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Evolving Innovation Paradigms and the Global Intellectual Property Regime

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Since the negotiation of the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS) in 1994, the innovative landscape has undergone dramatic changes due to technological advances in fields such as biotechnology, nanotechnology, and digital communications and computation. The increasing potential for user innovation, and open and collaborative innovation has brought an explosion of innovative activity that does not fit into the sales-oriented, mass market model which underlies the global intellectual property regime. In this Article, I argue that the debate over global governance of innovation should be expanded to account more fully for the implications of these changes. For the most part, criticisms of TRIPS have focused on its failure to account adequately for current needs for access to the fruits of innovative activity. In particular, critics have focused on the agreement's failure to balance urgent public health needs appropriately against the marginal boost to pharmaceutical innovation supplied by patent protection in developing countries. Here I take a different (though complementary) tack, focusing on the ways in which TRIPS and related agreements enshrine an unduly narrow approach to innovation itself. An adequate global governance system for innovation must take account of the diversity and dynamism of modes of innovation. I propose a re-imagining of the World Intellectual Property Organization as a broader-based innovation policy organization and a global administrative law approach to accommodate evolving modes of innovation.

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Evolving Innovation Paradigms and the Global Intellectual Property Regime

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I. INTRODUCTION

Since the negotiation of the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS) in 1994,¹ the innovative landscape has undergone dramatic changes due to technological advances in fields such as biotechnology, nanotechnology, and digital communications and computation. Notably, the negotiation of TRIPS coincided almost exactly with the rise in importance of the Internet following the invention of the World Wide Web and the introduction of the Mosaic web browser in the early 1990s.² These technological changes have spawned major social changes, which are increasingly felt throughout the world. The resulting changes in the innovative landscape, especially as instantiated in the complex technologies of the information technology industry, have given rise to controversy about the proper contours of intellectual property (IP) protection and to upheaval in the political economy of IP lawmaking. This upheaval is reflected in the split between the pharmaceutical sector and many information technology companies in their positions on patent reform in the United States.³

Since 1994, there has been explosive growth in user innovation⁴ and

* Professor of Law, DePaul University. I thank Steve Charnovitz, Margaret Chon, Kevin Davis, Graeme Dinwoodie, Rochelle Dreyfuss, Ruth Okediji, participants at the NYU-Cape Town Global Administrative Law Workshop, 2008 IP Scholars Conference, faculty workshops at George Washington University, University of Minnesota, and Fordham University for invaluable comments and Hima Lawrence for excellent research assistance. A brief report of some of this work will appear in *Acta Juridica* (2008) as part of the proceedings of the NYU-Cape Town Global Administrative Law Workshop. This Article was written in part while the Author was visiting at New York University School of Law in 2007-08.

¹ See Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, 33 I.L.M. 1197 (1994) [hereinafter TRIPS]; see also DANIEL GERVAIS, *THE TRIPS AGREEMENT: DRAFTING HISTORY AND ANALYSIS* 27 (2d ed. 2003) (describing the adoption and implementation of the agreement).

² See, e.g., NAT'L SCI. FOUND., *AMERICA'S INVESTMENT IN THE FUTURE* 13 (2000), available at <http://www.nsf.gov/about/history/nsf0050/internet/mosaic.htm>.

³ See Christopher M. Holman, *Biotechnology's Prescription for Patent Reform*, 5 J. MARSHALL REV. INTELL. PROP. L. 318, 322 (2005) (discussing the disagreement between the pharmaceutical sector and information technology companies regarding the Patent Reform Act of 2005).

⁴ For an overview of user innovation, see ERIC VON HIPPEL, *DEMOCRATIZING INNOVATION* 1-3 (2006).

innovation resulting from open and collaborative processes.⁵ These innovation paradigms do not fit into the sales-oriented, mass market model underlying IP doctrine. While these innovative paradigms are not new, the ascendance of industrial research and development and of mass production had pushed them to the margins. Technological advances, particularly in digital communications, have revitalized these contexts for innovation in surprising ways.

There has been considerable scholarly and public debate about the impact of the TRIPS minimum standards approach to patent law on access to patented technology, particularly in the public-health-related fields of pharmaceuticals and agriculture.⁶ Indeed that debate has led to modifications of the TRIPS agreement, as reflected in the Doha Declarations,⁷ and to the adoption of a Development Agenda by the World IP Organization (WIPO).⁸ Critics have also argued that the overly cramped interpretations of TRIPS exceptions evident in the handful of relevant World Trade Organization (WTO) dispute resolution decisions distort the balance between initial and follow-on innovation under a mass market seller-based innovation regime.⁹ There has been considerably less discussion, however, about the interplay between the global IP regime and

⁵ See YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* 1–2 (2006) (discussing the economic importance of open and collaborative innovation).

⁶ See generally Margaret Chon, *Intellectual Property and the Development Divide*, 27 CARDOZO L. REV. 2821 (2006); Rochelle Cooper Dreyfuss, *TRIPS-Round II: Should Users Strike Back?*, 71 U. CHI. L. REV. 21 (2004); Daniel J. Gervais, *Intellectual Property, Trade & Development: The State of Play*, 74 FORDHAM L. REV. 505 (2005); Peter K. Yu, *TRIPs and Its Discontents*, 10 MARQ. INTELL. PROP. L. REV. 369 (2006); see also Thomas W. Pogge, *Human Rights and Global Health: A Research Program*, 36 METAPHILOSOPHY 182 (2005) (discussing the impact of TRIPS on biotechnology and pharmaceuticals); Symposium, *Intellectual Property, Trade and Development: Accommodating and Reconciling Different National Levels of Protection*, 82 CHI.-KENT L. REV. 1109 (2007) (collecting articles discussing the impact of intellectual property agreements on public health and agriculture); Symposium, *Traditional Knowledge, Intellectual Property, and Indigenous Culture*, 11 CARDOZO J. INT'L & COMP. L. 239 (2003) (collecting articles discussing the impacts of intellectual property agreements on indigenous cultures, plants, and medicines).

⁷ See World Trade Organization, Doha Ministerial 2001: Ministerial Declaration, Nov. 14, 2001, 41 I.L.M. 746, 748–49 (2002); World Trade Organization, Doha Ministerial 2001: Declaration on the TRIPS Agreement and Public Health, Nov. 14, 2001, 41 I.L.M. 755, 755–56 (2002).

⁸ WORLD INTELLECTUAL PROP. ORG., *THE 45 ADOPTED RECOMMENDATIONS UNDER THE WIPO DEVELOPMENT AGENDA* (2007) [hereinafter *DEVELOPMENT AGENDA*], available at <http://www.wipo.int/export/sites/www/ip-development/en/agenda/recommendations.pdf>.

⁹ For a discussion of recommended interpretations, see generally Graeme B. Dinwoodie & Rochelle C. Dreyfuss, *WTO Dispute Resolution and the Preservation of the Public Domain of Science Under International Law*, in *INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER GLOBALIZED IP REGIME* (Keith E. Maskus & Jerome H. Reichman eds., 2006); Graeme B. Dinwoodie & Rochelle Cooper Dreyfuss, *Patenting Science: Protecting the Domain of Accessible Knowledge*, in *THE FUTURE OF THE PUBLIC DOMAIN: IDENTIFYING THE COMMONS IN INFORMATION LAW* (Lucie Guibault & P. Bernt Hugenholtz eds., 2006); Graeme B. Dinwoodie & Rochelle C. Dreyfuss, *Diversifying Without Discriminating: Complying with the Mandates of the TRIPS Agreement*, 13 MICH. TELECOMM. & TECH. L. REV. 445 (2007) [hereinafter Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*]; Graeme B. Dinwoodie & Rochelle C. Dreyfuss, *TRIPS and the Dynamics of Intellectual Property Lawmaking*, 36 CASE W. RES. J. INT'L L. 95 (2004).

the revitalized practices of user innovation and open and collaborative innovation.¹⁰

In this Article, I argue that, over and above previously appreciated problems regarding access and the traditional IP balance, the trouble with TRIPS—and with the global IP law regime more generally—is that it is ill-designed to cope with changes in the innovative process itself and with the likely heterogeneity of desirable innovation approaches in different global contexts. While current TRIPS flexibilities might be interpreted in ways that will better balance the needs of initial innovators against those of users and follow-on innovators, the very structure of the agreement is based on an assumption of mass market, seller-based innovation which may make it difficult to accommodate newer innovation paradigms.

Because the processes by which innovation occurs are various and changing, it is important, but not sufficient, to focus on making substantive improvements to TRIPS and its interpretations so as to deal with current issues involving such things as access to medicines or agricultural technologies and the increasing importance of information technology with its predominance of cumulative innovation. The experience of the past fifteen years should serve as a cautionary tale regarding the wisdom of enshrining substantive rules based on any particular paradigm of innovation in an inflexible international instrument. Thus, along with seeking solutions to the particular problems confronting today's innovators in dealing with the outmoded TRIPS framework, it would be wise to consider how to implement an ongoing process at the global level for navigating the tension between the truly global reach of innovation and the heterogeneous and changing social practice of innovation. The complexity of the innovative environment, in combination with the need for both flexibility and consistency, suggests that we consider an administrative-type approach which builds in an expectation of the need for substantive updating of the global innovation policy governance regime, rather than an attempt to lock in substantive standards tailored to today's innovation environment.¹¹

¹⁰ But see Pamela Samuelson, *Challenges for the World Intellectual Property Organization and the Trade-related Aspects of Intellectual Property Rights Council in Regulating Intellectual Property Rights in the Information Age*, 21 EUR. INTELL. PROP. REV. 578, 578, 585 (1999) (discussing the need for global IP regulation to account for unfolding technological change).

¹¹ For general discussions of the varieties of and issues raised by "agency-like" actors at the global level, see generally Scott Burris et al., *Nodal Governance*, 30 AUSTL. J. LEG. PHIL. 30 (2005); Sabino Cassese, *Administrative Law Without the State? The Challenge of Global Regulation*, 37 N.Y.U. J. INT'L L. & POL. 663 (2005) [hereinafter Cassese, *Administrative Law Without the State*]; Sabino Cassese, *Global Standards for National Administrative Procedure*, 68 LAW & CONTEMP. PROBS. 109 (2005) [hereinafter Cassese, *Global Standards*]; Daniel C. Esty, *Good Governance at the Supranational Scale: Globalizing Administrative Law*, 115 YALE L.J. 1490 (2006); Benedict Kingsbury et al., *The Emergence of Global Administrative Law*, 68 LAW & CONTEMP. PROBS. 15 (2005); Anne-Marie Slaughter & David Zaring, *Networking Goes International: An Update*, 2 ANN. REV. L. SOC.

To that end, I propose a re-envisioning of WIPO as a more broadly conceived innovation policy organization, which would serve as a center of discourse not only about how IP law per se should be adapted to changing modes of innovation but also about how to confront new dilemmas raised by evolving innovative practices, which may involve issues beyond IP law, such as competition policy, licensing practices, and the tradeoff between private ordering and the public domain.¹² WIPO has historically focused on promoting the IP regime¹³ and has been rightly criticized for pursuing the stronger IP rights myopically.¹⁴ (Indeed, WIPO has manifested some hostility toward the poster child for open and collaborative innovation: open source software).¹⁵ Nonetheless, I argue—building on a related argument by Rochelle Dreyfuss¹⁶—that WIPO is the most promising home for a broader focus on innovation policy in light of its expertise, its experience with the Development Agenda, and its relationship with the WTO under TRIPS. Indeed, there are encouraging signs in this regard in

SCI. 211 (2006); Richard B. Stewart, *U.S. Administrative Law: A Model for Global Administrative Law?*, 68 LAW & CONTEMP. PROBS. 63 (2005).

¹² For general discussions regarding the challenges to the balance between IP and the public domain raised by private ordering, see Graeme B. Dinwoodie, *The International Intellectual Property System: Treaties, Norms, National Courts, and Private Ordering*, in INTELLECTUAL PROPERTY, TRADE AND DEVELOPMENT: STRATEGIES TO OPTIMIZE ECONOMIC DEVELOPMENT IN A TRIPS PLUS ERA (Daniel S. Gervais ed., 2007) [hereinafter Dinwoodie, *The International IP System: Treaties, Norms, National Courts, and Private Ordering*]; Graeme B. Dinwoodie, *Private Ordering and the Creation of International Copyright Norms: The Role of Public Structuring*, 160 J. INSTITUTIONAL & THEORETICAL ECON. 161, 162 (2004) [hereinafter Dinwoodie, *Private Ordering*], available at <http://ssrn.com/abstract=604161>; Séverine Dusollier *Sharing Access to Intellectual Property Through Private Ordering*, 82 CHI.-KENT. L. REV. 1391 (2007); Niva Elkin-Koren, *What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 FORDHAM L. REV. 375 (2005); Ronald J. Mann, *Commercializing Open Source Software: Do Property Rights Still Matter?*, 20 HARV. J.L. & TECH. 1 (2006); Stephen M. McJohn, *The Paradoxes of Free Software*, 9 GEO. MASON L. REV. 25 (2000); Arti K. Rai, "Open Source" and Private Ordering: A Commentary on Dusollier, 82 CHI.-KENT. L. REV. 1439 (2007).

¹³ Convention Establishing the World Intellectual Property Organization, July 14, 1967, 21 U.S.T. 1749, 1772 ("The objectives of the Organization are: (i) to promote the protection of intellectual property throughout the world through cooperation among States and, where appropriate, in collaboration with any other international organization, (ii) to ensure administrative cooperation among the Unions."). See generally Debora J. Halbert, *The World Intellectual Property Organization: Past, Present and Future*, 54 J. COPYRIGHT SOC'Y U.S.A. 253 (2006), for a discussion of the history of WIPO and its goals, along with a critique of WIPO governance and a proposal that it take on a broader, more participatory role in the development context.

¹⁴ See, e.g., Ruth L. Okediji, *WIPO-WTO Relations and the Future of Global Intellectual Property Norms*, 39 NETHERLANDS YEARBOOK INT'L L. (forthcoming 2008), draft at 37 ("In sum, WIPO's institutional transformation and the strategies by which that transformation was effected . . . were central in entrenching the contemporary prevailing IP orthodoxy in which public policy concerns can limit the exclusive proprietary rights of rights owner only in exceptional circumstances.")

¹⁵ See, e.g., Jonathan Krim, *The Quiet War Over Open-Source*, WASH. POST, Aug. 21, 2003 at E01, available at LEXIS, News Library, WPOST File (describing WIPO capitulation to pressure to cancel a meeting to discuss open source software).

¹⁶ Rochelle C. Dreyfuss, *Fostering Dynamic Innovation and Development: International IP as a Case Study in Global Administrative Law*, ACTA JURIDICA (forthcoming 2008), available at <http://www.iilj.org/publications/documents/2008.4Dreyfuss.pdf>. For a similar argument with respect to development issues, see also Halbert, *supra* note 13, at 283–84.

recent WIPO recognition of the impingement of broader innovation policy issues on the patent system.¹⁷ The thrust of this Article is to encourage a more central place for considerations of the full panoply of innovation paradigms in the development of patent policy and of IP more generally.

A broader mandate for WIPO could be implemented in several ways, with varying levels of administrative discretion vested in the re-imagined organization.¹⁸ As a first cut, WIPO might develop an Innovation Policy Agenda incorporating the concerns of innovative communities of various types, including commercial firms, user innovator communities, scientific researchers, and open source proponents, along with the concerns of other stakeholders such as developing and developed countries and NGOs representing users. An Innovation Policy Agenda would be distinct from the Development Agenda because it would focus on the effects of evolving innovation paradigms, which cut across countries at every level of development. Nonetheless, it would benefit from WIPO's experience with the Development Agenda, which has already taken a peripheral interest in some aspects of open and collaborative innovation and in preservation of the public domain.¹⁹ One of the tasks involved in proposing an Innovation Policy Agenda must be to reconsider current WIPO projects in light of a broader view of the global innovation regime. In particular, WIPO should reconsider its attempt to develop a Substantive Patent Law Treaty (SPLT) in light of a broader innovation mandate, just as it has been urged to do with respect to development and access issues.²⁰

Rochelle Dreyfuss has considered in detail various legal mechanisms by which the WTO might incorporate WIPO input in interpreting TRIPS flexibilities under Articles 27, 30, and 31 in light of the Policies and

¹⁷ WORLD INTEL. PROP. ORG., STANDING COMM. ON THE LAW OF PATENTS, REPORT ON THE INTERNATIONAL PATENT SYSTEM 2 (Apr. 15, 2008), *available at* http://www.wipo.int/edocs/mdocs/scp/en/scp_12/scp_12_3.pdf; WORLD INTEL. PROP. ORG. STANDING COMM. ON THE LAW OF PATENTS, SUMMARY BY THE CHAIR, annex (June 26, 2008), *available at* http://www.wipo.int/edocs/mdocs/scp/en/scp_12/scp_12_4_rev.pdf. The standing Committee on the Law of Patents (SCLP) has long been stymied in its efforts to devise a Substantive Patent Law Treaty by a divide between developed countries favoring strong protection and less developed countries concerned with facilitating access. As discussed below in more detail, *infra* nn. 241–43 and accompanying text, changing innovation practices may shake up the familiar alliances.

¹⁸ See Okediji, *supra* note 14, draft at 48–52 (discussing potential models for the WIPO-WTO relationship).

¹⁹ See DEVELOPMENT AGENDA, *supra* note 8, at paras. 16, 17, 23, 27, 35, 36, 45 (recommending policies to facilitate innovation and openness in intellectual property systems).

²⁰ See Jerome H. Reichman & Rochelle Cooper Dreyfuss, *Harmonization Without Consensus: Critical Reflections on Drafting a Substantive Patent Law Treaty*, 57 DUKE L.J. 85, 90–92 (2007) (arguing that the proposed SLPT would negatively impact both developing and developed countries); WORLD INTEL. PROP. ORG., PROPOSAL BY ARGENTINA AND BRAZIL FOR THE ESTABLISHMENT OF A DEVELOPMENT AGENDA FOR WIPO, annex at 2–3 (Aug. 27, 2004), *available at* http://www.wipo.int/documents/en/document/govbody/wo_gb_ga/pdf/wo_ga_31_11.pdf (suggesting that new intellectual property protections under the SLPT would obstruct access to information).

Objectives set out in Articles 7 and 8.²¹ As part of an Innovation Policy Agenda, WIPO should consider proposed implementations of TRIPS flexibilities from an innovation policy perspective. Its deliberation procedures should be designed—in analogy to notice and comment proceedings in domestic administrative law—to provide transparency and participation²² sufficient to endow the results with persuasive weight in the deliberations of WTO dispute resolution panels and the TRIPS Council.²³ Alternatively, as also discussed by Dreyfuss, the formal role of WIPO in interpreting TRIPS could be expanded either by amending TRIPS to provide for deference to WIPO interpretations or by expanding the joint activities of WIPO and the TRIPS Council as a means of incorporating WIPO views indirectly through the TRIPS Council.²⁴

These suggestions for implementing a broader-based innovation policy are constrained, of course, by the language of TRIPS itself. While there is arguably considerable leeway in TRIPS, its provisions, which prohibit technological “discrimination,”²⁵ mandate a case-by-case approach to compulsory licensing,²⁶ assume that all exceptions to strong patent rights should be “limited,”²⁷ and require that all patentees be afforded exclusive rights of use,²⁸ were not designed with user innovation, or open and collaborative innovation in mind. In the end, these provisions may not stretch far enough to accommodate newer innovative paradigms in an optimal manner.

An even more ambitious approach to WIPO involvement would be to amend TRIPS to provide a more open-ended exception provision which would accommodate evolving innovation practices by providing a more explicit role for WIPO in vetting potential exceptions in light of innovation policy. For example, one might imagine replacing Article 30 with a broad provision permitting exceptions that are “reasonably calculated to promote innovation and not to restrain trade” and explicitly providing that Articles

²¹ Dreyfuss, *supra* note 16, at 25–33.

²² For discussions of issues of accountability, transparency, and participation in global governance see, for example, Cassese, *Administrative Law Without the State*, *supra* note 11, at 690–91; Esty, *supra* note 11, at 1527–37; Kingsbury et al., *supra* note 11, at 37–40; Slaughter & Zaring, *supra* note 11, at 220–24.

²³ Okediji, *supra* note 14, draft at 22, 42, discusses the way in which WIPO and its predecessors have employed publications and studies to play a key role in shaping the substantive debate about the contours of IP protection in the past.

²⁴ Dreyfuss, *supra* note 16, at 26–31. See also Okediji, *supra* note 14, draft at 49–50, discussing a possible role for WIPO as an “expert agency,” though concluding that it would be preferable for the WTO to be the primary setter of global IP norms. *Id.* at 54–58. WIPO’s structure and procedures would have to be re-tooled in order for WIPO to play this type of formal vetting role. I float the possibility here, but leave detailed discussion of how WIPO would be organized to play this role for another day.

²⁵ TRIPS, *supra* note 1, art. 27.

²⁶ *Id.* art. 31.

²⁷ *Id.* art. 30.

²⁸ *Id.* art. 28.

27 and 28 are subject to such exceptions. WIPO evaluations of the reasonableness of particular exceptions as a matter of innovation policy could then be afforded a degree of deference. Such an approach would be desirable only if WIPO's vetting procedures met minimal standards of transparency and accountability, of course, and there is room for debate as to the proper degree of deference that should be afforded to WIPO determinations.²⁹

Finally, a re-tooled WIPO would also provide a forum for discourse and possible standard-setting regarding issues specifically raised by new modes of innovation that are not covered by TRIPS with its mass market, seller-based focus. In particular, an innovation policy organization would provide a forum for debate about appropriate licensing forms for open and collaborative innovation projects; standards for competition policy in relation to such collaborative projects, including, for example, patent pools; issues of exhaustion and of repair and reconstruction, which are of relevance for user innovation; and proposals for navigating the boundaries between collaborative projects and proprietary inventions on the one hand and the public domain on the other.

There are a number of private organizations currently involved in global standard-setting for open and collaborative projects.³⁰ A global innovation policy organization could learn much from such organizations, some of which have adopted rulemaking procedures strikingly similar to those required under domestic administrative law regimes.³¹ Perhaps such organizations should simply be left to their own devices. However, if the collaborative limited commons paradigm is emulated more broadly, it might be appropriate to consider some limitations or standards to govern the extent to which commons arrangements should be permitted to fence off the public domain through private, albeit distributed, ordering.³² In any event, the point here is not to answer, or even to pose, all of the substantive questions that would fall within the purview of an international innovation policy organization, but only to query whether the global governance of innovation would benefit from a more flexible, broadly-based center of innovation expertise. Encouragingly, the WIPO Standing Committee on

²⁹ See Dreyfuss, *supra* note 16, at 26–27 (discussing “the legitimacy of relying on standard generated by WIPO” in interpreting TRIPS).

³⁰ E.g., Creative Commons, <http://creativecommons.org> (last visited Oct. 12, 2008); Free Software Foundation, www.fsf.org (last visited Oct. 12, 2008); Open Source Initiative, www.opensource.org (last visited Oct. 12, 2008); CAMBIA's BiOS (Biological Open Source) Initiative, <http://www.cambia.org/daisy/cambia/home.html> (last visited Oct. 12, 2008); Patent Commons Project, www.patentcommons.org (last visited Oct. 12, 2008).

³¹ For example, the Free Software Foundation uses a highly structured online public comment procedure for reviewing drafts of its licenses. Free Software Foundation, <http://gplv3.fsf.org/> (last visited Oct. 12, 2008).

³² For articles that discuss the limitations of private ordering, see Dinwoodie, *Private Ordering*, *supra* note 12, at 168; Dusollier, *supra* note 12, at 1434–35; Elkin-Koren, *supra* note 12, at 407–20; Rai, *supra* note 12, at 1440–42.

Patents has recently shown an inclination to consider some of these broader innovation policy questions.³³ The proposal here would be to shift the focus of WIPO's portfolio to put innovation policy front and center, regarding IP as only one mechanism for innovation, rather than focusing on IP, with merely a secondary concern for innovation policy more generally.

In pursuing any of these objectives, it will be important to consider how to provide transparency and accountability. Here, WIPO's experience with the Development Agenda should be instructive.³⁴ Because innovative paradigms cross national boundaries and may bring together developing and developed country inventors, it will be important to allow for the participation of a variety of stakeholders in the discourse, including countries, NGOs, user innovators, open and collaborative innovation groups, and the commercial sector. The Internet itself opens up more expansive possibilities for voice even beyond increased participation by recognized groups—a global online version of notice and comment is a practical possibility that would permit the development of innovation policy itself to tap into the same emergent and heterogeneous expertise that drives some of these newer innovation paradigms.³⁵

In Part II, I begin by describing the emerging paradigms of user innovation and open and collaborative innovation and go on to explore some of their relevant features. In Part III, I discuss the shortcomings of the current TRIPS-based regime as a means of promoting global innovation, arguing that the trade paradigm underlying TRIPS distorts innovation policy and discussing how current TRIPS provisions may

³³ See REPORT ON THE INTERNATIONAL PATENT SYSTEM, *supra* note 16, at 35–38 (discussing open technology standards and collaborative research projects such as open source software, the proposal for a medical research and development treaty, and public-private research projects); SUMMARY BY THE CHAIR, *supra* note 16, at 2 & Annex (reiterating the issues discussed in the Report on the International Patent System, agreeing to further discuss their significance, and establishing preliminary studies on several issues).

³⁴ See, e.g., Halbert, *supra* note 13, at 272–76 (describing the opening up of WIPO to broader participation during the period leading up to its adoption of the Development Agenda).

³⁵ For related ideas to promote online participation in governance, see, for example, Cynthia M. Ho, *Biopiracy and Beyond: A Consideration of Socio-Cultural Conflicts with Global Patent Policies*, 39 U. MICH. J.L. REFORM 433, 532–40 (2006) (proposing that WIPO host an online forum for commentary and debate about potential biopiracy and other moral and policy issues raised by particular patents); Steven Charnovitz, *Economic and Social Actors in the World Trade Organization*, 7 ILSA J. INT'L & COMP. L. 259, 274 (2001); Beth Simone Noveck, "Peer to Patent": *Collective Intelligence, Open Review, and Patent Reform*, 20 HARV. J.L. & TECH. 123, 143 (2006) (proposing the peer-to-patent review process); Beth Simone Noveck, *The Electronic Revolution in Rulemaking*, 53 EMORY L.J. 433, 433–38 (2004) (discussing the potential, generally, for online public participation in notice-and-comment rulemaking in the United States domestic context); <http://gplv3.fsf.org> (showing the discussion process used by the Free Software Foundation in developing its GPL licenses); www.peertopatent.org (discussing an experimental project inviting online review of patent applications in the United States Patent and Trademark Office). See also Steve Charnovitz, *The World Trade Organization in 2020*, 1 J. INT'L L. & INT'L RELATIONS 167, 182–88 (2005) (arguing for broader participation and greater transparency in the WTO generally).

impede the full realization of the potential of these newer innovation modes. Part IV discusses the proposal for re-imagining WIPO. Part V concludes.

II. THE (RE)-EMERGENCE OF USER INNOVATION AND OPEN AND COLLABORATIVE INNOVATION

The twenty-first century has seen an explosion in user innovation and in open and collaborative innovative activity. These modes of innovation have very different characteristics from the mass market seller-based innovation which was the model for TRIPS.³⁶ They are simultaneously more global and more local than the mass market paradigm. They rely much less than the traditional paradigm on IP for incentives to invent, disclose, and disseminate,³⁷ make use of sticky information which is distributed heterogeneously in the population and of diverse experiences and knowledge,³⁸ and often are heavily reliant on ongoing contractual or social ordering rather than on isolated arms-length transactions.³⁹

While these practices are unlikely to replace the mass market seller-based innovation paradigm wholesale, they already pose a serious challenge to that paradigm in some arenas—particularly in the production

³⁶ See BENKLER, *supra* note 4, at 1–2, 35–40 (discussing traditional commercial models and the emergence of non-commercial models of information sharing); VON HIPPEL, *supra* note 4, at 1–5; *supra* text accompanying note 4–5.

³⁷ See STEVEN WEBER, THE SUCCESS OF OPEN SOURCE 1, 5 (2004) (discussing the nonproprietary nature of open source code); Yochai Benkler, *Coase's Penguin, or, Linux and The Nature of the Firm*, 112 YALE L.J. 369, 423–40 (2002) (discussing effective peer production, diverse motivations, and the commons and incentives problems); Katherine J. Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467, 483–90 (discussing implications of user innovation for patent doctrine); Dietmar Harhoff et al., *Profiting from Voluntary Information Spillovers: How Users Benefit by Freely Revealing Their Innovations*, 32 RES. POL'Y 1753–54 (2003), available at <http://userinnovation.mit.edu/papers/3.pdf> (discussing “free revealing” of proprietary information and its incentives, explanations, and effects); Josh Lerner & Jean Tirole, *The Scope of Open Source Licensing*, 21 J.L. ECON. & ORG. 20, 21–22 (2005); Karim R. Lakhani & Robert G. Wolf, *Why Hackers Do What They Do: Understanding Motivation Effort in Free/Open Source Software Projects*, in PERSPECTIVES ON FREE AND OPEN SOURCE SOFTWARE 3, 3 (J. Feller, B. Fitzgerald, S. Hissam, K. R. Lakhani eds., 2005), available at <http://ocw.mit.edu/NR/rdonlyres/Sloan-School-of-Management/15-352Spring-2005/D2C127A9-B712-4ACD-AA82-C57DE2844B8B/0/lakhaniwolf.pdf>.

³⁸ See BENKLER, *supra* note 5, at 408–12; VON HIPPEL, *supra* note 4, at 8–9; Christian Luthje, Cornelius Herstatt & Eric von Hippel, *User-Innovators and “Local” Information: The Case of Mountain Biking*, 34 RES. POL'Y 951, 951–52, 962–63 (2005) (discussing users’ tendency to use “local information”); Eric von Hippel & Georg von Krogh, *Open Source Software and the Private-Collective Innovation Model: Issues for Organization Science*, 14 ORG. SCI. 209, 210–13 (2003); Eric von Hippel, *“Sticky Information” and the Locus of Problem Solving: Implications for Innovation*, 40 MGMT. SCI. 429, 429–32 (1994) (discussing the impact of information stickiness on innovation).

³⁹ See *supra* note 12; see also Arti Rai, *Open and Collaborative Research: A New Model for Biomedicine*, in INTELLECTUAL PROPERTY RIGHTS IN FRONTIER INDUSTRIES 131–34 (Robert W. Hahn, ed. 2005); Nikolaus Franke & Sonali Shah, *How Communities Support Innovative Activities: An Exploration of Assistance and Sharing Among End-Users*, 32 RES. POL'Y 157, 157–58 (2003); Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 TEX. L. REV. 1745, 1747–48 (2007) (discussing the legal challenges posed in devising an open innovation model for synthetic biology).

of platform information technology⁴⁰—and are likely to increase in importance over time. Moreover, there is no reason to believe that these relatively recent developments represent the end of evolution of global innovation practice. Instead, recent history suggests that we would be wise to “expect the unexpected” and anticipate an evolving innovation policy regime.

A. User Innovation

Cyclists interested in off-road cycling invent the original mountain bikes.⁴¹ Steel manufacturers develop improvements on the Bessemer steel process that lead to an eight-fold increase in production in a ten-year period.⁴² Users of printed circuit computer-aided design software modify and develop the software to accommodate increasingly densely-packed circuit boards.⁴³ Surgeons improve and modify medical equipment for their own use.⁴⁴ Builders develop means for routing wiring through commercially available “stressed-skin panels” used to form the outer walls of houses.⁴⁵ An operator of an online store develops a method of streamlining the payment process for frequent customers.⁴⁶ A research scientist develops a new instrument for measuring the chemical composition of a surface.⁴⁷

The above are all examples of user innovation. In earlier studies, Eric von Hippel and others demonstrated that “users of products and services—both firms and individual consumers—are increasingly able to innovate for themselves” in many fields of technology.⁴⁸ Several recent developments exemplify the increasing relevance of user innovation to the traditional IP regime. For example, open source software is significantly driven by user

⁴⁰ See, e.g., WEBER, *supra* note 37, at 94–108 (discussing the evolution and growth of the Unix-based operating system, Linux).

⁴¹ See Guido Buenstorf, *Designing Clunkers: Demand-Side Innovation and the Early History of Mountain Bikes*, in CHANGE, TRANSFORMATION AND DEVELOPMENT 54, 61 (John Stan Metcalfe & Uwe Cantner eds., 2003).

⁴² Peter B. Meyer, *Episodes of Collective Invention* 7 (U.S. Dept. of Labor, Bureau of Labor Statistics, Working Paper No. 368), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=466880.

⁴³ Glen L. Urban & Eric von Hippel, *Lead User Analyses for the Development of New Industrial Products*, 34 MGMT. SCI. 569, 571–73 (1988).

⁴⁴ Christian Lüthje, *Customers as Co-Inventors: An Empirical Analysis of the Antecedents of Customer-Driven Innovations in the Field of Medical Equipment*, in PROCEEDINGS OF THE 32ND EMAC CONFERENCE (2003) (on file with author).

⁴⁵ Sarah Slaughter, *Innovation and Learning during Implementation: A Comparison of User and Manufacturer Innovations*, 22 RES. POL’Y 81, 83–88 (1993).

⁴⁶ See, e.g., Saul Hansell, *Injunction against Barnesandnoble.com is Overturned*, N.Y. TIMES, Feb. 15, 2001, at C3, available at LEXIS, News Library, NYTFile (discussing patent dispute between Amazon.com and Barnes & Noble over “One-Click” ordering method).

⁴⁷ William Riggs & Eric von Hippel, *Incentives to Innovate and the Sources of Innovation: The Case of Scientific Instruments*, 23 RES. POL’Y 459, 460–63 (1994).

⁴⁸ VON HIPPEL, *supra* note 4, at 1.

innovation.⁴⁹ Besides providing products with mass appeal, such as Linux, the open source process provides a means to pool inventive resources to obtain customized software products to suit the needs of dispersed and relatively small groups of users.⁵⁰ The expanding patentability of the tools and products of agriculture, such as genetically modified seeds, brings agricultural firms into conflict with farmers who have a long tradition of innovation for their own use.⁵¹ The extension of patentable subject matter to encompass business methods in the United States has been met with skepticism.⁵² Underlying this skepticism may be an implicit recognition

⁴⁹ See, e.g., VON HIPPEL, *supra* note 4, at 87; Lakhani & Wolf, *supra* note 34, at 3, 6–7 (discussing users' motivations for working on open source software); James E. Bessen, *Open Source Software: Free Provision of Complex Public Goods* 1–3 (B.U. Sch. of L., Working Paper, 2005), available at <http://ssrn.com/abstract=588763> (stating that free/open source software is a complement to proprietary development by extending the market).

⁵⁰ Open source software projects are extremely diverse in their participation rates. There is also great diversity in the nature of participation—from proposing to administering to developing to merely commenting on projects. A 2002 empirical study of open source projects on www.sourceforge.net, probably the most popular platform for open source development, showed that the mean number of developers for one hundred mature projects studied was about six. Sandeep Krishnamurthy, *Cave or Community? An Empirical Examination of 100 Mature Open Source Projects*, FIRST MONDAY, 2002, http://www.firstmonday.org/Issues/issue7_6/krishnamurthy/.

⁵¹ See, e.g., Keith Aoki, *Weeds, Seeds & Deeds: Recent Skirmishes in the Seed Wars*, 11 CARDOZO J. INT'L & COMP. L. 247, 247–52 (2003); David R. Downes, *The Convention on Biological Diversity: Seeds of Green Trade?*, 8 TUL. ENVTL. L.J. 163, 168 (1994); Ho, *supra* note 35, at 455–59 (discussing the conflict between patents, genetic resources, and traditional knowledge in developing countries); Sabrina Safrin, *Chain Reaction: How Property Begets Property*, 82 NOTRE DAME L. REV. 1917, 1917–18, 1920–21, 1926–28 (2007) (discussing the patenting of genetic material in developing countries); Haley Stein, Note, *Intellectual Property and Genetically Modified Seeds: The United States, Trade, and the Developing World*, 3 NW. J. TECH. & INTELL. PROP. 160, 161–64 (2005) (discussing seed modification and commodification and its implications).

⁵² See, e.g., Jay Dratler, Jr., *Does Lord Darcy Yet Live? The Case Against Software and Business-Method Patents*, 43 SANTA CLARA L. REV. 823, 833–36 (2003) (arguing that patents on business methods are a monopolization of a line of business); Rochelle Cooper Dreyfuss, *Are Business Method Patents Bad for Business?*, 16 SANTA CLARA COMPUTER & HIGH TECH. L.J. 263, 267 (2000) (discussing the negatives of allowing patents of software-embodied business methods); Alan L. Durham, “Useful Arts” in the Information Age, 1999 BYU L. REV. 1419, 1495 (1999) (similarly arguing that software-embodied business method patents should not be patentable subject matter); Julia Alpert Gladstone, *Why Patenting Information Technology and Business Methods Is Not Sound Policy: Lessons from History and Prophecies for the Future*, 25 HAMLINE L. REV. 217, 218–19 (2002) (arguing that patenting internet business methods stifles innovation and rewards existing monopolies); Nari Lee, *Patent Eligible Subject Matter Reconfiguration and the Emergence of Proprietary Norms—The Patent Eligibility of Business Methods*, 45 IDEA 321, 321–25 (2005); Keith E. Maskus & Eina Vivian Wong, *Searching for Economic Balance in Business Method Patents*, 8 WASH. U. J.L. & POL'Y 289, 290–93 (2002); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 580–81 (1999); Michael J. Meurer, *Business Method Patents and Patent Floods*, 8 WASH. U. J.L. & POL'Y 309, 309–11 (2002) (arguing that the death of the business method exception will lead to a patent flood); Malla Pollack, *The Multiple Unconstitutionality of Business Method Patents: Common Sense, Congressional Consideration, and Constitutional History*, 28 RUTGERS COMPUTER & TECH. L.J. 61, 61–62 (2002); John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. REV. 1139, 1141–43 (1999). See also *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 126 S. Ct. 2921 (2006) (Breyer, J., dissenting from dismissal of cert as improvidently granted); *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1842 (2006) (Kennedy, J., concurring) (raising questions about business methods patents and the Federal Circuit's standard for patentable subject matter); *In re Bilski*, 545 F.3d 943, 2008 U.S. App. LEXIS 22479, *154–*194 (Fed. Cir. 2008) (en banc) (Mayer, J., dissenting). *But*

that intent to use rather than sell has traditionally motivated the invention of business methods.⁵³ Scientific researchers are also user innovators, inventing research tools and methods in the course of their research.⁵⁴ Nevertheless, universities are increasingly (and controversially) patenting scientific research tools.⁵⁵

While user innovation has no doubt always been widespread, its significance is growing because of technological changes since the negotiation of TRIPS in 1994. The growing importance of software, as both a tool of innovation and a component of products, means that more and more design and experimentation is feasible with relatively limited capital expenditure.⁵⁶ Computerization of manufacturing and design also decreases the cost of creating custom-designed products.⁵⁷ The Internet also enhances the potential for user innovation by providing mechanisms by which medium-sized groups of users with similar needs for customization can pool their inventive resources, thereby widening the range of cost-effective user innovations.

User innovation is of greatest importance where users have both unique local information about their needs and the technical capacity to make inventions that fulfill those needs. The comparative advantage of user innovation for a particular technology depends on factors such as the heterogeneity of uses, the presence of lead users, the technical difficulty of invention in a particular field, and the costs of development.⁵⁸ For present purposes, its most important features are its de-emphasis on the “incentive to invent” justification for IP, its reliance on heterogeneous experience and

see, e.g., John R. Allison & Emerson H. Tiller, *The Business Method Patent Myth*, 18 BERKELEY TECH. L.J. 987, 1081–83 (2003) (arguing that business method patents are indistinguishable from other patents on processes).

⁵³ For a more extensive discussion of this case, see Katherine J. Strandburg, *What If There Were a Business Method Use Exemption to Patent Infringement?*, 2008 MICH. ST. L. REV. 245, 248 (2008).

⁵⁴ See Riggs & von Hippel, *supra* note 47; Strandburg, *supra* note 37, at 459.

⁵⁵ See, e.g., Katherine J. Strandburg, *The Research Exemption to Patent Infringement: The Delicate Balance Between Current and Future Technical Progress*, in INTELLECTUAL PROPERTY AND INFORMATION WEALTH 107–08 (Peter Yu ed., 2006) (reviewing the longstanding debate over whether there should be an exemption to patent infringement for research use); Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1726 (1996) (positing that the patenting of upstream research tools calls into question the appropriateness of public funding to support that research).

⁵⁶ See BENKLER, *supra* note 5, at 68–75 (giving examples of peer production); *id.* at 212–33, 277–78 (discussing the cost of communication, examples of dissemination of information through network-based media, and the greater participatory role of individuals using networked media in fostering discourse and formulating culture); VON HIPPEL, *supra* note 4, at 177 (“[T]here is a general trend toward an open and distributed innovation process driven by steadily better and cheaper computing and communications.”).

⁵⁷ Stefan Thomke & Eric von Hippel, *Customers as Innovators: A New Way to Create Value*, HARV. BUS. REV., Apr. 2002, at 74, 74–79.

⁵⁸ See VON HIPPEL, *supra* note 4, at 70–76 (discussing circumstances under which users are low-cost innovators); Joachim Henkel & Eric von Hippel, *Welfare Implications of User Innovation*, 30 J. TECH. TRANSFER 73, 73–74 (2005) (discussing in detail the welfare implications of user innovation in comparison and relationship to manufacturer innovation).

on tailoring innovation to specific uses (which undercuts the international trade conception of commodity knowledge goods) and its recursive nature, which heightens the importance of questions of control and private ordering between users and manufacturers.

1. *User Innovation and the IP Incentive Story*

In sharp contrast to the standard seller-based view underlying most discussions of the societal justifications for the patent system, user innovators expect to benefit primarily from developing and using an innovation rather than selling it.⁵⁹ User innovators may also derive non-pecuniary returns from innovation, such as enjoyment of the process of improving products for their own use, reputational status within a user community, or opportunities to gain skills.⁶⁰ Patents thus play a relatively minor role in motivating them to invent.⁶¹ Besides motivating invention, patenting should also motivate disclosure and dissemination of inventions. Elsewhere, I have discussed in detail the ways in which patenting affects incentives to disseminate and disclose user innovations, concluding that on balance patent incentives tend to be much less important for user innovations than for seller innovations.⁶² In part this is because a rather surprising amount of “free revealing” of user innovations takes place.⁶³ Presumably, this is because free revealing has significant reputational, reciprocal, and other benefits to user innovators.⁶⁴ This is partly because users often form innovative communities in which they exchange ideas in a collaborative fashion to the mutual advantage of group members.⁶⁵ Free revealing may enable others to improve on a user innovation, thus making that innovation more valuable to the original user innovator.⁶⁶ Free

⁵⁹ For discussions of the traditional incentive theories of patenting, see, for example, Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 78–80 (2001); Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1024–28 (1989); Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 WIS. L. REV. 81, 90–93 (2004).

⁶⁰ VON HIPPEL, *supra* note 4, at 85–88.

⁶¹ Strandburg, *supra* note 37, at 483–85.

⁶² *Id.* at 483–87.

⁶³ VON HIPPEL, *supra* note 4, at 77–80; see also Joachim Henkel, *Selective Revealing in Open Innovation Processes: The Case of Embedded Linux*, 35 RES. POL’Y 953, 955, 960–62 (2006) (noting various industries in which free revealing takes place and explaining its utility).

⁶⁴ VON HIPPEL, *supra* note 4, at 77–80; Harhoff et al., *supra* note 37, at 1756; Eric von Hippel & Georg von Krogh, *Free Revealing and the Private-Collective Model for Innovation Incentives*, 36 R&D MGMT. 295, 297–301, 304 (2006).

⁶⁵ VON HIPPEL, *supra* note 4, at 93–94; Katherine J. Strandburg, *Norms and the Sharing of Research Materials and Tacit Knowledge*, in WORKING WITHIN THE BOUNDARIES OF IP (Rochelle C. Dreyfuss et al., eds. forthcoming 2009) (discussing sharing of research tools among scientists); Franke & Shah, *supra* note 39, at 158–60, 164, 174; Katherine J. Strandburg, *User Innovator Community Norms at the Boundary between Academic and Industry Research*, FORDHAM L. REV. (forthcoming 2009) [hereinafter Strandburg, *User Innovator Community Norms*] (discussing and modeling sharing in user innovator communities).

⁶⁶ See discussion *infra* Part II.B.1.

revealing occurs even between competitors, who sometimes prefer to share certain kinds of information freely while competing in other ways.⁶⁷

In general, then, patent protection is both less necessary and more socially costly for user innovations than for seller innovations.

2. *User Innovation and Heterogeneous and Local Knowledge*

User innovation is also mismatched with the mass market seller-based innovation paradigm because it is heterogeneous and relies on distributed local knowledge. Users develop innovations that respond to their specific needs and situations, leveraging their information advantages rather than manufacturers' advantages in large-scale production.⁶⁸ Many user innovators are lead users who develop their innovations by customizing or modifying commercial products to satisfy their specific needs,⁶⁹ often anticipating features for which general consumer demand has not yet developed.⁷⁰ A study of innovations in mountain biking equipment, for example, found that user innovations often depended on dispersed, local information reflecting the inventors' cycling experiences, unique circumstances, and interests, such as a desire to bike in extreme weather conditions or to perform acrobatic stunts.⁷¹ Transferring this experiential knowledge to manufacturers can be expensive, making user innovation more efficient, in many cases, than attempting to teach manufacturers what diverse users want.⁷²

Particularly in the international context, user innovation may be necessary in order for a technology developed in one environment to be useful in another.⁷³ It may be extremely difficult for a manufacturer to acquire the local experiential knowledge needed to customize a technology for its best use in circumstances different from those for which it was

⁶⁷ VON HIPPEL, *supra* note 4, at 10, 87–88; Harhoff et al., *supra* note 37, at 1753, 1756; Henkel, *supra* note 63, at 954; Strandburg, *User Innovator Community Norms*, *supra* note 65.

⁶⁸ Sonali K. Shah, *Open Beyond Software*, in OPEN SOURCES 2.0: THE CONTINUING EVOLUTION 339, 341–43 (Chris DiBona et al. eds., 2006) [hereinafter Shah, *Open Beyond Software*]; Sonali K. Shah, *From Innovation to Firm Formation in the Windsurfing, Skateboarding, and Snowboarding Industries* 32–33 (Univ. of Ill., Working Paper No. 05-0107, 2006) [hereinafter Shah, *From Innovation to Firm Foundation*], available at http://www.allacademic.com/meta/p_mla_apa_research_citation/1/8/4/9/9/p184994_index.html (hyperlink “From Innovation to Firm Formation in the Windsurfing, Skateboarding, and Snowboarding Industries”, then hyperlink “Application PDF”); VON HIPPEL, *supra* note 4, at 45–46, 49.

⁶⁹ VON HIPPEL, *supra* note 4, at 22–24.

⁷⁰ *Id.* at 22.

⁷¹ *Id.* at 72–73.

⁷² See Henkel & von Hippel, *supra* note 58, at 73–74, 79–80 (arguing that users innovate more efficiently than manufacturers, because as consumers they know what innovations they want).

⁷³ See B. Douthwaite et al., *Why Promising Technologies Fail: The Neglected Role of User Innovation During Adoption*, 30 RES. POL'Y 819, 819, 830–32 (2001) (explaining that user innovations improved farming technologies during the Green Revolution in Asia); see also Anil K. Gupta, *From Sink to Source: The Honey Bee Network Documents Indigenous Knowledge and Innovations in India*, 1 INNOVATIONS 49, 49–50, 65 (2006) (reporting on a project attempting to document local innovations and to “forge links” between local innovators and university researchers).

originally designed. Even an innovation targeted to a foreign market may fall flat without user participation in the design. A study by B. Douthwaite, J.D.H. Keatinge, and J.R. Park, for example, probed the role of user innovation in adoption of agricultural technologies intended to assist development in Asia.⁷⁴ The researchers concluded that user innovation and interaction between the technology originators and local users are critically important, especially as technologies or local agricultural systems become more complex.⁷⁵ Recognizing this, Anil Gupta and his Honey Bee Network provide a means of documenting, sharing, and commercializing grassroots user innovations in India.⁷⁶

3. User Innovation and the “Permission to Innovate” IP Culture

Another relevant feature of user innovation is the extent to which it involves functional improvements to existing technology.⁷⁷ While users may be large corporate entities, often they are individuals unlikely to engage in ex ante licensing transactions to obtain “permission to innovate.”⁷⁸ Moreover, because user innovation often occurs as a side effect of use rather than deriving from a research and development program, even corporate users may not plan in advance to improve on the technologies they are using. Because users tend to make heterogeneous functional inventions while manufacturers tend to make innovations that spring from their expertise in standardization, safety, ease of manufacture, and returns to scale,⁷⁹ user innovation and manufacturer innovation are often recursive, meaning that an ongoing dialogue of innovation is most productive of technological advance.⁸⁰ These characteristics of user innovation mean that the patent law doctrine of repair and reconstruction,⁸¹ the first sale (or patent exhaustion) doctrine,⁸² and the extent to which

⁷⁴ Douthwaite et al., *supra* note 73, at 819–20.

⁷⁵ *Id.* at 834–35.

⁷⁶ Gupta, *supra* note 73, at 61–64.

⁷⁷ See, e.g., VON HIPPEL, *supra* note 4, at 24 (discussing the important role of “lead user[s]” of existing technologies in user innovations); Henkel & von Hippel, *supra* note 58, at 75 (arguing that lead user innovations are eventually in demand in the mainstream market).

⁷⁸ Viktor Braun & Cornelius Herstatt, *Barriers to User-Innovation: The Paradigm of “Permission to Innovate,”* in 2006 IEEE INTERNATIONAL CONFERENCE ON MANAGEMENT OF INNOVATION AND TECHNOLOGY 176 (2006) (discussing problems posed by a “permission culture”). Henkel & von Hippel, *supra* note 58, at 75.

⁷⁹ VON HIPPEL, *supra* note 4, at 66, 70–71.

⁸⁰ Henkel & von Hippel, *supra* note 58, at 75, 82–84.

⁸¹ 5 DONALD S. CHISUM, CHISUM ON PATENTS § 16.03[3] (2005). The repair and reconstruction doctrine holds that a purchaser of a patented item may repair it without the permission of the patentee as long as the repairs do not amount to a complete reconstruction of the patented item (essentially making a new item). See *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 342, 346 (1961) (discussing the doctrine as it relates to automobile repair).

⁸² See, e.g., *Quanta Computer, Inc. v. LG Elecs., Inc.*, 170 L. Ed. 2d 996, 1000, 1003 (2008) (Supreme Court reaffirmation of the patent exhaustion doctrine). The first sale doctrine holds that a patentee’s rights are “exhausted” when a patented product is sold, leaving the purchaser free to do with

purchasers' rights to use and modify their purchases may be limited by non-negotiable license and contract terms (such as those involved in recent controversies involving farmer seed-saving practices)⁸³ are important in determining whether there are barriers to user innovation.

4. *User Innovation and Development*

While user innovation occurs throughout the world, it seems likely that user innovation is of particular importance to developing countries.⁸⁴ The local needs and preferences of citizens of developing countries are less likely to be accounted for in mass markets both because those citizens will be less likely to constitute economically important blocks of consumers and because mass market goods are likely to be designed in developed countries.⁸⁵ User innovation thus is an important means of adapting mass market technologies to the needs of developing country citizens. User innovation building upon a primary technology is also more likely to be within the capacity of some developing country innovators, who may lack sophisticated engineering training but be able to exploit local knowledge and expertise in their innovative activities.⁸⁶ Thus, though making space for user innovation in the global IP regime is of general importance, it may be of particular importance to the developing world.

B. *Open and Collaborative Innovation*

The opening years of the twenty-first century have seen an outpouring of interest in the deployment of open and collaborative processes for innovative endeavors.⁸⁷ The buzzwords "open" and "collaborative" have been used to describe projects ranging from more distributed approaches to

it as he or she wishes. *United States v. Univis Lens Co.*, 316 U.S. 241, 250 (1942); *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 516 (1917).

⁸³ See, e.g., Michael J. Madison, *Legal-Ware: Contract and Copyright in the Digital Age*, 67 *FORDHAM L. REV.* 1025, 1026 & n.3, 1028–29, 1142 (1998) (discussing similar issues in the context of copyright protection); Liam Seamus O'Melinn, *Software and Shovels: How the Intellectual Property Revolution is Undermining Traditional Concepts of Property*, 76 *U. CIN. L. REV.* 143, 168–72 (2007) (discussing "suicide seeds" which do not propagate, thereby preventing farmers from using seeds procured from harvest); Elizabeth I. Winston, *Why Sell What You Can License? Contracting Around Statutory Protection of Intellectual Property*, 14 *GEO. MASON L. REV.* 93, 133 (2006) (arguing that "[b]y licensing chattels rather than selling them, intellectual property owners can circumvent public legislation and expand the protection of intellectual property far beyond the scope envisioned by federal and state governments").

⁸⁴ See, e.g., Gupta, *supra* note 73, at 51–61 (discussing local innovations in India).

⁸⁵ See, e.g., Amy Kapczynski et al., *Addressing Global Health Inequities: An Open Licensing Approach for University Innovations*, 20 *BERKELEY TECH. L.J.* 1031, 1051–55 (2005) (addressing the issue of under-production of goods for developing countries in the context of medication).

⁸⁶ See, e.g., Gupta, *supra* note 73, at 54, 61 (giving as examples a tractor built from scrap materials by a grassroots innovator with a fourth grade education, as well as a method of using cow urine for cooking fuel invented by a local farmer).

⁸⁷ For a fascinating compendium of relevant articles about many forms of "open" innovation, see *OPEN SOURCES 2.0* (Chris DiBona, Mark Stone, and Danese Cooper, eds., 2006). See generally BENKLER, *supra* note 5 (discussing the issues raised in this section).

innovation by commercial firms⁸⁸ to data repositories such as the Human Genome Project,⁸⁹ to works created entirely by online collaborations, such as Wikipedia.⁹⁰ Open and collaborative innovation is common among user communities. Studies have documented the phenomenon among users of sports equipment, computers, early automobiles, the eighteenth century iron industry, scientific research tools, and, of course, open source software itself.⁹¹

While the most prominent and well-studied example of open and collaborative production is open source software,⁹² in recent years, the focus has shifted to attempts to bring the power of open and collaborative innovation to bear on problems in agriculture and biotechnology.⁹³ Some of these projects revolve around putting together databases for use in bioinformatics research.⁹⁴ Still others attempt to put together portfolios of technological building blocks and tools and then make them available to participants in a limited commons, who agree to constraints on their uses of the tools and obligations to contribute to the growth of the commons.⁹⁵ The most recent potential entrant into this field is synthetic biology. Synthetic biology aims eventually to provide a true engineering approach to biological innovation by using a commonly available set of genetic building blocks to produce a variety of customized biological products.⁹⁶

⁸⁸ See, e.g., HENRY CHESBROUGH, *OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY* 93–94 (2006) (discussing IBM's transition to open innovation).

⁸⁹ See, e.g., Kapczynski et al., *supra* note 85, at 1071 (describing the Human Genome Project as a “commons-based initiative[.]”).

⁹⁰ Wikipedia: About, <http://en.wikipedia.org/wiki/Wikipedia:About> (last visited Oct. 21, 2008).

⁹¹ E.g., Shah, *Open Beyond Software*, *supra* note 68, at 340–41; VON HIPPEL, *supra* note 4, at 27–28; Franke & Shah, *supra* note 39, at 157–58; Robert P. Merges, *From Medieval Guilds to Open Source Software: Informal Norms, Appropriability Institutions, and Innovation* 3–4 (Univ. of Cal., Berkeley Sch. Of Law, Working Paper No. 368, 2004), available at <http://ssrn.com/abstract=661543>; Meyer, *supra* note 42, at 4–7; Fiona Murray, *The Oncomouse That Roared: Resistance and Accommodation to Patenting in Academic Science*, *AMERICAN JOURNAL OF SOCIOLOGY* (forthcoming 2006); Shah, *From Innovation to Firm Formation*, *supra* note 68.

⁹² See, e.g., WEBER, *supra* note 37 (describing the success of open source software).

⁹³ E.g., Rai, “Open and Collaborative” *Research*, *supra* note 39, at 131; Andrés Guadamuz González, *Open Source: Licenses in Scientific Research*, 7 N.C. J.L. & TECH. 321, 323–24, 333 (2006); Yann Joly, *Open Source Approaches in Biotechnology: Utopia Revisited*, 59 ME. L. REV. 385, 386–87, 389, 391, 394–95 (2007); Stephen M. Maurer, *Open Source Drug Discovery: Finding A Niche (Or Maybe Several)*, 76 UMKC L. REV. 405, 410, 413–15 (2007); Lee Petherbridge, *Road Map to Revolution? Patent-Based Open Science*, 59 ME. L. REV. 339, 340, 361–62 (2007); Rai, *supra* note 12, at 1441.

⁹⁴ See, e.g., International HapMap Project, <http://snp.cshl.org/thehapmap.html> (last visited Oct. 11, 2008).

⁹⁵ See, e.g., About PIPRA (The Public Intellectual Property Resource for Agriculture), www.pipra.org/en/about.en.html (last visited Oct. 11, 2008) (describing their work helping those in developing countries access new agricultural technologies); CAMBIA Initiative for Open Innovation, www.cambia.org/daisy/cambia/home.html (last visited Oct. 11, 2008) (providing tools for working toward a “commons of capability” in the life sciences).

⁹⁶ Joachim Henkel & Stephen M. Maurer, *The Economics of Synthetic Biology*, 3 MOLECULAR SYS. BIOLOGY 117, 117 (2007); Kumar & Rai, *supra* note 39 at 1745; Arti Rai & James Boyle,

Open and collaborative innovation embodies a fundamentally different view of the innovative process than the traditional seller-oriented paradigm that motivates high protection IP regimes.⁹⁷ The traditional model assumes that innovation is the province of “inventors,” who must be awarded exclusive rights over their innovations to motivate them to make relatively large investments of time, money, and effort so that they can go above and beyond the ordinary skill in the art.⁹⁸ Because of this focus on investment, some sense of the fungibility of inventive effort underlies the traditional model.

The basic insight underlying open and collaborative innovation, on the other hand, is that in some situations it is more effective for contributors to an innovative project (who are often current or potential users) to self-select their own tasks based on their own interests, experiences, and expertise rather than for a project manager either to assign tasks to a pre-existing Research and Development (R&D) team or to search for and locate individuals with the necessary skills and experience.⁹⁹

Though community-based innovation involving collaboration and reciprocal sharing is probably as old as human society, the Internet and other digital technology dramatically extend the possible scope of such community-based approaches. First, technology allows many more people to participate in a given project, by providing access and mechanisms for structuring tasks and by facilitating communication that can overcome the high overhead often inherent in attempts to scale up cooperative activities.¹⁰⁰ Second, technology allows collaborators to match up dispersed sources of problems and solutions, expanding the diversity of

Synthetic Biology: Caught Between Property Rights, the Public Domain, and the Commons, 5 PLOS BIOLOGY e58, e58 (2007).

⁹⁷ See, e.g., BENKLER, *supra* note 5 at 35–58 (exploring the economic aspects of innovation and non-market production of innovation); Rai, *supra* note 39 (proposing collaborative research as a new model for medicine and biotechnology). See generally OPEN SOURCES 2.0, *supra* note 87 (providing detailed analysis of numerous aspects of open and collaborative innovation); Benkler, *supra* note 37 (analyzing Linux through the prism of Coase’s *The Nature of the Firm*); Harhoff et al. *supra* note 34 (discussing why free revealing, though surprising to economists, benefits innovators and users of technology).

⁹⁸ See, e.g., BENKLER, *supra* note 5, at 42 (describing the “Romantic Maximizer” as the “ideal-type strategy that underlies patents and copyrights,” and as a “single author or inventor laboring creatively—hence romantic—but in expectation of royalties, rather than immortality, beauty, or truth.”).

⁹⁹ See Benkler, *supra* note 37 at 406–23 (contrasting the process through which workers are assigned tasks in the traditional firm with the process through which workers find tasks in a “peer production enterprise”). The formation of innovation “teams” in this manner is only one example of a larger phenomenon of emergent group activity. See CLAY SHIRKY, *HERE COMES EVERYBODY* 109 (2008) (describing the trend towards group activity using a variety of examples, including the development of Wikipedia).

¹⁰⁰ In the software world this problem is known as Brooks’s Law. Fred Brooks coined what became known as Brooks’s Law in his book *The Mythical Man-Month*. FREDERICK P. BROOKS, *THE MYTHICAL MAN-MONTH* (1975). Brooks’s Law states: “Adding manpower to a late software project makes it later.” *Id.*, at 25.

experience and expertise brought to bear on a problem and making it more likely that someone with the right set of skills will address the problem.¹⁰¹

Four features of open and collaborative innovation are particularly important here. First, like user innovation, open and collaborative innovation does not rely in traditional fashion on IP-based incentives to invent, disclose, and disseminate. Second, like user innovation, it makes use of heterogeneous and local knowledge. Third, open and collaborative innovation is often not nationally based, but rather makes use of a global network of digitally linked innovators. Finally, open and collaborative innovation raises questions concerning private ordering and governance, which do not figure importantly in the traditional IP paradigm.

1. *Incentives for Open and Collaborative Innovation.*

Open and collaborative innovation regimes all rely, almost by definition, on motives for participation that are not premised on exclusive control of innovative results by individual participants. While in some cases these motives are purely hedonic, the crucial insight that allows these models to propagate beyond the realm of hackers and hobbyists is that participation in open and collaborative innovation can provide other rewards that are either equal to or better than the rewards of proprietary innovation.¹⁰² These rewards are primarily of four types: inexpensive and flexible use benefits; tailoring of the product to heterogeneous specific needs; benefits related to participation in the project itself (such as enjoyment, skill-building, and reputation enhancement); and complementary benefits (such as the ability to base a business model on the availability of the collaboratively produced innovation or otherwise use the innovation as a platform for some other rewarding purpose).¹⁰³ The fact that an open and collaborative process allows tasks to be divided among many innovators also reduces the requisite investment in the project by most contributors, making it more likely that these other benefits will be sufficient to incentivize participation.¹⁰⁴

¹⁰¹ See, e.g., Benkler, *supra* note 37, at 414–15 (“The widely distributed model of information production will better identify who is the best person to produce a specific component of a project, all abilities and availability to work on the specific module within the specific time frame considered.”) (emphasis omitted).

¹⁰² See, e.g., Eric von Hippel, *Horizontal Innovation Networks—By and for Users*, 16 INDUS. & CORP. CHANGE 293, 304–07 (2007) (describing the benefits of free-revealing and noting that those benefits can outweigh those provided by patent or licensing protection).

¹⁰³ See Benkler, *supra* note 37, at 423–43 (describing contributors’ motivations in terms of monetary rewards, intrinsic hedonic rewards, and social-psychological rewards); Harhoff et al., *supra* note 37, at 1759–67 (developing a model to systematically assess the profitability of a user/innovator’s decision to share or hide information); von Hippel, *supra* note 102, at 304–07 (2007) (describing the benefits of free-revealing); Lakhani & Wolf, *supra* note 37, at 3–12, 23 (identifying career advancement, the feeling of creativity, connection with the hacker community, user need, and the opportunity to improve programming skills as important motivators).

¹⁰⁴ Benkler, *supra* note 384 at 435.

Many participants in open and collaborative innovation are prospective users of the innovative results.¹⁰⁵ There are a number of reasons that users might choose to participate in an open and collaborative endeavor rather than going it alone, waiting for a commercial product to become available, or attempting to free ride off the open and collaborative projects of others. As discussed above, users of a technology have different and localized information about their needs and experiences than that which manufacturers have.¹⁰⁶ Transferring this information to manufacturers is costly for both users and manufacturers.¹⁰⁷ In many cases, collaborating with other users is very effective, providing a way to develop improvements that manufacturers are not yet ready to adopt and to pool user interests and experiences so that each participant gets back a result that is worth more than the cost in time or money of her own contribution.¹⁰⁸

2. *Heterogeneity and Reliance on Localized Knowledge*

Open and collaborative innovation projects must compete with proprietary means of production, which will often benefit from manufacturing expertise, economies of scale, the ability to hire experts, marketing expertise, and so forth.¹⁰⁹ Open and collaborative innovation will be preferable when there are advantages to be gained from a dispersed approach. A dispersed approach is most likely to succeed where innovation bumps up against heterogeneity—either in the needs of users for customized and adapted products or in the capabilities, experiences, and insights that are necessary to produce the innovation.

There is, of course, a Hayekian dispersed information component to the IP system itself—patents are intended to elicit investment in projects which will fulfill consumer demand and encourage inventive activity by those who demonstrate likelihood of success, either by their own willingness to put up the money for their R&D efforts or by their ability to attract investment from others.¹¹⁰ The problem with the IP approach is that

¹⁰⁵ See, e.g., Harhoff et al., *supra* note 37, at 1768 (“[P]romoting the development, free revealing, and widespread utilization of user innovations may often be in the best interest of profit-seeking user-innovators, and welfare improving as well.”); von Hippel & von Krogh, *supra* note 64, at 296–97 (noting that the practice of free-revealing innovations is widespread in the user communities of several different technologies).

¹⁰⁶ See *infra* notes 68–76 and accompanying text.

¹⁰⁷ See generally von Hippel, *supra* note 38 (discussing “sticky” information and how such information is costly to transfer from one party to another).

¹⁰⁸ See Strandburg, *User Innovator Community Norms*, *supra* note 65, for a simple model of these tradeoffs.

¹⁰⁹ VON HIPPEL, *supra* note 4, at 70–71.

¹¹⁰ See F. A. HAYEK, *INDIVIDUALISM AND ECONOMIC ORDER* 95 (1948) (“[T]he real problem is rather how it can be brought about that as much of the available knowledge as possible is used. This raises for a competitive society the question, not how we can ‘find’ the people who know best, but rather what institutional arrangements are necessary in order that the unknown persons who have

it does not scale well to innovation that would proceed best by iterative and collaborative input from a large number of diverse inventors performing relatively modular tasks. The pace of obtaining and licensing patents is too slow and the transaction costs are too high for a dispersed collaborative approach to be workable. Firm-based collaborative innovation, on the other hand, requires a high degree of *a priori* top-down management to assemble a team of personnel with the necessary variety of expertise. Firm-based research and development thus unavoidably reproduces some of the difficulties inherent in a command-and-control approach to innovation that justify having a patent system (rather than direct government funding of R&D or a prize system) to begin with. While patent pools can provide means of sharing technology in industries where innovation is performed by large repeat-player firms, patent pools are also too inflexible to permit highly dispersed, heterogeneous collaboration between self-identified participants.

Because they are based on a different paradigm of innovation, open and collaborative approaches will likely produce different innovative results than a mass market proprietary system. Importantly, an open and collaborative innovation project leaves users with the ongoing freedom to tinker with, reconfigure, and recombine the resulting innovations.¹¹¹ Platform technologies produced in an open and collaborative fashion may combine many of the robustness advantages of mass production with the ability to tailor and build upon the platforms to meet heterogeneous needs.¹¹² An open and collaborative innovation process can produce both highly robust products with widespread appeal (such as Linux) and customized products that appeal to heterogeneous needs (such as many of the small open source software projects on SourceForge). These heterogeneous, “long tail” products may not have the robustness of a mass-produced product, but without the open and collaborative innovation process they would not exist at all.¹¹³

3. Global Network Organizational Structure

The potential for open and collaborative innovation is, by its nature,

knowledge specially suited to a particular task are most likely to be attracted to the task.”). Hayek himself was skeptical about the effectiveness of IP in producing valuable innovation. F.A. HAYEK, *The Origins of Liberty, Property and Justice*, in *THE FATAL CONCEIT: THE ERRORS OF SOCIALISM* 36–37 (W.W. Bartley, III ed., 1988).

¹¹¹ See, e.g., Nikolaus Franke & Eric von Hippel, *Satisfying Heterogeneous User Needs via Innovation Toolkits: The Case of Apache Security Software*, 32 RES. POL’Y 1199 (2003) (asserting that an “innovation toolkit,” such as the one in Apache software, helps satisfy diverse user needs).

¹¹² See, e.g., Robert P. Merges, *A New Dynamism in the Public Domain*, 71 U. CHI. L. REV. 183, 192–94 (2004) (discussing how the adaptability of software like Apache helps satisfy diverse user needs, and that this is a reason that commercial companies might contribute to open innovation).

¹¹³ CHRIS ANDERSON, *THE LONG-TAIL: WHY THE FUTURE OF BUSINESS IS SELLING LESS OF MORE* (2006).

constrained by the nature of communication technology. In the past, collaborative enterprises often involved localized face-to-face communities.¹¹⁴ They also employed available communication technologies such as letter correspondence, trade publications, and journals.¹¹⁵ While many projects still employ those “old-fashioned” collaborative methods, the Internet has led to an explosion of collaborative potential by reducing the cost and increasing the speed of long distance communications, permitting the rapid communication of both text and graphics, and allowing communication at a distance to come close to replicating the many-to-many character of discussions in geographically localized communities.¹¹⁶ The search capabilities of the Internet also make it possible for dispersed groups of potential innovators to find one another, thus making customized innovation more feasible.

The result of these communication advances is that the open and collaborative innovation paradigm is able not only to find, make use of, and respond to heterogeneous and localized preferences and experience but also to operate via a global networked organizational structure which is not defined by geographical or political boundaries. The increasing importance of software and other information as products and as tools for producing customized products also means that this global network sometimes can replace not only the research and development capacity of the industrial sector but also its manufacturing capability.

4. *Governance and Private Ordering in Open and Collaborative Innovation*

Despite the occasional rhetoric of some enthusiasts, one should not think of open and collaborative approaches to innovation as necessarily “emergent” or “self-organizing” in any strong sense of those terms. Most open and collaborative projects are not centrally organized in the assignment of tasks or even in the selection of tasks to be accomplished. Nonetheless, most have some coordination of control over decision-making concerning the final product and some means for resolving disputes.¹¹⁷ And while some open and collaborative innovation is structured almost entirely by unarticulated social norms (such as those of the traditional scientific research community),¹¹⁸ many projects have more

¹¹⁴ See generally Meyer, *supra* note 42, for historical examples.

¹¹⁵ *Id.* at 8–11.

¹¹⁶ Benkler, *supra* note 37, at 404–06.

¹¹⁷ See, e.g., WEBER, *supra* note 37 at 157–71 (explaining how open source projects are coordinated through individual incentives, cultural norms, and leadership); Benkler, *supra* note 37 at 441–43 (describing the integration and quality control processes of various peer production enterprises).

¹¹⁸ See, e.g., Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, in *ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION AND ECONOMIC GROWTH: VOLUME 16*, at 102–07 (Gary D. Libecap ed., 2005) (discussing the social norms of scientific

formal governance structures which often involve centralized decision-making of some kind and sometimes involve highly centralized control over official versions of the project results.¹¹⁹ One way to look at open and collaborative innovation, then, is as an alternative to the firm which, like a firm, structures transactions to internalize and systematize them and thus reduce their costs, but which also exploits a market-type information processing system for the assignment of tasks and design of the product.¹²⁰

Open and collaborative innovation is thus not *unstructured*, but *differently* structured from seller-based innovation methods. It requires a fairly high degree of private ordering, much of which depends not only on IP law but also on other legal structures, such as contract and licensing law, and on social structure such as community norms.¹²¹

In order to structure and govern their collaborative endeavors, at least some innovation projects, while purporting to eschew proprietary limitations, rely heavily on IP protections as means of controlling the uses which can be made of the results of their efforts and of controlling who has access to them. Thus, collaborative projects are structured around not only the need to organize the efforts of the collaborative process, but also the need to delineate and govern the unavoidable and increasingly important boundaries between open and collaborative innovation and proprietary approaches.¹²²

These privately ordered “open” regimes often create not untrammelled contributions to the public domain but limited commons environments in which innovators seek to exercise significant hegemony over the uses of their innovations.¹²³ The most well-known example of such a regime is the use of the “copyleft” or “viral” clause of the General Public License (GPL)

researchers, and how those norms might change in response to legal and policy changes); Emmanuelle Fauchart & Eric von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 ORG. SCI. 187 (2008) (describing the social norms that French chefs follow to respect one another’s intellectual property). See generally Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77 (1999), for an explanation of the term “norm” and the role of norms in basic research.

¹¹⁹ See, e.g., ERIC RAYMOND, *THE CATHEDRAL AND THE BAZAAR: MUSINGS ON LINUX AND OPEN SOURCE BY AN ACCIDENTAL REVOLUTIONARY* 87–92 (2001) (discussing the concept of “ownership” of open source projects); WEBER, *supra* note 37, at 88–93 (using the example of Linux and its creator Linus Torvalds).

¹²⁰ Benkler, *supra* note 37, at 406–23.

¹²¹ See, e.g., WEBER, *supra* note 37 at 84–86 (discussing how open source licensing produces social structure); Sapna Kumar, *Enforcing the GNU GPL*, 2006 U. ILL. J.L. TECH. & POL’Y 1, 11–35 (2006) (discussing whether the GNU GPL is a contract or a license, and the implications for enforceability).

¹²² See, e.g., Siobhan O’Mahony & Beth Bechky, *Boundary Organizations: Enabling Collaboration Among Unexpected Allies*, X ADMIN. SCI. Q. Y, P (2008).

¹²³ See, e.g., Anupam Chander & Madhavi Sunder, *The Romance of the Public Domain*, 92 CAL. L. REV. 1331, 1357–62 (2004) (discussing legal approaches aimed at preventing “one-sided expropriation” of the public domain). See generally Molly Shaffer van Houweling, *The New Servitudes*, 96 GEO. L.J. 885 (2008) (comparing IP licenses to servitudes in land).

copyright license to control downstream uses of open source software.¹²⁴ While patent licensing has so far played a much less significant role in open source software projects, the importance of patents in both constructing and obstructing collaborative projects is certain to increase if open innovation practices become more prevalent in areas such as biotechnology where copyright protection is unavailable or does not cover the relevant aspects of the technology.¹²⁵ Finally, as “open source” projects in biology and other arenas begin to center less around software code and more around commonly-held data, trade secrecy is also likely to play a more important role in constructing collaborative projects, as a means to limit access to commonly held data to those who agree to certain rules about use of the resulting innovation.¹²⁶

Thus, even “open and collaborative” projects display a balance of openness and control. In structuring the innovative process, many open and collaborative projects rely rather heavily on reach-through-type and boilerplate licensing practices akin to the shrink-wrap and click-wrap licenses often criticized when used by proprietary copyright holders.¹²⁷

¹²⁴ For an explanation of the basic principles of the GPL, see A Quick Guide to GPLv3, <http://www.fsf.org/licensing/licenses/quick-guide-gplv3.html> (last visited Oct. 11, 2008). For the terms of the GPL, see GNU General Public License, <http://www.fsf.org/licensing/licenses/gpl.html> (last visited Oct. 11, 2008). See also, Kumar, *supra* note 121 at 8–9 (discussing the terms of the license and critiquing the use of the term “viral” to describe it).

¹²⁵ See, e.g., Rai, *supra* note 39 (discussing the possible use of collaborative innovation in medicine); Dusollier, *supra* note 12, at 1401–05 (describing the concept of open source patent); Robin Feldman, *The Open Source Biotechnology Movement: Is It Patent Misuse?*, 6 MINN. J.L. SCI. & TECH. 117 (2004) (arguing that while open source biotechnology may implicate the doctrine of patent misuse, it should not be considered as such); González, *supra* note 93, at 325 (suggesting “a new licensing model for patentable scientific research that allows access and dissemination to diverse fields of endeavor”); Henkel & Maurer, *supra* note 96 (examining which IP practices will lead the emerging field of synthetic biology to the greatest success); Kapczynski et al., *supra* note 85 (arguing that public sector institutions such as U.S. universities should change their licensing practices to a system that improves access to biomedical innovation); Kumar & Rai, *supra* note 39, at 1749 (noting that biotechnology “has already proven difficult for intellectual property law to manage”); Mann, *supra* note 12 (analyzing the relationship between patents and open source technology); Maurer, *supra* note 93, at 406–07 (arguing that open source ideas would work well drug development and exploring why there is little open collaboration in that field as yet); Merges, *supra* note 112 (stressing the importance of the public domain); David W. Opperbeck, *The Penguin’s Genome, or Coase and Open Source Biotechnology*, 18 HARV. J.L. & TECH. 167 (2004) (assessing the “feasibility of applying open source principles to the biotechnology industry”); Petherbridge, *supra* note 93 (discussing the role of patents in creating an “open science” framework”); Rai, *supra* note 12 (expanding upon Dusollier’s article and addressing how open source concepts impact industrial organizations); Rai & Boyle, *supra* note 96 (noting that synthetic biology poses special challenges in IP law because the innovations are not necessarily protected by copyright).

¹²⁶ See, e.g., J. H. Reichman & Paul F. Uhler, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, 66 LAW & CONTEMP. PROB. 315, 348–51 (2003).

¹²⁷ See generally Douglas A. Hass, *A Gentlemen’s Agreement: Assessing the Gnu General Public License and Its Adaptation to Linux*, 6 CHI.-KENT J. INTELL. PROP. 213 (2007) (discussing the Gnu public license’s application to Linux); van Houweling, *supra* note 123 (comparing IP licenses to servitudes in land); Mark A. Lemley, *Intellectual Property and Shrinkwrap Licenses*, 68 S. CAL. L. REV. 1239 (1995) (discussing shrinkwrap licenses generally); Greg R. Vetter, *The Collaborative*

The GPL is dependent on strong reach-through or “viral” provisions, the enforceability of which is bound to vary among jurisdictions and has rarely been litigated.¹²⁸ The Creative Commons “Share Alike” copyright license to facilitate open production of creative works is similarly dependent on rather strong interpretations of licensing doctrine.¹²⁹

The issues of contract, licensing, and competition law raised by the governance of open and collaborative innovation practices further demonstrate the inadequacy of a view of innovation based solely on a simplistic seller-based model.

5. *Open and Collaborative Innovation and Development*

A premise of this Article is that the need for a broader perspective on innovation than that reflected in the TRIPS agreement is a matter of immediate concern to developed and developing countries alike. Nonetheless, there are aspects of open and collaborative innovation that may make it particularly important to the technological advancement of developing countries.¹³⁰ First, of course, is the fact that the fruits of many open and collaborative projects will be cheaply available, either as software products or as blueprints or data which are made available over the Internet. Quite aside from a low initial price, however, as already noted, the incentive structure of these projects means that the results of many open and collaborative projects are likely to be highly customizable platform technologies.¹³¹ Such innovations may be particularly useful to developing countries, which may not have the resources to develop their own platform technologies, but may have the desire and ability to adapt

Integrity of Open-Source Software, 2004 UTAH L. REV. 563, 644–47 (2004) (discussing licensing of open-source software).

¹²⁸ See generally Kumar, *supra* note 121, for a discussion of enforceability problems with the GNU GPL.

¹²⁹ See Elkin-Koren, *supra* note 12, at 390–91, 395 (arguing that “Creative Commons’ ideology communicates a strong proprietary message” and that “reliance on a property regime may undermine Creative Commons’ agenda by further strengthening the regulatory power of property rights”).

¹³⁰ See, e.g., Jyh-An Lee, *New Perspectives on Public Goods Production: Policy Implications of Open Source Software*, 9 VAND. J. ENT. & TECH. L. 45, 68 (2006) (“[Open source software] presents an ideal means by which governments can attempt to substantially lower costs of software acquisition. . . . This cost concern is especially pronounced in the debt-laden governments of developing countries.”); Daniel F. Olejko, Comment, *Charming a Snake: Open Source Strategies for Developing Countries Disillusioned with TRIPS*, 25 PENN ST. INT’L L. REV. 855, 877–81 (2007) (arguing that open source software is cost-effective for the governments of developing countries and that the intellectual property of indigenous peoples can be protected through licensing). See generally Gilberto Câmara & Frederico Fonseca, *Information Policies and Open Source Software in Developing Countries*, 58 J. AMER. SOC’Y INFO. SCI. & TECH. 121 (2007) (discussion of different types of open source software and suitability for developing countries); Gupta, *supra* note 73 (providing a case study of the Honey Bee Network in India); Steven Weber, OPEN SOURCE SOFTWARE IN DEVELOPING ECONOMIES (2003), available at http://www.ssrc.org/programs/itic/publications/ITST_materials/webern timer2.pdf (discussing how developing countries can benefit from the use of open source software).

¹³¹ E.g., Mann, *supra* note 12, at 11.

platform technologies to local conditions, preferences, and needs.¹³² Whether they are computer programs, seeds, or some other technology, the products of open and collaborative innovation will tend, by their nature, to lend themselves to local adaptation. This realization is reflected in initiatives aimed at either adopting open source software as a standard for government use in developing countries or encouraging its use.¹³³ In South Africa, for example, the government in early 2007 adopted a national policy for open source implementation.¹³⁴ The policy commits the government both to use open source software as a default choice and to encourage its use in the country.¹³⁵

The open and collaborative innovation process, to the extent that it involves networks of far-flung collaborators in cyberspace, also promises to provide opportunities for education, skill-building, and training for those in developing countries who have a requisite threshold level of education and skills.¹³⁶ Because many open and collaborative innovation projects naturally have a global scope, a country can benefit from local participation in such a project without having a local critical mass of technical skills necessary for a stand-alone ground-up project. Though a globally dispersed collaborative project is probably most easily conducted in the arena of software or some other intangible product, collaborative innovation in tangible technology may also be possible through communications among dispersed individuals. Scientists and engineers have collaborated at a distance through journals and letters for centuries. The Internet provides a potential means to scale up such collaboration to a global network of self-identified individuals. While those in locations remote from others with similar technological interests certainly remain at a disadvantage, improvements in digital communications provide at least some potential for participation by such individuals.¹³⁷

¹³² Olejko, *supra* note 130, at 880.

¹³³ See, e.g., Elzio Barreto & Carlos Caminada, *Brazil is Extending Microsoft a Challenge; Developing Nations Urged to Use Free Software*, HOUSTON CHRON., May 12, 2005, at 4, available at LEXIS, News Library, HCHRN File; Olejko, *supra* note 130 at 875–81.

¹³⁴ See SOUTH AFRICA DEPARTMENT OF PUBLIC SERVICE & ADMINISTRATION, POLICY ON FREE AND OPEN SOURCE SOFTWARE USE FOR SOUTH AFRICAN GOVERNMENT 3 (2006), available at http://www.oss.gov.za/FOSS_OC_POLICY_2006.pdf; see also <http://www.oss.gov.za/> (noting that the policy was approved by the Cabinet on February 22, 2007).

¹³⁵ *Id.*

¹³⁶ See Chon, *supra* note 6, at 2897 (discussing the importance of reducing limitations on sharing educational materials between nations).

¹³⁷ See, e.g., Gupta, *supra* note 73, at 49–50 (utilizing an electronic database, website, and newsletter to share traditional knowledge in India). Of course, the benefits of open and collaborative innovation are only of use to those who can deploy the resulting products or participate in the innovative process. Professor Chon and others are clearly correct that there is a need to balance the importance of promoting innovation—even as more broadly understood here—with the provision of basic human needs such as food, public health, security, and education that are necessary for human beings to flourish in many respects, including the ability to participate in creative and innovative activity. Chon, *supra* note 6, at 2893. See generally Denis Borges Barbosa, Margaret Chon & Andrés

Besides the potential for adopting, adapting, and participating in the recent technology-based revival of open and collective innovation practices, many developing countries are home to indigenous groups which already have traditional open and collaborative innovation practices.¹³⁸ Much of the debate about traditional knowledge focuses either on means to preserve traditional cultural goods or on finding ways to commodify traditional knowledge so that the communities that produced it are compensated when others use it.¹³⁹ Because these questions relate to the propertization of knowledge, these discussions are often associated with IP (and are included in WIPO's Development Agenda).¹⁴⁰ Perhaps because the discussion of traditional knowledge in the international arena is motivated largely by a desire to open similar markets for developing country knowledge goods, the discussion may not have focused enough on the continuing creative potential of such communities.¹⁴¹ One benefit of global attention to the potential advantages of open and collaborative innovation practices might be to recognize and galvanize the innovative potential of indigenous and other more traditional collaborative innovators.

III. THE TROUBLE WITH TRIPS: CONSTRAINED BY AN OUTMODED INNOVATION PARADIGM

As mentioned in the Introduction, much of the criticism of TRIPS, as well as most of the impetus for the progress reflected in the Doha Declarations and the adoption of the WIPO Development Agenda, has focused on the failure of TRIPS to balance adequately the need to promote future innovation with current needs for access to technology, particularly in the public health arena.¹⁴² Here I leave aside those pressing concerns and focus, in light of the evolving paradigms of innovation explored in Part II, on TRIPS—particularly its patent provisions—as innovation regulation. TRIPS reflects a particular mass market seller-based view of innovation which tends to evoke a one-size-fits-all high protection IP regime. The

Moncayo von Hase, *Slouching Towards Development in International Intellectual Property*, 2007 MICH. ST. L. REV. 71 (2007) (discussing how international intellectual property law must incorporate the social welfare goals of developing nations).

¹³⁸ See, e.g., Gupta, *supra* note 73, at 50 (discussing the Honey Bee Network as a source for Indian traditional practices).

¹³⁹ See, e.g., Kal Raustiala, *Density and Conflict in International Intellectual Property Law*, 40 U.C. DAVIS L. REV. 1021, 1032–34 (2007) (discussing and critiquing the move toward propertization of traditional knowledge); Safrin, *supra* note 51, at 1940 (same). But see Chander & Sunder, *supra* note 123, at 1345 (pointing out the inequalities often present in access to the non-propertized “public domain”).

¹⁴⁰ DEVELOPMENT AGENDA, *supra* note 8, at para. 18.

¹⁴¹ But see Raustiala, *supra* note 139, at 1034 (expressing concern that propertization of traditional knowledge may have negative effects on creativity within indigenous communities); Madhavi Sunder, *The Invention of Traditional Knowledge*, 70 LAW & CONTEMP. PROBS. 97, 109 (2007) (discussing the innovative nature of traditional cultures in meeting the demands of the market).

¹⁴² See *supra* text accompanying notes 6–9.

high protection baseline of TRIPS reflects, among other things, its primary mission as an instrument of trade, rather than innovation, and its genesis during a period of manufacturer-based innovation aimed at producing mass market goods.¹⁴³ A trade paradigm based on a concept of static comparative advantage¹⁴⁴ is best suited to mass market goods, which can be effectively designed and produced in one place and shipped off for use in another.

While the pharmaceutical products, off-the-shelf software and mass market entertainment products which dominated the context in which TRIPS was negotiated might fit this conception, TRIPS locked in a set of minimum standards based on the mass manufacturer model at precisely the wrong moment.¹⁴⁵ As discussed in Part II, the turn of the twenty-first century has seen a virtual explosion in the importance of information technology, leading to a surge in user innovation and open and collaborative models of innovation made possible (and certainly more visible) by the World Wide Web and other digital technologies.¹⁴⁶ A simplistic trade perspective is singularly inapt for these new modes of innovative practice. Indeed, the very concept of “trade” is often *in apropos* since these innovation practices are simply not well-described as means by which goods invented and produced in one place are sold in another.

The TRIPS “minimum standards” commitment to a mass market seller-based innovation regime is reflected in its requirement of equal treatment of different technological arenas;¹⁴⁷ its crabbed approach to enforcement exceptions¹⁴⁸ (reflecting an assumption that unauthorized use constitutes free riding, is nearly always undesirable and should be permitted only in closely cabined circumstances); and its stringent restrictions on compulsory licensing.¹⁴⁹ The lack of any substantive maxima for IP protection, along with the agreement’s failure to put any

¹⁴³ See DANIEL GERVAIS, *THE TRIPS AGREEMENT: DRAFTING HISTORY AND ANALYSIS* ix–x (2d ed. 2003) (giving an overview and background of the TRIPS Agreement); SUSAN K. SELL, *PRIVATE POWER, PUBLIC LAW: THE GLOBALIZATION OF INTELLECTUAL PROPERTY RIGHTS* 3–4 (2003) (arguing that TRIPS was molded to protect the markets of particular IP rights holders—notably the major pharmaceutical companies).

¹⁴⁴ See, e.g., Bruce Greenwald & Joseph E. Stiglitz, *Helping Infant Economies Grow: Foundations of Trade Policies for Developing Countries*, 96 AM. ECON. REV. 141 (2006) (arguing for a concept of dynamic comparative advantage which would take into account the potential for evolving economic capacity).

¹⁴⁵ Steve Charnovitz argues that the “exaggerated claim that TRIPS establishes common minimum international standards” is incorrect and countries are free to provide lesser protection to their own nationals. Charnovitz, *WTO in 2020*, *supra* note 35 at n.22. Nonetheless, as Charnovitz acknowledges, *id.* at 171, governments are unlikely as a political matter to provide stronger IP rights to foreigners than to their own citizens.

¹⁴⁶ See *supra* text accompanying notes 38–54.

¹⁴⁷ TRIPS, *supra* note 1, art. 27.

¹⁴⁸ See *id.* art. 30 (imposing limits on permissible exceptions to patent rights).

¹⁴⁹ See *id.* art. 31 (setting out limitations on permissible means by which countries can provide for use of patented inventions under compulsory licenses).

limits on restrictive licensing practices or to deal with private ordering more generally, also reflect this myopic focus on one specific innovative model.¹⁵⁰ While it is certainly desirable to read TRIPS flexibilities more expansively than they have been read in the past, it is nonetheless unlikely that an international IP regime so thoroughly grounded in a single mass market model will be optimally suited to a world of diverse innovation paradigms.

This indictment of TRIPS is not intended to suggest that national legislatures have done much better at crafting innovation policy regimes. TRIPS was patterned after high protection national intellectual policies, particularly those of the United States.¹⁵¹ The United States has been struggling to adapt its own patent law to the changing innovation landscape, a struggle reflected in stalemates between the pharmaceutical and information technology industries in attempted legislative revision¹⁵² and in Supreme Court intervention to dial back some of the rigid interpretations of patent doctrine by the Federal Circuit Court of Appeals.¹⁵³ The point, though, is that it is particularly problematic to enshrine a one-size-fits-all approach to innovation in an international agreement both because states are likely to be heterogeneous in their preferred innovative approaches and because, as a practical matter, renegotiating an international agreement is fraught with difficulty.

With that said, the recent history of TRIPS in the access to medicines context does provide some grounds for optimism and a model of how regime-shifting,¹⁵⁴ and what Scott Burris and collaborators have called a nodal approach to governance,¹⁵⁵ might lead to incremental progress.¹⁵⁶

¹⁵⁰ See generally Graeme B. Dinwoodie, *The International Intellectual Property Law System: New Actors, New Institutions, New Sources*, 10 MARQ. INTELL. PROP. L. REV. 205, 214 (2006) (stating that international treaties should contain user rights); Dreyfuss, *supra* note 6 (arguing for explicit protection of user rights in international patent law).

¹⁵¹ See references *supra* note 143.

¹⁵² See Brian Kahin, *Patents and Diversity in Innovation*, 13 MICH. TELECOMM. & TECH. L. REV. 389, 389–91 (2007) (discussing the divergent interests of the two sectors).

¹⁵³ E.g., *Quanta Computer, Inc. v. LG Elec., Inc.*, 128 S. Ct. 2109, 2113 (2008); *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1734–35 (2007); *Microsoft Corp. v. AT&T Corp.*, 127 S. Ct. 1746, 1760 (2007); *MedImmune, Inc. v. Genentech, Inc.*, 127 S. Ct. 764, 777 (2007); *eBay, Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006); *Merck KGaA v. Integra Lifesciences I, Ltd.*, 545 U.S. 193, 207 (2005).

¹⁵⁴ See Chon, *supra* note 6, at 2855; Laurence R. Helfer, *Regime Shifting: The TRIPs Agreement and New Dynamics of International Intellectual Property Lawmaking*, 29 YALE J. INT'L L. 1, 42–43 (2004) (discussing the response to TRIPS in the context of essential drugs); Peter K. Yu, *International Enclosure, the Regime Complex, and Intellectual Property Schizophrenia*, 2007 MICH. ST. L. REV. 1, 27 (2007). See generally Scott Burris, Michael Kempa & Clifford Shearing, *Changes in Governance: A Cross-Disciplinary Review of Current Scholarship*, 41 AKRON L. REV. 1 (2008) (discussing the evolving mechanisms of international governance); Susan K. Sell, *The Quest for Global Governance in Intellectual Property and Public Health: Structural, Discursive, and Institutional Dimensions*, 77 TEMP. L. REV. 363 (2004).

¹⁵⁵ Burris et al., *supra* note 11, at 33. See generally John Braithwaite, *Methods of Power for Development: Weapons of the Weak, Weapons of the Strong*, 26 MICH. J. INT'L L. 297 (2004); Scott Burris, *Governance, Microgovernance and Health*, 77 TEMP. L. REV. 335 (2004); Peter Drahos,

Further, a number of commentators have suggested creative approaches to interpreting TRIPS Articles 27 and 30 flexibly, especially in light of the Objectives and Principles outlined in Articles 7 and 8.¹⁵⁷ These attempts are commendable and essential to the promotion of innovation globally. Here I provide only an overview of the substantive challenges to adapting TRIPS to new modes of innovation before focusing in Part IV on administrative mechanisms for an evolving international innovation policy regime.

A. *TRIPS as an Instrument of Trade in “Knowledge Goods”: A Poor Fit with Emerging Innovation Paradigms*

The fact that TRIPS is first and foremost a trade instrument, focused on opening global markets to an existing pipeline of products rather than on promoting innovation in any broader sense, undermines its effectiveness of TRIPS as an innovation regime. It leaves little room for adapting the global IP regime to new and diverse innovative practices. Strong IP protection presents itself as an apparently natural supplement to a free trade regime so as to permit (and encourage) developed countries to exploit a comparative advantage in production of intangible knowledge goods.

Innovation is not a good fit for this comparative advantage model except in the short term. The comparative advantage concept depends on the idea that global welfare will be improved when countries specialize in the types of production they do best. However, the concept of comparative advantage is inappropriately static and simply inapt when applied to innovation.¹⁵⁸ Innovative capacity is essentially a kind of infrastructure, like roads and communication networks, which underlies the ability to develop other capacities. Because diverse perspectives further innovation, enhancing global welfare may depend on spreading innovative capacity

Intellectual Property and Pharmaceutical Markets: A Nodal Governance Approach, 77 TEMP. L. REV. 401 (2004). These authors argue that “nodal governance” is a weapon that can be employed by both the weak and the strong. Specifically, Drahos describes the original methods by which the pharmaceutical industry obtained a high protection patent regime as an example of nodal governance, Drahos, *supra*, at 405–06, yet argues that nodal governance provides an opportunity for developing countries with respect to traditional knowledge, Drahos, *supra*, at 420–21. Thus, it remains unclear whether the shift toward a less state-based international governance regime will benefit developing countries in the IP debate in the long run. For general discussions of this issue see Burris et al., *supra* note 154, at 1–2; Slaughter & Zaring, *supra* note 11, at 222–23.

¹⁵⁶ See, e.g., Yu, *supra* note 6, at 401–02.

¹⁵⁷ See, e.g., Barbosa et al., *supra* note 137, at 105–06; Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 447–48; Dreyfuss, *supra* note 6, at 22–23; Christopher Garrison, *Exceptions to Patent Rights in Developing Countries*, INTERNATIONAL CENTRE FOR TRADE AND SUSTAINABLE DEVELOPMENT (ICTSD), Issue Paper No. 17, at 19–42 (2006), available at <http://ictsd.net/i/publications/11716/>.

¹⁵⁸ See Greenwald & Stiglitz, *supra* note 144, at 141.

broadly.¹⁵⁹ Since copying and building on pre-existing technology are means of developing innovative capacity, strong IP rights may preclude some countries from ever developing the innovative capacity needed to develop and exploit a comparative advantage in some as-yet-undetermined arena of innovation.¹⁶⁰

Moreover, the focus on trade assumes an unrealistic fungibility between innovations produced in different countries. Because, as discussed in Part II, inventors are heterogeneous, innovation is simultaneously more global and more local than the production of mass market goods. Innovation in many cases builds incrementally on a global pool of previous experience and technology and, as demonstrated by the global scope of open source software projects, the best innovation may combine ideas from individuals in widely dispersed locales. On the other hand, many innovations are responsive to and tailored for local circumstances and needs. Without local input, an imported invention may fall short of its potential to increase welfare.¹⁶¹ This means that it is in the global interest for every nation to develop the infrastructure and skill set to engage in technical innovation so that it can both contribute to the global pool of ideas and produce goods and services that are desirable in its particular circumstances and culture. Innovation is not something which can simply be “out-sourced” to another country. Just as users play an important and different innovative role from manufacturers because of their ability to tap into dispersed local knowledge, local innovators are essential to the development of desirable technologies for local contexts.

The importance of user experience as a spur to innovation also suggests that the balance between first comers and follow-on innovators, which can be neglected when the focus is on opening up present markets, may be particularly important in the global context. The optimal balance between opening markets for knowledge goods, incentivizing foreign investment, and allowing the “freedom to tinker” as a means of developing local innovative capability and customizing innovation to local needs is likely to vary from one country to the next and from one technology to the next. Even where economic resources would be available in principle to provide a “demand pull” to foreign inventors to provide technology tailored to local circumstances, there is good reason to believe that transferring the knowledge of local circumstances required for such tailored innovation to foreign companies would be expensive and difficult. Even in the United States and Europe, where the capacity of technology

¹⁵⁹ For broad discussions of the relationship between IP, innovation, and human capabilities, see, for example, Chon, *supra* note 6, at 2885; Samuelson, *supra* note 10, at 590–91.

¹⁶⁰ See 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, 58–59 (1997).

¹⁶¹ See, e.g., Douthwaite et al., *supra* note 73, at 820 (discussing agricultural examples); Gupta, *supra* note 73, at 49–50 (exploring a local network in India as a source of ideas).

companies is high and the market for consumer goods is well-oiled, users are still predominant in producing leading edge functional improvements in many areas.¹⁶² In fact, industry has begun to realize the importance of harnessing user experience as an engine of innovation and firms are experimenting as to the best way to do so.¹⁶³ The simplistic view of the world as divided into “producers” and passive “consumers” is breaking down in most arenas, yet the TRIPS Agreement’s focus on trade and static comparative advantage obscures the dialectical nature of the innovation process.

The trade paradigm is also inappropriate for many platform technologies which are the locus of much of today’s open and collaborative innovative activity. These technologies, such as computer software, are foundational to the conduct of commerce and the production of a variety of goods and services. Because of the important role they play in facilitating other aspects of economic activity, there are strong national interests in autonomous control of these technologies.¹⁶⁴ Technical excellence is not the only measure of social benefit in these cases. This is particularly true because of the ongoing relationships between purchasers and manufacturers of these technologies inherent in modern licensing practice, as well as in the need for compatibility between different programs running on different computer hardware. For a country to be entirely dependent on a foreign company for its basic software platforms is comparable not merely to having a foreign company build some of its roads or airports, but to having a foreign company run the tollbooths or air traffic control, maintaining ongoing control of a vital infrastructural resource. At least some software and digital technology is a strategic resource to which the concept of comparative advantage is at least partly inapplicable.

Moreover, tying innovators globally to a particular innovation model ends up betraying the very tenets of free trade itself. Free traders do not argue that all countries should agree to a single approach to mining their natural resources regardless of whether geological factors, the labor market, and so forth are varied.¹⁶⁵ Instead, the free trade premise of comparative advantage assumes that each country will compete on the

¹⁶² See e.g., VON HIPPEL, *supra* note 4, at 97 (discussing “hackers” who tailored software to their specific needs).

¹⁶³ See, e.g., VON HIPPEL, *supra* note 4, at 133–34 (discussing “lead user idea-generation techniques”); Nikolaus Franke & Frank Piller, *Value Creation by Toolkits for User Innovation and Design: The Case of the Watch Market*, 21 J. PRODUCT INNOVATION MGMT. 401, 402 (2004) (analyzing user innovation toolkits from the customer perspective).

¹⁶⁴ See, e.g., Jay P. Kesan & Rajiv C. Shah, *Shaping Code*, 18 HARV. J.L. & TECH. 319, 371 (2005) (giving examples of use of government procurement power to shape technology).

¹⁶⁵ Although, as Greenwald & Stiglitz point out, the temptation to view countries’ comparative advantages in too static a fashion is one to which free traders too often succumb in general. Greenwald & Stiglitz, *supra* note 144, at 141.

basis of its own most efficient means of production.¹⁶⁶ A global commitment to a one-size-fits-all innovation model may well have the perverse result of privileging a mode of innovation that is less efficient in producing a particular technological advance.¹⁶⁷

B. *TRIPS Flexibilities and Evolving Paradigms of Innovation*

TRIPS sets out minimum standards of IP protection. For patents, TRIPS specifies various minimum requirements involving patent coverage, term, associated rights, and remedies for infringement.¹⁶⁸ Of particular interest for our purposes are Articles 27 and 28, dealing with patentable subject matter and rights conferred, respectively. With certain exceptions, Article 27 requires countries to make patents available “for any inventions . . . in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application,” severely constraining the possibility of a nuanced approach to patentable subject matter.¹⁶⁹ Article 27 also requires that patent rights be “enjoyable without discrimination as to . . . the field of technology.”¹⁷⁰ Article 28 mandates that patents confer on their owners exclusive rights “to prevent third parties not having the owner’s consent from the acts of: making, using, offering for sale, selling, or importing” their patented inventions.¹⁷¹ Article 33 adds to the constraints by mandating a patent term of twenty years which may be badly mismatched with the cumulative and collaborative pace of invention in some areas.¹⁷²

These basic all-encompassing requirements clearly reflect the mass market seller-based innovation paradigm. In requiring that patents be available without discrimination for all fields of technology, TRIPS reflects the assumption that patents are equally appropriate and effective for promoting innovation in all fields of technology. Similarly, in mandating that patent rights include rights of exclusive making and use, along with exclusive rights of sale, TRIPS reflects an assumption that all of these exclusive rights are needed to promote innovation. User innovation and open and collaborative innovation undermine these basic assumptions. As discussed in Part II, the effectiveness of these alternative innovation approaches varies depending on issues such as the modularity of a particular technology, the extent to which users of a technology are likely

¹⁶⁶ See, e.g., Philip M. Nichols, *Electronic Uncertainty Within the International Trade Regime*, 15 AM. U. INT’L L. REV. 1379, 1382–83 (2000) (describing the basic free trade concept of comparative advantage).

¹⁶⁷ Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 456.

¹⁶⁸ TRIPS, *supra* note 1, arts. 27, 28, 33, 44.

¹⁶⁹ *Id.* art. 27.

¹⁷⁰ *Id.*

¹⁷¹ *Id.* art. 28.

¹⁷² *Id.* art. 33.

to have heterogeneous needs or diverse insights, the extent to which users and other distributed innovators have the technical capacity to improve a technology, the social structure of a particular technical field, and the availability of benefits from innovation other than those obtained by selling it.¹⁷³

The fact that TRIPS fails to incorporate any standards of maximum IP protection also reflects a paradigm of innovation in which follow-on innovation is either unimportant or occurs within an industry structure in which *ex ante* licensing is an effective means to structure it.¹⁷⁴ Such an assumption is inadequate even for traditional innovation, where a robust public domain plays an important role in promoting innovation. Yet, it is particularly detrimental for user and open and collaborative innovation, the distributed and rapidly evolving nature of which undermines the potential for *ex ante* licensing.

One response to concerns about the mismatch between the underlying innovation paradigm embodied in TRIPS and alternative innovation approaches is to point to TRIPS flexibilities. TRIPS itself bolsters the argument for a generous view of its flexibilities in Articles 7 and 8 which set out its Objectives and Principles, respectively. Article 7 specifies that:

The protection and enforcement of *intellectual property rights* should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.¹⁷⁵

Article 8 states that:

1. Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.

2. Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably

¹⁷³ See *supra* text accompanying notes 55–57.

¹⁷⁴ See, e.g., Dinwoodie, *supra* note 150, at 214 (arguing for user rights to be included in international treaties); Dreyfuss, *supra* note 6, at 21 (stating that TRIPS protects property holders rather than users).

¹⁷⁵ TRIPS, *supra* note 1, art. 7 (emphasis added).

restrain trade or adversely affect the international transfer of technology.¹⁷⁶

As has been argued with respect to both access and the traditional IP balance, Articles 7 and 8 provide a persuasive basis for interpreting TRIPS flexibly so as to encourage and support evolving modes of innovation.¹⁷⁷ In particular, Article 7 should be read as aspirational (rather than as an affirmation that IP will fulfill these objectives) and its recognition that IP “should contribute” to the goal of innovation understood as an acknowledgment of the possibility of other mechanisms for promoting innovation.¹⁷⁸ Article 8’s statement that members may adopt measures “to promote the public interest in sectors of vital importance to their . . . technological development” also provides a possible handle for accommodating alternative innovation approaches in the TRIPS context.¹⁷⁹

Nonetheless, Article 8 permits the adoption of such measures only when they are “consistent with the provisions of this Agreement.”¹⁸⁰ Since the provisions of the Agreement are slanted toward a high protection regime that does not provide any explicit accommodation for evolving innovation paradigms, the question is whether the existing flexibilities are sufficient to permit us to shoehorn new innovation models into what is at bottom a mass market seller-based paradigm.

Certainly it would be possible to make significant progress. Specifically, as argued by Graeme B. Dinwoodie and Rochelle C. Dreyfuss, and recognized in a recent overview of TRIPS patent exceptions, there may be wiggle room in the interpretation of Article 27’s non-discrimination requirement, allowing for differential treatment of various industries as long as it reflects a legitimate purpose.¹⁸¹ However, it is not clear that WTO panels will be inclined to interpret Article 27 with the expansive degree of flexibility envisioned by Dinwoodie and Dreyfuss.

¹⁷⁶ *Id.* art. 8 (emphasis added).

¹⁷⁷ See, e.g., Barbosa et al., *supra* note 137, at 109–12 (“Articles 7 and 8 are, beyond any doubt, interpretative tools with respect to the meaning of the TRIPS agreement.”); Chon, *supra* note 6, at 2829–30, 2835–36 (arguing generally for the use of TRIPS flexibilities in light of Articles 7 and 8 to incorporate a “substantive equality” norm); Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 447 (urging for “an interpretation of the TRIPS Agreement that . . . offer[s] broad latitude to member states to implement their core TRIPS patent obligations”); Dreyfuss, *supra* note 6, at 22–24 (explaining how under-developed countries can benefit from the aspirational provisions—Articles 7 and 8—of the TRIPS Agreement); Garrison, *supra* note 157, at 22 (using Art. 7 TRIPS in part to analyze Art. 30 TRIPS); Peter K. Yu, *The International Enclosure Movement*, 82 IND. L.J. 827, 863–66 (2007) (describing, in the pharmaceutical context, the impact of TRIPS flexibility on the policy and innovation of less developed countries).

¹⁷⁸ TRIPS, *supra* note 1, art. 7.

¹⁷⁹ *Id.* art. 8.

¹⁸⁰ *Id.*

¹⁸¹ See Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 449–50 (“[T]he language of the provision itself may contain latitude to create some level of differentiation.”); Garrison, *supra* note 157, at 39 (showing the wiggle room in Article 27 by presenting two competing interpretations of the same provision).

One WTO panel, in a dispute involving an exception permitting use of a patented invention during the patent term so as to facilitate regulatory review, did interpret Article 27 so as to allow “bona fide exceptions to deal with problems that may exist only in certain product areas.”¹⁸² This statement leaves open the question of what makes an exception “bona fide,” or, in Dinwoodie and Dreyfuss’s terms, gives it a legitimate purpose.¹⁸³ Particularly in light of Article 7, it would be a colorable argument that a WTO dispute resolution body should deem legitimate a purpose to promote innovation outside of the IP-based paradigm by, for example, providing an exemption from patent infringement for open source software.¹⁸⁴ A considerable amount of ground work might be necessary to make such an argument convincing, however. It seems likely that WTO panels and the WTO appellate body will take a much narrower view of Article 27’s anti-discrimination mandate unless they are given a road map to a more innovation-friendly approach, a point to which I return in Part IV of this Article.

With regard to exceptions to TRIPS patent minimum standards, the agreement provides for “limited exceptions” and compulsory licensing under Articles 30 and 31, respectively.¹⁸⁵ Article 30 states that:

Members may provide limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.¹⁸⁶

Beyond the exceptions permitted under Article 30, Article 31 provides for ex ante compulsory licensing in certain fairly circumscribed situations. Most importantly for present purposes, compulsory licensing is permitted only on a case-by-case basis and only if “prior to such use, the proposed user has made efforts to obtain authorization from the right holder on reasonable commercial terms and conditions and that such efforts have not been successful within a reasonable period of time.”¹⁸⁷ Because of these and other limitations, compulsory licensing under Article 31 is unlikely to play an important role in making room for user innovation and open and collaborative innovation; they do not lend themselves to such case-by-case

¹⁸² WORLD TRADE ORG., CANADA—PATENT PROTECTION OF PHARMACEUTICAL PRODUCTS ¶ 7.92, WT/DS114/R (2000) [hereinafter CANADA PHARMACEUTICALS].

¹⁸³ Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 452.

¹⁸⁴ See Garrison, *supra* note 157, at 76 (mentioning the possibility of such an exemption in passing).

¹⁸⁵ TRIPS, *supra* note 1, art. 30–31.

¹⁸⁶ *Id.* art. 30.

¹⁸⁷ *Id.* art. 31.

and ex ante licensing, especially if a government procedure is required.

Accommodation to evolving modes of innovative activity under TRIPS will thus have to pass muster under Article 30. The most important interpretive questions for this purpose are probably the meanings of “limited” and “unreasonably” in Article 30.¹⁸⁸ These terms raise crucial questions of baseline. Against what background standard should we measure the magnitude or reasonableness of an exception? To make room for alternative modes of innovation, such as user and open and collaborative innovation, these terms would have to be interpreted in light of the impact of an exception on innovation overall. This type of interpretation would be a far cry from what we have seen so far. There has been only one panel interpretation of Article 30, in the *Canada Pharmaceuticals* dispute.¹⁸⁹ As discussed in more detail by Dreyfuss¹⁹⁰ and by Christopher Garrison,¹⁹¹ the panel interpretation construed the requirement of a limited exception very stringently—based on the extent of impairment of each of the patentee’s exclusive rights, counted individually, and permitting only the most minor impairment of any of the rights.

Garrison argues that the panel’s interpretation is inconsistent with pre-existing exemptions that were well accepted by TRIPS signatories and has limited precedential value in light of the re-affirmation of the importance of TRIPS objectives and principles after the Doha Declarations.¹⁹² The reaffirmation of Articles 7 and 8 of TRIPS in the Doha Ministerial Declaration, aimed primarily at issues of access to medicine, may provide a hook for efforts to interpret TRIPS flexibilities expansively to account for varying modes of innovation.¹⁹³ The Declaration reaffirms the importance of Articles 7 and 8 of TRIPS and emphasizes development goals.

It is thus likely that the interpretation of TRIPS flexibilities in the patent arena will evolve in light of ongoing concerns about the international IP balance. Nonetheless, there is a long way to come from the approach of the *Canada Pharmaceuticals* panel to the breadth of flexibility necessary to accommodate evolving modes of innovation that may optimally even replace intellectual-property-inspired innovation in some arenas.

As an example, consider the possibility of exemptions for making and use. TRIPS requires under Article 28 that patent infringement encompass

¹⁸⁸ *Id.* art. 30.

¹⁸⁹ CANADA PHARMACEUTICALS, *supra* note 182, at 18–21.

¹⁹⁰ Dreyfuss, *supra* note 16, at 14–18.

¹⁹¹ Garrison, *supra* note 157, at 23–33.

¹⁹² *Id.* at 37, 41–42.

¹⁹³ See Doha Ministerial Declaration, *supra* note 7, at ¶ 19 (“[T]he TRIPS Council shall be guided by the objectives and principles set out in Articles 7 and 8 of the TRIPS Agreement and shall take fully into account the development dimension.”).

not only unauthorized sales of a patented invention but unauthorized use and making of an invention.¹⁹⁴ As I have detailed in earlier work, exclusive rights to make and use may be counter-productive in some arenas in which user innovation is highly effective.¹⁹⁵ Patent protection is less important as an incentive for user innovation than it is for manufacturer-centered research and development. Moreover, patent licensing is likely to be a costly and ineffective means to coordinate user innovation, which arises mostly not from pre-meditated research and development, but as a side effect of use combined with “freedom to tinker.” Thus, in some technologies, well-tailored use exemptions may be the best way to promote user innovation. Because a use exemption would promote certain kinds of innovation by users while decreasing incentives for innovation by certain types of sellers (those whose business models involve developing technology easily copied by users), the optimal menu of use exemptions is likely to vary from place to place and from time to time.

An optimal international innovation regime would leave room for countries to adapt their use exemptions to their innovative strengths. However, it is highly questionable whether use exemptions of this sort would pass muster under Article 30 as either limited or reasonable. While it is true that research exemptions and exemptions for personal and non-commercial use are relatively common among TRIPS signatories (and hence presumably, though not definitely, acceptable under Article 30),¹⁹⁶ those exemptions are generally premised on a lack of significant commercial impact on patent holders. While the effects on *innovation* of a broader use exemption might be salutary, such an exemption might very well have significant commercial ramifications for individual patentees—and hence not be deemed “limited” under Article 30. Article 30 reflects the one-size-fits-all assumption that patenting is the best way to go to promote innovation in every technology. It will be difficult to stretch it to accommodate situations in which patent protection is simply not needed or is counter-productive.

Even where there are colorable interpretations of TRIPS that might permit a robust response to evolving innovation mechanisms, it seems unlikely—as discussed more fully by Dreyfuss¹⁹⁷ and in Part IV of this

¹⁹⁴ TRIPS, *supra* note 1, art. 28.

¹⁹⁵ See Strandburg, *supra* note 37, at 483–88, 531–41 (explaining the costs and benefits of patent protection for user innovations and proposing a blanket exemption for research use of a patented invention or a “double-edged sword” exemption focusing on non-profit researchers); Strandburg, *supra* note 53, at 267–68 (noting that “[P]atent exclusivity for business methods invented by users is likely to impose particularly high social costs since user innovators are often motivated to restrict dissemination of their inventions . . .” and advocating a “business method use” exception).

¹⁹⁶ See Garrison, *supra* note 157, at 44–49 (discussing pre-existing exceptions for non-commercial use and for experimentation).

¹⁹⁷ Dreyfuss, *supra* note 16, at 14–20.

Article—that such interpretations will be forthcoming from WTO dispute resolution unless an institution with innovation policy expertise lays the analytic groundwork. Part IV argues that a WIPO exploration of evolving innovation modes and their interaction with IP could lay the groundwork for interpretation by WTO dispute resolution bodies and the TRIPS Council.

C. *What TRIPS Leaves Out: The Increasing Importance of Private Ordering*

In addition to providing insufficient flexibility with respect to minimum standards, TRIPS also simply does not deal with many issues raised by user innovation and open and collaborative innovation because they do not arise under the proprietary seller-oriented paradigm. In particular, private ordering and institutional governance, ranging from informal norms to complex licensing arrangements such as patent pools, standards, and viral licensing, play critical and still under-theorized roles in these newly important modes of innovation.¹⁹⁸ IP law both constrains and, in some cases, constructs these innovative models.

In retrospect, it is no surprise that those seeking to construct collaborative and commons-like approaches in an innovation landscape organized around the proprietary model will use both the IP regime itself and other means of private ordering to structure their activities. Certainly intermediate limited commons regimes are plentiful in the real property context.¹⁹⁹ Nonetheless, there are concerns about potential tensions between these limited commons approaches and other normative concerns.

The construction of limited commons regimes is in some tension, for example, with a commitment to the public domain as a resource for innovation. It is very hard to know whether programmers would participate in open source software projects without the guarantees facilitated by the automatic copyrighting of their code or even whether the copyright protection of source code produces more or less software innovation on balance. Questions have also been raised as to whether attempts to promote open innovation using the Creative Commons menu of

¹⁹⁸ See generally Dinwoodie, *The International IP System: Treaties, Norms, National Courts, and Private Ordering*, *supra* note 12 (discussing “the increased role of national courts and private ordering in developing international norms”); Dinwoodie, *Private Ordering*, *supra* note 12, at 167–69 (explaining the importance of private ordering in copyright law); Dusollier, *supra* note 12, at 1393–96 (assessing the “normative sustainability” of private ordering of intellectual property in the global regime); Elkin-Koren, *supra* note 12, at 376 (noting that private ordering is an “attractive option” for remedying the rapid expansion of intellectual property rights but expressing concern that private ordering relying on intellectual property rights may actually reinforce the property discourse as a conceptual framework and a regulatory scheme for creative works); McJohn, *supra* note 12 at 66–68; Rai, *supra* note 12, at 1439.

¹⁹⁹ See, e.g., ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990).

copyright licenses lead to more or less building upon the creative work of others as compared to a regime in which registration is required to obtain copyright protection or even a regime of benign neglect in which most authors never bother to enforce their copyrights.²⁰⁰ Similar issues arise in the context of university patenting and sharing of research tools within a bounded academic community; a number of universities have recently advocated licensing approaches that would create a limited commons among university researchers by excluding commercial researchers (or at least making them pay to use the tools).²⁰¹ A number of “open biology” projects use (or propose to use) contractually limited access to data to construct a shared resource despite the fact database protection has been adopted in some places, notably the EU, and not in others, notably the United States.²⁰² The conflict between the usefulness of strong IP in constructing collaborative arrangements and its deleterious effects on the public domain is also evident in debates over the protection of traditional knowledge.²⁰³ Moreover, it is also surfacing in the debate about synthetic biology, where some have even suggested extending copyright protection to genomic sequences to facilitate a GPL-type approach.²⁰⁴ In general, the desire to use IP to construct collaborative space can lead to controversial attempts to increase propertization of the intellectual domain.²⁰⁵

The use of GPL-type licensing raises other normative questions as

²⁰⁰ See, e.g., Elkin-Koren, *supra* note 12, at 407–22 (outlining the limits of private ordering as exemplified by Creative Commons in creating a governance regime for creative works).

²⁰¹ See, e.g., *In the Public Interest: Nine Points to Consider in Licensing University Technology* (March 6, 2007), available at <http://news-service.stanford.edu/news/2007/march7/gifs/whitepaper.pdf> (“Universities should reserve the right to practice licensed inventions and to allow other non-profit and governmental organizations to do so”); see also Strandburg, *User Innovator Community Norms*, *supra* note 65, at 43–44 (discussing means of establishing an academic research tool commons).

²⁰² See, e.g., González, *supra* note 93, at 337–39, 346–50 (discussing the available strategies for “open source” scientific databases).

²⁰³ See, e.g., Raustiala, *supra* note 139, at 1032–34 (discussing and critiquing the move toward propertization of traditional knowledge); Safrin, *supra* note 51, at 1921–22 (arguing “that the establishment and the expansion of intellectual and other property rights have an internally generative dynamic”); see also Chander & Sunder, *supra* note 123, at 1343–46 (pointing out the inequalities often present in access to the non-propertized “public domain” and in the coverage of IP protection).

²⁰⁴ See, e.g., Rai & Boyle, *supra* note 96, at e58 & nn. 27–28 (discussing the difficulties in trying to evoke copyright to create a synthetic biology commons).

²⁰⁵ See Dinwoodie, *The International Intellectual Property System: Treaties, Norms, National Courts, and Private Ordering*, *supra* note 12, at 63 (noting “the entanglement of intellectual property with trade and development”); Dinwoodie, *Private Ordering*, *supra* note 12, at 161 (noting the balancing act between copyright law and public objectives); Dusollier, *supra* note 12, at 1391 (“Intellectual property is a complex mix of different interests that either protects an intellectual creation by an exclusive and proprietary right or guarantees some free access to, and use of, an intellectual creation.”); Elkin-Koren, *supra* note 12, at 375 (“[M]any of the new opportunities that were made possible by digital technology are increasingly enjoyed by the massive enclosure of the public domain and the increasing commodification of information.”); Mann, *supra* note 12, at 2 (noting how collaborative work and propertization are competing interests that are a byproduct of an open source approach); McJohn, *supra* note 12, at 42–43 (reconciling an open source approach with a property approach); Rai, *supra* note 12, at 1439–41; Safrin, *supra* note 51, at 1922 (introducing the “patent paradox”).

well. The open source software process works in part because the licenses reach through in varying degrees to constrain and direct the way in which licensees use the technology. Such constraints take on a very different normative cast when proprietary firms impose them so as to control and limit the ways in which users can engage in tinkering, modification, reverse engineering, and sometimes even criticism of the products they buy.²⁰⁶ Attempts to deploy open source approaches in realms such as biology, where patents, which are expensive to obtain and of somewhat indeterminate scope, are the IP of choice, raise further questions about using such restrictions to construct a limited commons for collaborative activity.²⁰⁷ For one thing, while there may be very little to constrain the imposition of such use restrictions by contract, at least under United States law,²⁰⁸ patent-based commons arrangements are vulnerable to claims of exclusive rights by independent inventors and patent “trolls.” Copying is neither a legal requirement for infringement nor a practical necessity. Limitations on use imposed by notice alone are generally unenforceable under the doctrine of patent exhaustion recently reaffirmed by the U.S. Supreme Court.²⁰⁹ This doctrine complicates the formation of a patent-based open source project, but may be vitally important for user innovation and personal use rights. Similar issues arise as a result of attempts to facilitate “open source biology” that rely on controlling access to databases using trade secrecy, contract, and technical protection measures.

In addition, the open source software process works in part because licensing is standardized and automated. Use restrictions imposed by manufacturers in online adhesion-type contracts are highly controversial,

²⁰⁶ See, e.g., van Houweling, *supra* note 123 (analogizing to the doctrine of servitudes for real property to analyze modern intellectual property licensing practices) and references therein; Lemley, *supra* note 127.

²⁰⁷ See generally Rai, *supra* note 39, at 131–33, 151–52 (noting the interplay between open and collaborative projects and the biomedical research field); Dusollier, *supra* note 12, at 1401–05 (discussing open-source patents in the biotechnological field); Feldman, *supra* note 125, at 117–20; González, *supra* note 93, at 345 (explaining the difficulty in using open source licenses in a commercially viable field like biotechnology); Henkel & Maurer, *supra* note 96, at 1–3 (laying out the policy debate regarding an open source approach in the synthetic biology field); Kapczynski et al., *supra* note 85, at 1073; Kumar and Rai, *supra* note 39, at 1747–48 (“[S]ynthetic biology illustrates a tension between different methods of creating ‘openness.’”); Maurer, *supra* note 93, at 405 (commenting on the challenging application of open source to difficult innovation problems such as complex computer systems and drug discovery); Merges, *supra* note 112, at 186–87 (“[I]t is possible for patents [in the biotechnology field] to create over-fragmentation in this area, and . . . wind up deterring innovation instead of encouraging it.”); Opderbeck, *supra* note 125, at 171 (“Even if open source models could work in biotechnology as a practical matter, one must ask the normative question whether law and public policy *should* support such models”); Petherbridge, *supra* note 93, at 362–63 (explaining how an open source approach differs in the life sciences context from other industries); Rai, *supra* note 12, at 1442 (commenting that biotechnology may make drawing the boundaries of the commons more difficult); Rai & Boyle, *supra* note 96, at e58 (“[S]ynthetic biology raises . . . an issue [of] the tension between different methods of creating ‘openness.’”).

²⁰⁸ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 170 L. Ed. 2d 996, n. 7 (2008).

²⁰⁹ *Id.* at 1011.

but “clickable” use restrictions would no doubt make it easier to extend the GPL-type open source approach to patentable subject matter.

The enforceability of open source software licenses in jurisdictions around the globe has barely been tested.²¹⁰ Countries may well take different views of these licensing practices and of attempts to extend them to other technologies, raising questions about both the normative and legal status of agreements used to create a supposed open and collaborative innovation commons with global extent.

Thus, attempts by collaborative and nominally open projects to fence off territory in which there is freedom to operate raise difficult and important questions that leave a mass-market-based IP regime like TRIPS both overly constraining and too narrowly focused to serve as the focal point of global innovation policy. TRIPS does virtually nothing to regulate private ordering through restrictive license provisions or to guarantee use rights based on principles of exhaustion or first sale. Probably fortunately, Article 6 specifically excludes the subject of exhaustion from the ambit of TRIPS because of disagreements over how to treat exhaustion on the international stage (though many bilateral TRIPS-plus agreements cabin signatories’ ability to implement expansive international exhaustion doctrines).²¹¹ Regulation of licensing practices is limited to a permissive clause in Article 40 allowing members to “specify[] licensing practices or conditions that may . . . hav[e] an adverse effect on competition in the relevant market.”²¹²

Given its genesis, it is not surprising that TRIPS does not address these issues. Until now, TRIPS silence in these arenas may have been a blessing—facilitating the development of an open source regime of software copyright licensing which takes the potential for strong reach-through licensing and turns it into a mechanism for collaboration. Nonetheless, the growing prevalence of user innovation and open and collaborative innovation brings these issues of private ordering and its

²¹⁰ See, e.g., Brian W. Carver, *Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses*, 20 BERKELEY TECH. L.J. 443, 464–70 (2005) (discussing the private enforcement of GPL’s and the beginning of minimal judicial enforcement); Dusollier, *supra* note 12, at 1420–25 (discussing the legal enforceability of open-source licensing); Rebecca S. Eisenberg & Arti K. Rai, *Harnessing and Sharing the Benefits of State-Sponsored Research: Intellectual Property Rights and Data Sharing in California’s Stem Cell Initiative*, 21 BERKELEY TECH. L.J. 1187, 1209 (2006) (discussing the enforceability of clickwrap licenses as contracts in court); Kumar, *supra* note 121, at 26, 27, 30 (discussing the interpretation of the GPL by a German District Court); Daniel B. Ravicher, *Facilitating Collaborative Software Development: The Enforceability of Mass-Market Public Software Licenses*, 5 VA. J.L. & TECH. 11 (2000) (discussing the fact that only four courts have addressed the issue of mass-market license enforceability); Jason B. Wacha, *Taking the Case: Is the GPL Enforceable?*, 21 SANTA CLARA COMPUTER & HIGH TECH. L.J. 451, 453–54 (2005) (discussing the enforceability of the GPL in court).

²¹¹ TRIPS, *supra* note 1, art. 6; see also, Cynthia M. Ho, *A New World Order for Addressing Patent Rights and Public Health*, 82 CHI.-KENT. L. REV. 1469, 1501–02 (2007) (discussing TRIPS-Plus agreements and international exhaustion).

²¹² TRIPS, *supra* note 1, art. 40.

place in shaping the innovation environment to the fore. It may well be that taking into account user and collaborative innovation and its interaction with both the manufacture-innovator paradigm and the public domain would call for broader-based regulation of private ordering or at least for the promulgation of “best practices” or standards for licensing.²¹³

The point here is not to propose substantive solutions to the problem of creating a healthier global innovation policy regime and certainly not to suggest that all of these aspects of global innovation practice should be subject to international agreements or standards. On the contrary, the continually evolving nature of innovation practice means that states need flexibility to adapt their legal regimes to the innovative practices that are most appropriate to a particular time and place.²¹⁴ Just as it was a mistake to enshrine an industrial manufacturer-based paradigm of innovation as an international norm, it would be a mistake to make an inflexible commitment to a particular collaborative paradigm. At the same time, one must recognize the interests in predictability and lowering trade barriers in a global innovation market. The trick is to balance the need for some international consistency in a global economy with a diversity of innovative paradigms.

IV. RE-IMAGINING WIPO: TOWARD AN ADMINISTRATIVE APPROACH TO A HEALTHIER GLOBAL INNOVATION REGIME

As noted above, there is a broader lesson in the rise of user and open and collaborative innovation practices regarding the wisdom of freezing in substantive requirements at the international level. Innovation is unpredictable in both its substance and its process. A rigidly locked-in international IP regime, no matter how well tailored at its inception, is unlikely to serve innovation well in the long term. What, then, is to be done? There are no easy answers and there is much to learn about these innovative paradigms and others which may emerge in the future as we seek to determine the right balance of public domain, proprietary “knowledge goods” and privately ordered, limited commons approaches.

Rather than consider possible substantive mechanisms in more detail, this Part discusses possible institutional mechanisms, based on a global

²¹³ See Dinwoodie, *Private Ordering*, *supra* note 12, at 162 (discussing recent examples of (possible) international copyright norm formation); Dusollier, *supra* note 12, at 1392 (discussing why intellectual property regimes exist not only in the private domain, but are intertwined with the public domain); Elkin-Koren, *supra* note 12, at 421 (suggesting that “creating an alternative to copyright requires standardization”); McJohn, *supra* note 12, at 45 (discussing the public interest in private ordering); Rai, *supra* note 12, at 1441.

²¹⁴ One should, in fact, view this contention as an extension of the comparative advantage idea underlying the original trade-based paradigm to the context of innovation. See Dinwoodie & Dreyfuss, *Diversifying Without Discriminating*, *supra* note 9, at 456.

administrative law approach,²¹⁵ to facilitate ongoing reform and development of global innovation governance. Specifically, I propose re-imagining WIPO and its relationship to TRIPS in light of a broader approach to innovation policy. To this end, I will discuss four potential roles for WIPO in moving toward a more satisfactory global innovation policy regime.

At a minimum, WIPO should adopt an Innovation Policy Agenda (in rough analogy to its recently adopted Development Agenda).²¹⁶ A WIPO Innovation Policy Agenda would provide a focal point for global discourse and debate about continually evolving innovation approaches. Second, perhaps as an outgrowth of an Innovation Policy Agenda, WIPO should play a greater role in interpreting TRIPS flexibilities and examining potential exceptions for TRIPS compliance. Third, and more ambitiously, consideration should be given to the possibility of amending TRIPS to provide for an exception authorization broader than is available under Articles 27, 30, and 31, coupled with a more explicitly administrative role for WIPO in vetting proposed exceptions. Finally, one might consider expanding WIPO's role to encompass consideration of international standard-setting for activities, such as licensing, which are critical for innovation yet not a matter of IP law per se. Any such initiatives would need to balance harmonization with allowance for country-specific and evolving innovation practices.

A. *Why WIPO?*

As Rochelle Dreyfuss points out persuasively, TRIPS suffers from a law-making deficit because of the rarity and non-precedential character of WTO panel decisions.²¹⁷ This law-making deficit is responsible at least in part for the dearth of examples of states testing the limits of the flexibilities currently available in TRIPS.²¹⁸ The barriers to states adopting patent laws that test the TRIPS flexibilities are many, including, in many developing countries, the capacity and expertise to implement cutting-edge TRIPS interpretations and the political, financial, and human capital resources to risk challenges to those interpretations and to pursue disputes before the WTO.²¹⁹ This means that some other mechanism is needed to develop

²¹⁵ See *supra* note 22 and accompanying text.

²¹⁶ See DEVELOPMENT AGENDA documents, *supra* note 8; see also Halbert, *supra* note 13, at 255–62, for an overview of the history of WIPO with particular attention to development issues.

²¹⁷ Dreyfuss, *supra* note 16, at 1–3.

²¹⁸ See Garrison, *supra* note 157, at 19–23 (detailing a study of patent infringement exceptions globally demonstrating their limited scope); see also Ho, *supra* note 211, at 1495–99 (discussing the effects of bilateral Free Trade Agreements on signatories' flexibility).

²¹⁹ See, e.g., Dreyfuss, *supra* note 6, at 25–27 (stating that implementing these laws requires either that a country have experience with intellectual property protection or sufficient human capital, neither of which developing countries have); Yu, *supra* note 6, at 387 (discussing some of the difficulties developing countries face in implementing aggressive interpretations of TRIPS flexibilities).

interpretations of TRIPS flexibilities that countries will be willing to adopt.

The WTO and the TRIPS Council are probably not the right places to make progress on a broader understanding of innovation policy in the first instance.²²⁰ Though they may be capable of implementing a more nuanced approach to the TRIPS flexibilities (particularly with some input from WIPO), an organization steeped in a trade mandate is unlikely to have either the inclination or the expertise to make progress on a broader innovation agenda.

In part because of its recent experience with the Development Agenda, WIPO is probably best placed to provide a forum for dialogue about how to use TRIPS flexibilities to accommodate broader innovation policy concerns.²²¹ This is the case despite complex questions, discussed at length by Dreyfuss, about how exactly to incorporate the results of WIPO deliberation into TRIPS interpretation under the WTO dispute settlement process.²²² WIPO has a standing committee structure for consideration of IP-related issues, which has already been expanded to include a Committee on Development and IP.²²³ Under the auspices of such committees and otherwise, WIPO sponsors conferences, studies, and other forms of discourse involving scholars, NGOs, stakeholders, and country representatives. By these means, WIPO could conduct an ongoing analysis of how to permit a variety of forms of innovative activity to flourish together in a global governance framework.²²⁴

Of course, the relevance of innovation policy is not confined to any single international organization. Indeed, discussion about open and collaborative innovation is beginning in a variety of international forums. For example, the United Nations Conference on Trade and Development (UNCTAD) just released its “Information Economy Report 2007-2008, Science and Technology for Development: the New Paradigm of ICT,”²²⁵

²²⁰ See Dreyfuss, *supra* note 16, at 32–33 (discussing the shift from WIPO to the WTO). But see Kal Raustiala, *Compliance & Effectiveness in International Regulatory Cooperation*, 32 CASE W. RES. J. INT’L L. 387, 435–38 (2000) (arguing in favor of an active role for the TRIPS Council as a primary forum for TRIPS interpretations).

²²¹ For an argument in favor of WIPO’s greater involvement in promoting TRIPS flexibilities see, for example, Dreyfuss, *supra* note 16, at 21–34. For general arguments in favor of WIPO taking a greater role in promoting a more balanced approach to IP, see, for example, Geneva Declaration on the Future of the World IP Organization, available at <http://www.cptech.org/ip/wipo/futureofwipodeclaration.pdf> (discussed in Halbert, *supra* note 13, at 273–76); James Boyle, *A Manifesto on WIPO and the Future of IP*, 2004 DUKE L. & TECH. REV. 1, 10 (2004); Halbert, *supra* note 13, at 283–84.

²²² Dreyfuss, *supra* note 16, at 26–29.

²²³ World Intellectual Property Organization, Committee on Development and Intellectual Property, <http://www.wipo.int/ip-development/en/agenda/cdip/> (last visited Oct. 23, 2008).

²²⁴ See Okediji, *supra* note 14, draft at 22, 42, discussing how WIPO and its predecessor organizations have used such avenues to affect substantive global IP norms in the past.

²²⁵ UNCTAD, INFORMATION ECONOMY REPORT 2007–2008, SCIENCE AND TECHNOLOGY FOR DEVELOPMENT: THE NEW PARADIGM OF ICT (2007), available at http://www.unctad.org/en/docs/sdteech20071_en.pdf.

which recognizes that “ICT has also given rise to new models for sharing knowledge and collective production of ideas and innovations,” known as “open access” models, “which often bypass the incentive system provided by [IP] rights”²²⁶ and notes that “[a]n innovation policy framework that fully takes into consideration the changes generated by ICT must give prominence to open approaches to innovation, which present significant advantages for developing countries.”²²⁷ Promoting a dialogue on these issues in a number of venues will ensure that a variety of perspectives are included. Nonetheless it seems desirable to have a focal point organization around which various stakeholders can coalesce and create coalitions of participation in the debate. WIPO is a natural choice for this role in light of its expertise in IP and its experience with the Development Agenda.

Indeed, while one may question WIPO’s capacity and willingness to take a broader view of innovation policy in light of its high protectionist history and IP-focused mandate, this is an opportune time for a re-focusing of WIPO’s mission, given its weakened role in the global IP system after TRIPs. WIPO’s efforts in undertaking the Development Agenda and its activities in the arena of traditional knowledge demonstrate a growing willingness and capacity to consider ramifications of IP outside of a narrow manufacturer-based paradigm perhaps as part of a search to preserve its relevance in a post-TRIPs world.²²⁸ Building an understanding of and expertise in new and evolving innovation paradigms is within the purview of WIPO in any event because of WIPO’s role in developing and administering most IP agreements other than TRIPs.²²⁹ Crucially, WIPO has been engaged for some time in attempts to develop a Substantive Patent Law Treaty to harmonize further the international patent system.²³⁰ Such efforts clearly raise red flags in light of the problems already visible in the substantive harmonization involved in TRIPs minimum standards for patent law. It is very important to ensure that a broader innovation policy perspective inform any discussions of further harmonization.

Though WIPO has clear institutional advantages as a focus for global innovation policy setting, WIPO has a checkered history with respect to open innovation. Its Convention sets its primary goal as to “promote the

²²⁶ *Id.* at 2.

²²⁷ *Id.* at 12.

²²⁸ One should not be too sanguine about this recent openness, of course. WIPO’s history is as an organization devoted to the promotion of IP rights which has arguably been brought kicking and screaming to its present openness to development issues. See, e.g., Halbert, *supra* note 13, at 272–76 (discussing this history). Nonetheless, of the available institutions in the international IP regime, WIPO seems the most likely to be both able and willing to pursue a broader innovation policy agenda.

²²⁹ For a list of WIPO-administered IP treaties, see World Intellectual Property Organization, WIPO-Administered Treaties, <http://www.wipo.int/treaties/en/> (last visited Oct. 23, 2008).

²³⁰ For a discussion of and critique of WIPO’s efforts in this regard, see Reichman & Dreyfuss, *supra* note 20, at 122–29.

protection of [IP] throughout the world.”²³¹ Moreover, in 2003, the United States government, reportedly as a result of objections from Microsoft and related corporate interests, pressured WIPO to rescind a plan to hold a meeting on open source approaches.²³² At that time Lois Boland, director of international relations for the U.S. Patent and Trademark Office, reportedly said “that open-source software runs counter to the mission of WIPO, which is to promote intellectual-property rights” and that “[t]o hold a meeting which has as its purpose to disclaim or waive such rights seems to us to be contrary to the goals of WIPO.”²³³

Times seem to be changing, though, as a result of efforts from NGOs supportive of open source approaches along with WIPO’s adoption of the Development Agenda. Though a specific reference to open source software was removed from the approved version, the Development Agenda proposals agreed upon in 2007 contain language that is consistent with an important role for user and open and collaborative innovation in development. The approved proposals include calls to “deepen the analysis of the implications and benefits of a rich and accessible public domain,” to “initiate discussions on how . . . to further facilitate access to knowledge and technology . . . and to foster creativity and innovation[.]” to “request WIPO to undertake . . . studies to assess the economic, social and cultural impact of the use of intellectual property systems[.]” and to “exchange experiences on open collaborative projects such as the Human Genome Project as well as on intellectual property models.”²³⁴ These proposals provide hooks for consideration of innovation paradigms beyond the IP regime. Moreover, new paradigms for innovation cut across the traditional divide between developing and developed countries, splitting the perspectives of powerful developed country actors in new ways.

WIPO is also a good choice as a locus for a broader innovation policy agenda because TRIPS itself contemplates the possibility that TRIPS interpretation might be influenced by WIPO. Thus, Article 68 contemplates that the TRIPS Council, in its activities in monitoring the agreement, “may consult with and seek information from any source it deems appropriate. In consultation with WIPO, the Council shall seek to establish, within one year of its first meeting, appropriate arrangements for cooperation with bodies of that Organization.”²³⁵ Though the metes and bounds of cooperation set out in the subsequently-adopted formal agreement between WIPO and the TRIPS Council are narrow and primarily technical, the language of Article 68 certainly implies that the

²³¹ Convention, *supra* note 13, art. 3.

²³² See Krim, *supra* note 15.

²³³ *Id.*

²³⁴ DEVELOPMENT AGENDA, *supra* note 19, at *16, *19, *35, *36.

²³⁵ TRIPS, *supra* note 1, art. 68.

TRIPS Council may consult with WIPO more broadly.²³⁶ Though the current relationship between WIPO and TRIPS does not warrant explicit deference to WIPO positions by WTO dispute resolution bodies,²³⁷ it certainly places WIPO in a position to begin a dialogue over TRIPS interpretation. As discussed in Section D of this Part, it might eventually be advisable to amend TRIPS to provide WIPO with a more formal role in TRIPS interpretation.

B. *An Innovation Policy Agenda at WIPO*

An important step toward incorporating consideration of evolving innovation paradigms in the global debate about IP law would be for WIPO to develop and adopt an Innovation Policy Agenda, along the lines of the recently-adopted Development Agenda. This adoption would take a wide view of promoting innovation in the long term and avoid the inaccurate perception that open and collaborative innovation is necessarily averse to business interests. Under the auspices of an Innovation Policy Agenda, WIPO could provide a forum for vetting interpretations of TRIPS flexibilities and proposals for national legislation to accommodate a broader approach to innovation. WIPO could also consider a range of issues beyond IP per se related to user innovation and open and collaborative innovation.

Very recently, WIPO has begun to take steps toward recognizing the importance of open and collaborative innovation. For example, a report prepared for the June 2008 meeting of the WIPO Standing Committee on Patents included sections on licensing, patent pools, collaborative research projects (including open source) and a discussion of potential problems caused by patent thickets.²³⁸ A list of “issues for further elaboration and discussion” approved at that meeting includes “alternative models for innovation,” “limitations to the rights,” and “research exemption.”²³⁹ At the July 2008 meeting of the WIPO Committee on Development and IP, the Electronic Frontier Foundation presented a statement in which it suggested that “WIPO could also provide Member States with information about the benefits for education and scientific research of Open Innovation and User Driven Innovation models” and that these “new theories of innovation . . . have the potential to radically reshape collaboration and

²³⁶ AGREEMENT BETWEEN THE WORLD INTELLECTUAL PROPERTY ORGANIZATION AND THE WORLD TRADE ORGANIZATION (1995), *available at* http://www.wipo.int/treaties/en/agreement/pdf/trtdocs_wo030.pdf; see also Nichols, *supra* note 166 at 1420–22, summarizing the current relationship between the WTO and WIPO.

²³⁷ Dreyfuss, *supra* note 16, at 26.

²³⁸ See *generally* REPORT ON THE INTERNATIONAL PATENT SYSTEM, *supra* note 17.

²³⁹ SUMMARY BY THE CHAIR, *supra* note 17, at 2, 4.

innovation in the developing world.”²⁴⁰ All of these recent activities lay groundwork for a more formal WIPO Innovation Policy Agenda.

The development of an Innovation Policy Agenda at WIPO would provide a focal point for various stakeholders with interests in user innovation and open and collaborative innovation, along with others, such as information technology firms that object to the TRIPS one-size-fits-all approach. The political economy already makes it likely that TRIPS “flexibilities” will come to be more widely deployed in recognition of the needs of the information technology industry with its complex cumulative innovation. Participants in user and open and collaborative innovation, and those NGOs that support these approaches, should make use of the networks of connections which link them to information technology sector stakeholders.²⁴¹ There are great advantages to such an approach because of the global network of participants already involved in many user and open and collaborative innovation projects; the extent to which the networks of participants interpenetrate the networks of commercial stakeholders who will be involved in the debate; and the extent to which commercial stakeholders are increasingly dependent on the open source community for aspects of their businesses.²⁴²

An Innovation Policy Agenda would provide a point of coalescence for these parties to mobilize their resources, to create, to deploy, and to link nodes so as to affect the process of “nodal governance” that will no doubt be involved in the adaptation of TRIPS to the needs of the information technology sector.²⁴³ Over time, these adaptations are likely to be made both directly, by influencing the development of interpretative machinery at WIPO or the WTO, and indirectly, by influencing the evolution of domestic IP law, which will in turn influence the interpretation of TRIPS.

Participants in and advocates of open and collaborative innovation can also seek to use their networks of connections to influence the increasingly successful attempt to account for development concerns in the global IP regime. Already, many developing countries view the *use* of open source software as a beneficial path.²⁴⁴ Advocates for user innovation and open

²⁴⁰ EFF Statement at WIPO Development Agenda Meeting—CDIP2, Second Session, July 7–11, 2008, available at <http://lists.essential.org/pipermail/a2k/2008-July/003378.html>.

²⁴¹ See, e.g., O’Mahony & Bechky, *supra* note 122 (discussing the important interactions between information technology companies and the open source community).

²⁴² See, e.g., BENKLER, *supra* note 5, at 122–27 (discussing how social production is altering the business environment and the relationships between firms and individuals); WEBER, *supra* note 37, at 190–207 (examining business models and experiments in open source); Stephen R. Walli, *Under the Hood: Open Source and Open Standards Business Models*, in OPEN SOURCES 2.0, at 121, 127–35 (DiBona, Cooper & Stone eds., 2006) (explaining how businesses can use open source software as a tool to obtain a competitive advantage); O’Mahony & Bechky, *supra* note 122.

²⁴³ See Burris et al., *supra* note 11, at 52–53 (making a similar proposal in the context of the debate over public health and access).

²⁴⁴ See Câmara & Fonseca, *supra* note 130, at 129–30 (assessing how open source software can be promoted effectively in developing countries to help them meet their development goals); Gupta, *supra*

and collaborative innovation should deploy their networks of contacts in developing countries and in organizations serving developing countries to articulate the role that these forms of innovation play and could play in development.²⁴⁵ There is already progress in this direction with the proposal for exploration of “open collaborative projects” in the WIPO Development Agenda²⁴⁶ and the recent discussions of open innovation approaches in the WIPO Committee on Development and IP. A WIPO Innovation Policy Agenda would facilitate this involvement.

C. A Notice and Comment Approach to WIPO Interpretations of TRIPS Flexibilities

Particularly as WIPO develops broader innovation policy expertise pursuant to an Innovation Policy Agenda or otherwise, it might begin to play a more important role in interpreting TRIPS flexibilities and analyzing whether possible exceptions comply with TRIPS. As Dreyfuss argues, the WTO Dispute Settlement process is a poor mechanism to provide authoritative interpretations of amorphous terms in the agreement that might be interpreted so as to provide some flexibility, such as “limited,” “normal exploitation,” without “unreasonable prejudice” and so forth.²⁴⁷ This is in part because dispute settlement proceedings are rare and in part because the panels are unqualified to make innovation policy. Dreyfuss argues that an administrative mechanism is needed to give content to these terms in light of the purposes of IP in general and of the purposive statements incorporated in TRIPS itself.²⁴⁸ She then suggests ways in which the existing IP administrative bodies—primarily WIPO and the TRIPS Council—might undertake such an interpretive task so as to take advantage of WIPO’s expertise in IP policy.²⁴⁹

My proposal here piggybacks off of her suggestions. Consideration of evolving alternative mechanisms for innovation only reinforces the need for an administrative approach. The infrequent forays into TRIPS interpretation of WTO dispute resolution bodies are a completely ineffective mechanism for considering and vetting TRIPS exceptions under Article 30 once one moves away from the mass market seller innovator paradigm, which seeks to minimize exceptions to rigorous enforcement of

note 73, at 63–64 (describing the success of the Honey Bee Network, which has documented over 10,000 innovations and examples of indigenous knowledge); Lee, *supra* note 130, at 68 (explaining how developing countries can benefit from the cost savings of open source software); Olejko, *supra* note 130, at 875–81 (discussing steps developing countries can follow to utilize open source software); Weber, *supra* note 130, at 16–17, 20 (discussing the benefits that open source software can bring to developing countries).

²⁴⁵ E.g., Douthwaite et al., *supra* note 73, at 820–21; Gupta, *supra* note 73, at 50–51.

²⁴⁶ DEVELOPMENT AGENDA, *supra* note 19, at para. *16, *17, *23, *27, *35, *36, *45.

²⁴⁷ Dreyfuss, *supra* note 16, at 13–18.

²⁴⁸ *Id.* at 18–19.

²⁴⁹ *Id.* at 19–31.

patent protection. If TRIPS flexibilities are to play a positive role in promoting innovation and ensuring that the IP paradigm does not crowd out other innovation models, then it is critical to have an ongoing discussion not only of whether proposed exceptions would pass muster under TRIPS but also of which exceptions make sense as a matter of innovation policy under a variety of circumstances. Under a broader view of the goal of TRIPS as promoting innovation (rather than IP protection per se), exceptions should not only be tolerated but should be promoted under certain circumstances.

WIPO is well-placed to provide a forum for analyzing exceptions that might potentially be implemented in national legislation. A well-reasoned WIPO analysis would provide persuasive evidence to WTO bodies of how a large number of member states view the TRIPS provisions and also of the views of an organization with expertise in the area of innovation policy.

If WIPO begins to take a greater role in TRIPS interpretation, it will be important to deal with traditional administrative issues of transparency, legitimacy, and voice.²⁵⁰ WIPO consideration of potential exceptions should incorporate the views not only of IP stakeholders, developing countries, and potential consumers of new inventions, but also of participants in and advocates for less traditional innovative practices, including the user innovation and open and collaborative innovation discussed in earlier parts of this Article. Historically, WIPO has been very unwilling to permit participation from diverse constituencies.²⁵¹ However, its experience with the Development Agenda and, as Debora J. Halbert argues, with the issue of traditional knowledge appears to be opening it up to more expansive participation.²⁵²

Openness to input from innovators will be critical to the success of an Innovation Policy Agenda. Once one acknowledges the importance of new and evolving models of innovation, it becomes essential to combine the IP and innovation policy expertise of an organization like the re-imagined WIPO with a means of tapping into the global innovation grassroots. An

²⁵⁰ For general discussions of these issues in the global context, see, for example, Burris et al., *supra* note 11, at 54–57 (discussing administrative issues in seeking to use nodal forms of governance); Cassese, *Global Standards*, *supra* note 11, at 112–13 (discussing the emergence of global rules addressed to states and how the two interact); Cassese, *Administrative Law Without the State*, *supra* note 11, at 694 (discussing the procedural issues that must be dealt with in the global context to ensure the protection of individuals and organizations); Esty, *supra* note 11, at 1537–42 (stating the challenges that arise in the international context for administrative law); Kingsbury et al., *supra* note 11, at 37–39 (discussing procedural participation and transparency in global administrative law); Slaughter & Zaring, *supra* note 11, at 224–25 (discussing transgovernmental networks and their potential to facilitate cooperation on the international level); Stewart, *supra* note 11, at 69–73 (discussing the issues of control, accountability, participation and responsiveness regarding domestic and global administrative law).

²⁵¹ Halbert, *supra* note 13, at 271–76.

²⁵² *Id.* at 271–80.

ear to the ground complements IP expertise in informing a flexible and responsive global system.

With this in mind, WIPO should open up its deliberations on a regular basis to representatives of those involved in user innovation and open and collaborative innovation, as it is doing with indigenous communities in its deliberations regarding traditional knowledge.²⁵³ Beyond a more inclusive approach to NGOs, WIPO should consider adopting an accessible and open “notice-and-comment” approach to potential TRIPS exceptions.²⁵⁴ The same Internet technology which is responsible for the recent surge in new innovative practices provides a mechanism for implementing a truly global notice and comment procedure.²⁵⁵ WIPO conceivably could set up an online forum for proposing and discussing TRIPS exceptions.²⁵⁶ Interested parties, including states, industry actors, NGOs, and even individuals could submit comments about specific proposals for exceptions, interpretations of the TRIPS non-discrimination requirement, and so forth. To draw out serious and well thought proposals, each proposal might be required to include an “innovation impact assessment”—arguments as to why the proposed exception or interpretation would promote innovation. Online rating or tagging systems could also be used to weed out spurious proposals and comments or to group similar comments.²⁵⁷

An open notice and comment procedure would provide a means to solicit a variety of perspectives which could inform WIPO and give it access to the distributed expertise about innovation which is present at the global grassroots. An open process of notice and comment might go far to alleviate the legitimacy problems with WTO reliance on WIPO interpretations raised by Dreyfuss.²⁵⁸ TRIPS provides that the TRIPS Council “may consult with and seek information from any source it deems appropriate” in conjunction with its monitoring responsibilities.²⁵⁹ The more transparently vetted WIPO interpretations of TRIPS are, the more appropriate it would seem to be to rely on them.

Of course, as discussed in Part III, there are limits to the extent to

²⁵³ *Id.* at 276–80.

²⁵⁴ See Kingsbury et al., *supra* note 11, at 35 (discussing the relatively new phenomenon of adoption of notice and comment procedures by international bodies).

²⁵⁵ Of course, not all members of constituencies importantly affected by innovation policy would have direct access to such an online forum. However, as internet access is becoming more and more widespread, civil society NGOs would certainly have access, and, in any event, any procedure using the Internet to permit direct involvement by citizens worldwide in commenting on innovation policy would be vastly more inclusive than anything going on at WIPO presently.

²⁵⁶ This proposal is reminiscent of Noveck’s “Peer to Patent” approach to examination being tested at the USPTO, Noveck, *Peer to Patent*, *supra* note 35, at 143–51, or of Cynthia Ho’s proposal for a response to biopiracy and patent bioethics issues, Ho, *supra* note 35, at 532–40.

²⁵⁷ E.g., Noveck, *Peer to Patent*, *supra* note 35, at 147–49.

²⁵⁸ Dreyfuss, *supra* note 16, at 26.

²⁵⁹ TRIPS, *supra* note 1, art. 68.

which the provisions of TRIPS—which were meant to cabin patentability exceptions—can be stretched to accommodate the needs of a changing innovation regime.²⁶⁰ The advantages of having ongoing input and proposals for how states might implement the TRIPS flexibilities in light of an evolving innovation environment would extend beyond providing more informed and well-thought-out interpretations of the current provisions of TRIPS. Proposals rejected in the TRIPS/WIPO interpretive process that were accompanied by persuasive innovation impact assessments would generate suggestions and support for possible amendments to TRIPS in light of changing technology and practice.

For example, as discussed in Part III, there may be circumstances in particular technological fields which would make a relatively broad exception to the exclusive right to use an invention socially beneficial even where it might not be sufficiently limited to comply with Article 30.²⁶¹ An open interpretive forum would provide advocates of user innovation with an opportunity to make the case for amending TRIPS to permit use exemptions to nurture this innovative practice.

The availability of such a global forum for discussion and evaluation of proposed TRIPS exceptions and flexibilities would also feed debates about exceptions at the national level, likely helping to give political legitimacy to advocates of more flexible national IP regimes.

D. *Amending TRIPS to Give WIPO an Administrative Role*

While the adoption of an Innovation Policy Agenda at WIPO and the establishment of a WIPO forum for vetting TRIPS flexibilities would be steps in the right direction, such an *ad hoc* approach to TRIPS flexibilities may not be enough to make positive room for evolving innovation practices. Because of the complexity and continuing evolution of the innovation environment, it is hard to escape the conclusion that this is an arena in which a more explicitly administrative regime is needed at the global level.²⁶²

Here I propose a more far-reaching change than could be accomplished simply by having WTO dispute resolution bodies take WIPO analysis into account informally in evaluating TRIPS exceptions. The proposal would be to amend the TRIPS agreement to shift more of the burden for assessing

²⁶⁰ See *supra* Part III.A (discussing the limitation of TRIPS for accommodating evolving forms of innovation).

²⁶¹ See *supra* text accompanying notes 193–94.

²⁶² As Dreyfuss notes, the general framework of WTO reliance on expert international organizations to provide standards is not new. Dreyfuss, *supra* note 16, at 26. She also notes, however, that such an approach might be risky at the moment since WIPO's institutional identity is in a period of upheaval. *Id.* at 28. Most likely a change of the sort I advocate here would have to follow a period of experience with more informal input from WIPO under the auspices of an Innovation Policy Agenda.

the innovative benefits of TRIPS exemptions or of differential treatment of different technologies to an explicitly recognized administrative process, which would not require the very difficult step of treaty amendment every time the innovative process evolves.²⁶³ To accomplish this, a general provision permitting exceptions “reasonably intended to promote innovation and not to restrain trade” would be substituted for Article 30.²⁶⁴ The amendment should also clarify that Articles 27 and 28 are subject to such exceptions. As an expert innovation policy agency, WIPO would be given the formal responsibility for vetting exceptions to see whether they are “reasonably intended to promote innovation and not to restrain trade.”²⁶⁵ WTO dispute resolution would then defer, at least to some degree, to WIPO’s evaluations.

Contemplating a more formal role for WIPO in evaluating TRIPS flexibilities raises at least two important issues. First, there is the question of the extent of deference WTO dispute resolution bodies should give to WIPO interpretations of the proposed “reasonably intended to promote innovation and not to restrain trade” requirement.²⁶⁶ Rather than give even a re-imagined WIPO final authority over the validity of TRIPS exceptions, there are several reasons to prefer an intermediate level of deference. While a re-imagined WIPO would have a broad mandate, including, importantly, the current Development Agenda, there are a number of other international organizations with portfolios that touch on innovation policy. It would be reasonable to permit parties involved in dispute resolution proceedings to bring arguments against WIPO’s interpretations based on the views of organizations with expertise in areas other than innovation that are related to a particular dispute. Indeed, as noted by Dreyfuss, the WTO itself has a trade agenda which will not always align with the promotion of innovation.²⁶⁷ It is only reasonable to leave room for WTO

²⁶³ See Okediji, *supra* note 14, discussing the potential for WIPO to play the role of an expert agency. Okediji concludes that the WTO is the more appropriate forum for IP norm-setting in the final instance. The proposals here are not necessarily inconsistent with WTO dominance in final decisionmaking. The important point is that WIPO is well placed to formulate and vet innovation policy proposals even though final decisionmaking power undoubtedly will be vested in the WTO because of its enforcement powers.

²⁶⁴ Here I address only the patent provisions of TRIPS. Similar changes to the other sections of TRIPS should also be considered.

²⁶⁵ WIPO itself would have to be restructured to implement such a formal vetting process, an issue which I do not deal with here.

²⁶⁶ Stuart Benjamin and Arti Rai have recently considered a similar issue in connection with their proposal for an Innovation Policy Agency in the United States. Stuart Minor Benjamin & Arti K. Rai, *Innovation and Its Reform: A Regulatory Perspective*, 76 GEO. WASH. L. REV. (forthcoming 2008). They propose an Innovation Policy Agency with a mandate to review regulations proposed by other executive agencies in light of their effects on innovation policy. They argue that the Innovation Policy Agency should have the power to send a proposed regulation back for further review, but that the agency with substantive authority in a particular area should have the power to enact the regulation over IPA remand.

²⁶⁷ Dreyfuss, *supra* note 16, at 28.

dispute resolution panels to take specifically trade-focused rationales into account.

Second, there are good reasons, particularly in the international context (where the legitimacy of an administrative approach may be questioned) to avoid focusing too much power in one particular international actor (indeed, this is part of the problem with the current configuration of TRIPS). Giving more responsibility for interpreting TRIPS to a re-imagined WIPO raises reasonable concerns about agency capture by powerful developed country interests. These concerns are mitigated somewhat in the context of new paradigms of innovation (in contrast to the situation with respect to the Development Agenda, for example) because, as we have seen in the past few years in the disputes between the pharmaceutical industry and much of the information technology industry, the evolution of innovation paradigms can set even powerful developed country interests at odds with one another. Nonetheless, it would be best to avoid concentrating too much power over innovation policy in any one organization so as to avoid creating an overly attractive target for capture. Dividing power facilitates the ability for weaker players to have influence through nodal governance and regime shifting.

There is thus a need to balance the advantages of innovation policy expertise and a reliable institutional framework for vetting proposed exceptions against the disadvantages of concentrated power. An intermediate level of deference, in which WTO dispute resolution panels are required to articulate specific reasons for rejecting any exception which has survived WIPO's vetting procedure, might be appropriate. If a panel were to reject WIPO's determination as to whether a particular exception promotes innovation, the WTO Appellate Body would be empowered to reweigh the WIPO analysis against the panel's reasoning.

WIPO evaluation of proposed exceptions would provide states with a degree of certainty in enacting them even if the dispute resolution procedure retained its role as the finally binding interpreter. Because formal disputes under the WTO are rare, and because WIPO's analysis would be ongoing, WIPO's interpretations would likely be very influential. This would be particularly true if WIPO evaluations paved the way for broad adoption of exceptions by states, which might then constitute "subsequent practice in the application of the treaty" under Article 31 of the Vienna Convention and hence inform subsequent interpretations.²⁶⁸

E. International Governance and Private Ordering of Innovation

A final role for a re-imagined WIPO under an Innovation Policy Agenda would be as an incubator of potential international initiatives

²⁶⁸ Vienna Convention on the Law of Treaties art. 31(3)(b), May 23, 1969, 1155 U.N.T.S. 331.

related to the ways in which innovation is structured and governed by licensing law, competition law, and so forth. Such initiatives might range from offering model licensing regimes, to promulgating best practices and standards, to suggesting model national legislation concerning the governance of innovative collaborations (including, for example, patent pools and other limited commons constructions), through to proposing new international agreements about such issues as reach-through licensing.

Of course, existing open and collaborative projects have already wrestled with the question of how to employ IP and licensing in cooperation with formal or informal organizational structure to provide a productive and sustainable innovation process. They have also dealt with procedural issues raised by the need for decision-making within an often widely-dispersed and self-selecting group. Most significant open source software projects, for example, have well-defined governance structures, usually vesting decision-making authority, at least with respect to what goes into the official version of the program, in those who started the project or have demonstrated technical skill.²⁶⁹

The success of open source software is also attributable to the development of a standardized “platform” of legal technology to define and govern the resulting limited commons.²⁷⁰ This legal apparatus supervises the activities of a transnational network of private actors (primarily the technologists who actually develop the software) and also serves to mediate between the collaborative enterprise and the rest of society. The legal apparatus consists of a family of IP licenses, based on specific principles, which govern both the iterative development of the software and its potential uses.²⁷¹

Over time, the open source software community has also developed governance institutions, including primarily the activities of the Open Source Initiative²⁷² and the Free Software Foundation.²⁷³ These organizations certify licenses in accordance with agreed-upon principles, which differ somewhat. The Free Software Foundation maintains the widely used copyleft GPL license, while the Open Source Initiative has certified a number of different licenses,²⁷⁴ and maintains trademark protection for the “Open Source Initiative Approved” moniker and for the initiative’s symbol. Both organizations also engage in broader policy and

²⁶⁹ See, e.g., WEBER, *supra* note 37, at 88–89, 166–71, 186–89; Steven Weber, *Patterns of Governance in Open Source*, in OPEN SOURCES 2.0, at 361–72 (DiBona, Cooper & Stone eds., 2006).

²⁷⁰ See, e.g., WEBER, *supra* note 37, at 179–85 (discussing the role of open source licenses as de facto constitutions).

²⁷¹ *Id.* at 180.

²⁷² Open Source Initiative, <http://www.opensource.org> (last visited Nov. 4, 2008).

²⁷³ Free Software Foundation, <http://www.fsf.org> (last visited Nov. 4, 2008).

²⁷⁴ See, e.g., Dusollier, *supra* note 12, at 1398–1400 (discussing the “schism” between Free Software Foundation and Open Source Initiative).

advocacy activities.

These organizations, though non-governmental, provide models of governance of a widely dispersed and transnational community of developers and users. Perhaps even more than governments, they are sensitive to concerns of legitimacy in the eyes of their constituents, since the option of exit (known in the open source world as “forking”) is much more easily exercised in cyberspace. These legitimacy concerns have given rise to procedures reminiscent of typical administrative law.²⁷⁵ For example, the most recent release of the GPL copyleft license raised a great deal of controversy.²⁷⁶ In an effort to manage this controversy, Richard Stallman, whose Free Software Foundation “blesses” the license, held an eighteen-month period of what was essentially public “notice and comment” rulemaking before releasing the finalized version.²⁷⁷

While these governance mechanisms have been highly successful and may remain adequate, as these modes of innovation take on increasing economic and social importance, it also becomes more important to manage the boundaries between these projects and both the proprietary world and the public domain. It is not necessarily clear that the technologists involved in the governance of open and collaborative projects will be sensitive to the possible external impacts of their practices. As legal and organizational models for open and collaborative innovation proliferate, it may become more important to have broader public input into the forms they take. Since many of these collaborations are quintessentially transnational, these governance issues are unavoidably global despite their roots in local contract and licensing law.

It is thus possible that international bodies such as WIPO will be called upon to play a role in helping to shape the landscape in which this private ordering takes place so that the governance of user innovation and open and collaboration innovation takes into account broader public values. The same kinds of issues concerning the balance between harmonization and international diversity that arise in considering TRIPS exceptions are likely to arise in the governance of the products of open and collaborative innovation processes as well. A re-imagined WIPO focused on broad-based consideration of innovation policy would be alert to these issues.

²⁷⁵ Indeed, these procedures are to some extent a model and proof of concept for the Internet-enabled global notice and comment procedure proposed above.

²⁷⁶ E.g., Charles Babcock, *The Controversy Over GPL 3*, INFO. WEEK (Mar. 17, 2007), available at <http://www.informationweek.com/news/software/linux/showArticle.jhtml?articleID=198001444&pgno=1&queryText=&isPrev=>.

²⁷⁷ See Free Software Foundation, <http://gplv3.fsf.org/> (last visited Nov. 4, 2008), for press releases and archives of the process for debating the revised license.

V. CONCLUSION

We stand at what is probably only the beginning of a flowering of new and emergent innovation practices facilitated by developments in communication technology. Yet, we confront these evolving practices with a rigid and outdated international innovation policy regime. The main message of this Article is that it is high time to consider seriously both how to accommodate the user innovation and open and collaborative innovation practices that are already with us, and how to avoid repeating the mistake of institutionalizing any particular approach to innovation in a difficult-to-change international instrument. In doing so, we must also meet the need for sufficient harmonization to allow us to reap the benefits of globally distributed and diverse innovative practices.

In this Article, I suggest that we seek to deploy an administrative-type approach to cope with emerging innovation paradigms. To that end, I propose that WIPO be re-imagined as a broad-based innovation policy organization, at a minimum through the development and adoption of an Innovation Policy Agenda, and perhaps eventually through amendment of TRIPS to permit WIPO to serve as an interpretive “agency” under a more formal administrative approach to IP law exceptions. I also suggest that WIPO provide a forum for considering issues of licensing and competition law raised by the governance of collaborative innovation projects and their boundaries with proprietary models on the one hand and the public domain on the other. Primarily, this Article seeks to encourage an expanded dialogue in global innovation policy which takes into account emerging innovation paradigms.