in the Andean Community and India.[319]

In contrast with these palpable concerns about protecting potentially valuable genetic resources, the BRIC countries as a group lag behind in recognizing impediments to computational research methods and innovation that lie hidden in obsolete copyright regimes.[320] For example, nothing prevents Brazil, India, and China from proceeding on their own to codify broad limitations and exceptions for digitally integrated scientific research, education, and libraries in their domestic laws, as stepping stones to broader international action.[321] By the same token, courts or legislatures in these and other countries could begin to implement the Max Planck Institute's Declaration on the Three-Step Test in their domestic laws,[322] along with selected other "ceilings" on intellectual property rights that have emerged from parallel initiatives in the Nordic countries.[323]

Only if leading developing countries begin to enact suitable reforms of intellectual property law and policy at home will it become realistically possible to foresee these reforms spreading to the regional and multilateral levels, where both positive and negative results of such experiments could be evaluated. Just as the AIPPI forums in the nineteenth and early twentieth centuries shed a comparative light on state practice in developed countries and led to the progressive harmonization of inventors' rights over time,[324] so, too, can the WIPO Development Agenda become a focal point for comparing and contrasting diverse state actions on the road to achieving a new and better equilibrium between private and public goods at the national, regional, and multilateral levels.

Meanwhile, still other worthwhile initiatives can be rooted in state practice without formal acquiescence at IGOs. For example, there are now real prospects for an international treaty providing greater access to literature for the blind,[325] a process that is long overdue and worthy of strong support by all WIPO member countries. At the same time, nothing stops the developing countries from immediately codifying key provisions of this proposed treaty in order to create "facts on the ground" that would benefit the blind now and pave the way for future enactment in the WIPO framework.

Similarly, if a prize fund to promote research on a vaccine for Chagas disease is a good idea, as the evidence suggests,[326] then the Latin American countries should establish such a fund

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[319]*See* Feng, *supra* note 9, at 63–64. In China, unauthorized exports of genetic materials from wild soybeans, local gooseberry varieties, "and even the famous Beijing duck" had allegedly led to the development of hybrids patented abroad that were subsequently imported into China. Cheng, *supra* note 315.

[320]*See supra* text accompanying notes 200–05 (suggesting that developing countries adopt broad exemptions aimed at promoting scientific research uses of literature and data). *See generally* Reichman, Dedeurwaerdere & Uhlir, *supra* note 73, chs. 3–4.

[321]*See, e.g.*, Reichman & Okediji, *supra* note 23, at 39; *Three-Step Test*, *supra* note 180, at 3 (prefacing that individual states should have flexibility to shape their own copyright laws and stating that the three-step test should not undermine European legislation on limitations); *see also* Andrew Rens, *Implementing WIPO's Development Agenda: Treaty Provisions on Minimum Exceptions and Limitations for Education*, *in* Implementing the World Intellectual Property Organization's Development Agenda, *supra* note 78, at 158, 160–61 (pointing out that "[e]xceptions and limitations already exist in the laws of most developed countries and many developing countries" and, in particular, arguing for copyright exceptions for educational purposes). But lobbying pressures against change in the pending Brazilian copyright reform are reportedly fierce, according to confidential top-level sources.

[322]*See Three-Step Test*, *supra* note 180, at 3 ("[T]he Test may be incorporated directly or it may function exclusively as an aid to the interpretation of domestic legislation.").

[323]*See* Kur & Grosse Ruse-Khan, *supra* note 305, at 26 n.89.

[324]*See* Ladas, *supra* note 44, at 63–94 (chronicling the development of the Paris Convention).

[325]WIPO, *Treaty for Improved Access for Blind, Visually Impaired and Other Reading Disabled Persons*, Annex, WIPO Doc. SCCR/18/5 (May 25, 2009), *available at* http://www.wipo.int/edocs/mdocs/copyright/en/sccr_18/sccr_18_5.pdf (proposal put forward by Brazil, Ecuador, and Paraguay based on recommendations of the World Blind Union); William New, *Proposed WIPO Treaty on Visually Impaired Access Gets Deeper Look*, Intell. Prop. Watch, May 29, 2009, http://www.ip-watch.org/weblog/2009/05/29/proposed-wipo-treaty-on-visually-impaired-access-gets-deeper-look.

[326]*See* Sara E. Crager & Matt Price, *Prizes and Parasites: Incentive Models for Addressing Chagas Disease*, 37 J.L. Med. & Ethics 292, 300–01 (2009).

now, with their own contributions, and shame the developed countries into joining them later. In other words, the more that the developing countries are willing to stand up for their own intellectual property needs, the more likely they are to ensure that those needs will be respected in future international intellectual property lawmaking exercises.

C. Defending the TRIPS Flexibilities at the WTO

Moving beyond talk will not become feasible unless developing countries are willing to defend their rights to implement the TRIPS flexibilities in their own domestic laws without undue interference from powerful states that espouse conflicting interpretations of international IP standards. The more that single states, such as the BRIC countries, or regional coalitions, take steps to fully implement limitations and exceptions to the exclusive rights covered by the TRIPS Agreement, for example, the more likely it becomes that governments in developed countries will contest the legality of such actions through diplomatic representations and threats of retaliatory measures.

The USTR has repeatedly used actions under Section 301 of the Trade Act of 1974[327] to challenge developing country governments' interpretations of the TRIPS Agreement, in combination with threats to withdraw GSP privileges in reprisal.[328] These tactics aimed to keep developing countries from using compulsory licenses to persuade pharmaceutical companies to market patented medicines on a "high-volume low-margin" basis[329] rather than at prices only the affluent can afford.[330]

Unless public officials in developing countries are willing to stand up for their rights under the TRIPS Agreement and related conventions before the TRIPS Council[331] and, where necessary, in WTO dispute-resolution proceedings,[332] they will not retain the full policy space in which to maneuver that these conventions actually afford.[333] Conversely, governments that do stand up for such rights stand a good chance of persuading the WTO Appellate Body that unilateral actions taken against them violate fundamental WTO precepts.

Article 23 of the WTO's Dispute Settlement Understanding (DSU) obliges Members to seek redress for alleged violations of the WTO Agreement, including its TRIPS component, by

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[327]Trade Act of 1974, Pub. L. No. 93-618, § 301, 88 Stat. 1978, 2041–42 (1975) (codified as amended at 19 U.S.C. § 2411 (2006)).

[328]Office of the U.S. Trade Representative, 2009 Special 301 Report 3, 17, 23 (2009), *available at* http://www.ustr.gov/sites/default/files/Full%20Version%20of%20the%202009%20SPECIAL%20301%20REPORT.pdf (noting that Argentina and Brazil appear on the Priority Watch and Watch Lists, respectively, as targets for enforcement through trade preference programs such as the Generalized System of Preferences (GSP)).

[329]*See* Bird, *supra* note 47, at 210, 214 ("[L]icenses invite scrutiny by wealthy governments ready to defend their multinationals through trade sanctions…. Evidence certainly exists that compulsory licensing, or even the threat of compulsory licensing, can lower drug prices dramatically."); Kristina M. Lybecker & Elisabeth Fowler, *Compulsory Licensing in Canada and Thailand: Comparing Regimes to Ensure Legitimate Use of the WTO Rules*, 37 J.L. Med. & Ethics 222, 233 (2009); *see also* Abbott & Reichman, *supra* note 38, at 929–30; Bryan C. Mercurio, *TRIPs, Patents, and Access to Life-Saving Drugs in the Developing World*, 8 Marq. Intell. Prop. L. Rev. 211, 224 (2004); Outterson, *supra* note 38, at 229–30.

[330]*See* Flynn, Hollis & Palmedo, *supra* note 236, at 186 (describing the use of monopoly pricing in under-developed pharmaceutical markets).

[331]*See* TRIPS Agreement, *supra* note 10, art. 68; Agreement Establishing the World Trade Organization art. IV, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Legal Instruments—Results of the Uruguay Round, 33 I.L.M. 1125 (1994) (designating the roles and duties of the TRIPS Council).

[332]Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 2, Legal Instruments—Results of the Uruguay Round, 33 I.L.M. 1125 (1994) [hereinafter DSU].

[333]*See* Reichman, *supra* note 140, at 254 (observing that developing countries are hesitant to employ legitimate legal tools and flexibilities contained in the TRIPS Agreement when faced with threats of retaliation by powerful countries); Yu, *supra* note 208, at 350 (discussing Brazil's request for consultation following a dispute settlement process with developed countries). *But see* Gregory Shaffer, *Recognizing Public Goods in WTO Dispute Settlement: Who Participates? Who Decides? The Case of TRIPS and Pharmaceutical Patent Protection*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 884, 895–901 (describing impediments), 901–07 (prescribing strategies to overcome them).

means of specified multilateral venues and procedures.[334] Under this provision, the U.S. authorities can challenge a developing country's interpretation of its TRIPS obligations by initiating litigation before a dispute settlement panel, with a right of appeal to the WTO Appellate Body. But the USTR cannot unilaterally adjudicate disputes over matters covered by the TRIPS Agreement, nor can it legally impose sanctions for the loss of its expected trade benefits.[335] Freedom from unilateral action of this kind is one major reason that developing countries signed onto the 1994 agreement establishing the WTO in the first place.[336]

In 1999, a WTO panel convoked by European Union officials criticized the United States for unilaterally applying Section 301 to TRIPS-related matters, and it warned that sanctions would be in order if such violations continued in the future.[337] If developed countries continue to engage in unilateral retaliations of this sort, they run the further risk of other countervailing measures that aggrieved countries could invoke:

> Because such action constitutes a violation of the DSU and of the framework Agreement Establishing the WTO, it would entitle the aggrieved party to all the remedies that the Vienna Convention on the Law of Treaties provides for breach of the relevant agreements. A primary remedy thus provided is the age-old right of self-help implicit in the power of an aggrieved party to suspend its obligations under the treaty in question, pending compensation for breach.[338]

Developing countries that win dispute settlement cases against developed countries may also invoke cross-collateral trade sanctions in the event that damages based on sanctions against imports of knowledge goods alone were insufficient to cover the actual trade losses caused by the defendant country's violations of the WTO Agreements.[339]

Those developing countries willing to defend their interpretations of the TRIPS Agreement before WTO dispute settlement panels have already made significant contributions to our understanding of international intellectual property law. For example, in the very first WTO TRIPS case concerning a dispute between the United States and the European Union on one side and India on the other, the Appellate Body, while finding against India on the merits, rejected the interpretation put forward by the plaintiffs.[340] Instead, the Appellate Body stressed the need for deference to the manner in which states undertook good faith implementation of TRIPS obligations within their domestic legal systems, in keeping with Article 1.1 of the TRIPS Agreement itself.[341]

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[334]DSU, *supra* note 332, art. 23.1.

[335]The USTR has revoked the GSP privileges against several Latin American countries in the past (notably Argentina and Brazil), *see supra* note 328, and it has threatened Thailand with similar actions. Because GSP concessions are voluntary, and not required under the General Agreement on Tariffs and Trade (GATT 1994), they may normally be revoked at will; however, revoking GSP privileges as retaliation for a unilaterally determined violation of a TRIPS obligation would seem to violate both the letter and spirit of Article 23 of the DSU. Michael J. Trebilcock & Robert Howse, The Regulation of International Trade 434 (3d ed. 2005); Abbott & Reichman, *supra* note 38, at 980.

[336]*See* UNCTAD-ICTSD, Resource Book on TRIPS and Development 4–5, 8, 10, (2005).

[337]Panel Report, *United States—Sections 301–310 of the Trade Act of 1974*, WT/DS152/R (Dec. 22, 1999). At the time, the USTR promised to exercise its power in conformity with the DSU.

[338]Reichman, *supra* note 140, at 259 (footnotes omitted); *see* Vienna Convention on the Law of Treaties art. 60, May 23, 1969, 1155 U.N.T.S. 33 (permitting suspension of treaty obligations when one party materially breaches a multilateral treaty).

[339]*See, e.g.*, UNCTAD-ICTSD, *supra* note 336, at 682 (discussing cross-retaliation in the form of trade sanctions by suspension of concessions); Henning Grosse Ruse-Khan, *A Pirate of the Caribbean? The Attractions of Suspending TRIPS Obligations*, 11 J. Int'l Econ. L. 313, 316–18 (2008) (recounting a WTO Panel decision allowing Antigua to request suspension of its TRIPS obligations in response to the United States' refusal to comply with a prior DSB order to cease interference with Antigua's gambling and betting services); *see also* Catherine Saez, *WTO Ruling on Brazil-US Cotton Opens Door to Cross-Retaliation Against IP Rights*, Intell. Prop. Watch, Sept. 7, 2009, http://www.ip-watch.org/weblog/2009/09/07/wto-ruling-on-brazil-cotton-opens-door-to-cross-retaliation-against-ip-rights (describing the DSB's authorization of Brazil to take cross-collateral trade sanctions against the United States for illegal cotton subsidies).

[340]Appellate Body Report, *India—Patent Protection for Pharmaceutical and Agricultural Chemical Products*, ¶¶ 58, 84, WT/DS50/AB/R (Dec. 19, 1997).

More recently, in a dispute about the enforcement of intellectual property rights between China and the United States, the panel's decision on the merits went both ways, depending on the specific issues.[342] Nevertheless, as Professor Dreyfuss points out, the panel gave China "extensive leeway to determine how to dispose of infringing goods and where to set the threshold for criminal enforcement," while stressing that "TRIPS is a *minimum* standards regime … that gives members freedom to determine the most appropriate method of implementing their obligations."[343] Professor Dreyfuss thus predicts that greater participation of the emerging countries in the WTO adjudication process would likely push both panels and the Appellate Body to more carefully scrutinize the balancing factors favoring developing country interests that are already built into the TRIPS Agreement than has so far occurred in cases where the only antagonists are developed country Members.[344]

V. Concluding Observations

While much of the recent literature continues to focus on two fundamental tenets of the high-protectionist rhetoric, namely that stronger IPRs necessarily lead to more innovation and more transfer of technology and that they are essential for attracting FDI,[345] other studies have demonstrated that technology exporters need access to emerging Asian and Latin American markets as much as these countries need FDI, licensing, and up to date high-tech goods.[346] So long as the general level of IP protection in emerging markets affords technology exporters the minimum standards and entrepreneurial options available under the TRIPS Agreement, these exporters will find ways to reach attractive markets, and would-be purchasers in developing countries can usually meet their needs through sound procurement strategies.

Specific bottlenecks are more likely to arise from refusals to deal, excessive pricing, territorial restraints on outputs, and other restrictive business practices that suitable competition laws and policies could help to resolve than from gaps or inadequacies in local intellectual property laws.[347] Even so, the weak enforcement of IP laws may have detrimental effects on both local and foreign producers.[348] Meanwhile, innovative firms benefiting from a pro-competitive environment in developing countries can also profit from high-protectionist IP regimes abroad—under the independence of patents doctrine[349]—without aping the protectionist excesses of those regimes.

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[341] *Id.* ¶¶ 46, 59; TRIPS Agreement, *supra* note 10, art. 1.1 ("Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice."); *see* Jerome H. Reichman, *Securing Compliance with the TRIPS Agreement After* US *v* India, 1 J. Int'l Econ. L. 585, 596 (1998) ("Deference to local law and strict construction of treaties have thus become the pedestal on which the Appellate Body's TRIPS jurisprudence rests."); *see also* Dreyfuss, *supra* note 3, at 15–16.

[342] Panel Report, *China—Measures Affecting the Protection and Enforcement of Intellectual Property Rights*, ¶¶ 8.1–.4, WT/DS362/R (Jan. 26, 2009) [hereinafter *China Enforcement of IP*].

[343] Dreyfuss, *supra* note 3, at 16; *see China Enforcement of IP*, *supra* note 342, ¶ 7.236.

[344] Dreyfuss, *supra* note 3, at 17.

[345] *See* Cheung, *supra* note 277, at 8; Gervais, *supra* note 5, at 2371–72; Yu, *supra* note 8, at 176–78; *supra* note 21 and accompanying text.

[346] *See* Daniel C.K. Chow, *Counterfeiting in the People's Republic of China*, 78 Wash. U. L.Q. 1, 47, 49 (2000) (asserting that foreign brand owners invest in China's economy, in part due to the market for counterfeit products); Yu, *supra* note 8, at 175, 180 (arguing that foreign investors are attracted to China because of low production costs and market potential). *See generally* Keith E. Maskus, *The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer*, 9 Duke J. Comp. & Int'l L. 109 (1998) (noting the large amount of foreign investment in Latin American countries, in part due to tax and operating advantages).

[347] *See supra* notes 239–43, 253–54 and accompanying text.

[348] *See, e.g.*, Cheung, *supra* note 277, at 26, 31; Chow, *supra* note 346, at 51.

[349] *See* Paris Convention, *supra* note 88, art. 4*bis* ("Patents applied for … shall be independent of patents obtained for the same invention in other countries, whether members of the Union or not."); TRIPS Agreement, *supra* note 10, art. 2.1 (incorporating substantive provisions of the Paris Convention).

As Keith Maskus has explained, IP regimes are but one component of a healthy development-oriented economy. Without an appropriate infrastructure that includes corporate law, bankruptcy law, and a solid educational system, among other variables, IP protection may add little to either FDI or economic growth in its own right.[350] Moreover, as the relations between IPRs and innovation in knowledge economies become better scrutinized, the proper role of IPRs as such in overall development policies remains far less clear and more complex than the IP literature normally recognizes.[351]

Policies favoring the formation of scientific research commons, as well as open access to knowledge initiatives, may become as important in the BRIC countries, especially for sustainable upstream knowledge outputs, as strategic reliance on exclusive rights to stimulate downstream commercial applications of basic research.[352] Unless these countries actively adapt the TRIPS Agreement's flexibilities to their own development needs, with a view to maximizing the benefits and minimizing the social costs of harmonized international IP standards,[353] they may end up "financing not just or even primarily their own growth, but promoting the economic growth of developed countries, possibly to the detriment of their own economic development."[354]

Against this background, the high- and middle-income developing countries, as a group, are well positioned to undertake a leadership role in adapting traditional intellectual property law to the new technological conditions and challenges that the OECD countries have increasingly failed to address.[355] To the extent that these emerging economies avoid the pitfalls that have begun to undermine markets for technology in the United States and the European Union, fashioning a more flexible, balanced, and modern approach to intellectual property law could in fact enable them to boost their growing comparative advantages in cutting-edge technologies well beyond current levels.[356] To achieve this result, however, will require developing country governments to self-consciously adopt disciplined legal and political strategies that preserve the policy space in which to devise and test their own intellectual property institutions and to stimulate a vigorous and concerted debate about the proper design of those same institutions.[357]

Legal circles in the emerging economies will also have to study and master the relevant WTO jurisprudence, as the Japanese did at an earlier period,[358] in order to steer clear of obvious legal obstacles and to defend national autonomy at the TRIPS Council or, when necessary, in actual dispute settlement cases. These countries should also avoid further

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[350]Maskus, *supra* note 1, at 200–03.

[351]*See, e.g.*, Margaret Chon, *Substantive Equality in International Intellectual Property Norm Setting and Interpretation*, *in* Intellectual Property, Trade and Development, *supra* note 8, at 475, 488–91 ("[L]ittle … reflection takes place within intellectual property about its relationship to development law …. [T]he international intellectual property framework must begin to incorporate the alternate model of development as freedom."); Stiglitz, *supra* note 234, at 318–19.

[352]*See, e.g.*, Allarakhia, *supra* note 178, at 12; Hope, *supra* note 153, at 186–87; Octaviani, *supra* note 178, at 133 (predicting downstream research benefits of collaborative and open practices in biotechnology); Reichman & Uhlir, *supra* note 177, at 11 ("[G]overnment agencies will have to find ways of coping with bilateral data exchanges with other countries that exercise intellectual property rights in their own data collections."). *See generally* Benkler, *supra* note 176, at 130–31 (emphasizing the importance of networked information on economic opportunity and access to knowledge for both advanced and developing economies).

[353]*See* Reichman, *supra* note 43, at 28 (noting the "wiggle room" that the TRIPS Agreement gives to developing countries in implementing intellectual property policies).

[354]*See* Ostergard, Jr., *supra* note 13, at 155.

[355]*See* Dreyfuss, *supra* note 3, at 2–3 (referring to India, Brazil, and China as the "emerging Middle" countries positioned to "move into a leadership position in establishing new practices").

[356]Translating nascent technical advantages into competitive advantages on world markets is said to be an explicit goal of the Chinese Patent Law (as amended 2008). Feng, *supra* note 9, at 6–9.

[357]*See, e.g.*, Pedro Nicolletti Mizukami et al., *Exceptions and Limitations to Copyright in Brazil: A Call for Reform*, *in* Access to Knowledge in Brazil, *supra* note 33, at 67, 114 (concluding that Brazilian citizens must address the "inadequate state of the law" in order to deal with both copyright infringement problems and users' rights).

[358]Professor Akio Shimizu, Japan's Evolving International Trade Law, Lecture Delivered at Duke University School of Law (Mar. 2008).

multilateral and bilateral standard-setting negotiations likely to limit their own autonomy and governance capacities, while at the same time seeking to forge regional understandings on these same issues that could attenuate the pressures from abroad.[359] Above all, most developing countries still need to establish solid interagency review mechanisms that can exercise oversight of their intellectual property bureaus and ensure that the latter properly implement national innovation policies established at the highest levels of government.[360]

From a broader perspective, any uniquely developing country effort to fashion appropriate intellectual property regimes for the twenty-first century must necessarily seek a new equilibrium between public and private goods. Because the last half of the twentieth century was so consumed with conflicts between public-centered and private-centered economies, insufficient thought was given to evaluating the proper and ever-evolving interrelationship between private and public goods, which the rise of knowledge economies has made so critically important.[361] In this context, Joseph Stiglitz's call to recognize the role of "knowledge as a global public good"[362] has generated an important literature whose practical implementation should become a primary goal of forward-looking policymakers in all developing countries.[363]

These countries should also build ever stronger connections to the worldwide flow of scientific and technical information, a task that will require sharing locally generated scientific data with the rest of the world (as China has begun to do),[364] while resisting legal, economic, and technological restraints on the dissemination of such data.[365] A particularly forward-looking policy would, for example, lead developing countries to support open access and other sharing mechanisms at the level of scientific enquiry,[366] while taking steps to better ensure downstream support for innovative applications flowing from cooperative public–private upstream research initiatives.

If, at the end of the twentieth century, we learned that access to knowledge was as important for economic growth and human welfare as stimulating investment in the production of knowledge goods, it could be the developing countries as a group that lead us out of certain blind alleys that currently pit these two essential policy goals against one another. It is, as Professor Dreyfuss and I have recently argued, precisely a time for experimentation, and not a time to copy or codify obsolete approaches that are likely to boomerang against the long-

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359*See* Maskus & Reichman, *supra* note 2, at 36, 38 (calling for a moratorium on stronger international standards in order to give developing countries "breathing room" to adapt); Reichman & Dreyfuss, *supra* note 12, at 102 ("Developing countries cannot succeed if, at the international level, a new round of multilateral intellectual property negotiations threatens to raise the technological ladder once again.").

360*See supra* notes 290–94 and accompanying text.

361*See* Maskus & Reichman, *supra* note 2, at 15–18 (noting that the knowledge goods sector "is the most dynamic of all in terms of potential growth and yet partially resistant to any consensus-based economic analytical framework"). *See generally* Peter Drahos, *The Regulation of Public Goods*, *in* International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime, *supra* note 2, at 46, 62.

362Stiglitz, *supra* note 234, at 308.

363*See, e.g.*, Towards Knowledge Societies, *supra* note 7, at 27, *available at* http://unesdoc.unesco.org/images/0014/001418/141843e.pdf ("[T]he emerging global information society only finds its *raison d'être* if it serves to bring about a higher and more desirable goal, namely the building, on a global scale, of *knowledge societies* that are a source of development for all, first and foremost for the least developed countries."); Cimoli, Dosi & Stiglitz, *supra* note 234, at 3–6.

364*See, e.g.*, Guan-Hua Xu, *Open Access to Scientific Data: Promoting Science and Innovation*, 6 Data Sci. J. (Open Data Issue) 21 (2007).

365*See supra* notes 36–41 and accompanying text; Reichman & Uhlir, *supra* note 177, at 8.

366*See, e.g.*, So et al., *supra* note 41, at 2081–82; John Wilbanks, Vice President, Creative Commons, The Digital Commons: Infrastructure for the Data Web, Keynote Address at the Second COMMUNIA Conference on Global Science and the Economics of Knowledge-Sharing Institutions at Turin University (June 30, 2009) (overviewing the models needed to utilize the data generated by worldwide research); Mizukami & Lemos, *supra* note 33, at 50–52 (suggesting that legal scholarship will be important to prepare lawmakers and enforcers "in mapping the territory of possible interactions between copyright law and other fields of the law, to provide solutions for potential controversies").

term interests of the very developed countries that are most avidly pushing the harmonization buttons at the international level.[367]

To be sure, charting one's own course is never easy, especially when powerful countries and knowledge cartels apply countervailing pressures at every step. Nevertheless, I continue to believe that, with enlightened leadership, buttressed by "skillful lawyering, political determination and coordinated planning,"[368] the intellectual property institutions inherited from the Industrial Revolution can evolve into a worldwide system of innovation that will benefit countries at every stage of economic development.

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[367]Reichman & Dreyfuss, *supra* note 12, at 86, 102–03.
[368]Abbott & Reichman, *supra* note 38, at 921.