DOES IP NEED IP? ACCOMMODATING INTELLECTUAL PRODUCTION OUTSIDE THE INTELLECTUAL PROPERTY PARADIGM

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INTRODUCTION

Arguments for strong intellectual property protection proceed on the assumption that an exclusive right (freedom from free riders) is necessary to generate the incentives that encourage intellectual production. However, recent events suggest that that this assumption is questionable. Many creative endeavors are flourishing without strong intellectual property protection. Examples include fashion, stand-up comedy, magic, cuisine, and software (consider Linux, Apache, and Firefox).[1] Academic research has long been conducted under a sharing regime, and even after the Bayh-Dole Act permitted universities to claim patent rights in faculty inventions,[2] the Mertonian norm of communalism continues to exert a strong influence over academic practices.[3] And as Eric von Hippel has amply demonstrated, users

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[1] *See, e.g.*, Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687 (2006); Dotan Oliar & Christopher Sprigman, *There's No Free Laugh (Anymore): The Emergence of Intellectual Property Norms and the Transformation of Stand-Up Comedy*, 94 VA. L. REV. 1787 (2008); Jacob Loshin, *Secrets Revealed: Protecting Magicians' Intellectual Property Without Law*, *in* LAW AND MAGIC: A COLLECTION OF ESSAYS 123 (Christine A. Corcos ed., 2010); Christopher J. Buccafusco, *On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be Per Se Copyrightable?*, 24 CARDOZO ARTS & ENT. L.J. 1121 (2007); Josh Lerner & Jean Tirole, *The Economics of Technology Sharing: Open Source and Beyond*, J. ECON. PERSP., Spring 2005, at 99.

[2] 35 U.S.C. §§ 200-212 (2006).

[3] Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, *in* UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY 93 (Advances in the Study of Entrepreneurship, Innovation and Economic Growth Vol. 16, Gary D. Libecap ed., 2005); Fiona Murray et al., *Of Mice and Academics: Examining the Effect of Openness on Innovation* (Nat'l Bureau of Econ. Research,

generate and share the fruits of their creativity in contexts as varied as extreme sports, surgery, library science, and commercial high-tech manufacturing.[4]

Now that the existence of these robust forms of production has been recognized, it is tempting to argue that traditional intellectual property regimes should be abolished.[5] After all, intellectual property imposes exclusive rights on knowledge, which would otherwise be publicly accessible. Exclusivity thus raises the costs of both innovating and of enjoying the benefits of innovation. It also produces deadweight losses.[6] While intellectual property law may have been a necessary organizational tool at a time when coordinating workers along a value chain was difficult,[7] the Internet can make collaboration easy.[8] As important, proprietary models may inhibit open development. For-profit commercializers may crowd out norms of openness.[9] Even if they do not, a dual regime can be hard to maintain. In the proprietary realm, intellectual property infringement claims are often forestalled or settled because both parties have rights to assert (or cross-license); since open innovation is not protected, developers operate and litigate at a distinct disadvantage.[10]

Working Paper No. 14819, 2009), *available at* http://www.nber.org/papers/w14819.

4 ERIC VON HIPPEL, DEMOCRATIZING INNOVATION (2005); Jeroen P.J. de Jong & Eric von Hippel, *Transfers of User Process Innovations to Process Equipment Producers: A Study of Dutch High-Tech Firms*, 38 RES. POL'Y 1181 (2009); Fred Gault & Eric von Hippel, *The Prevalence of User Innovation and Free Innovation Transfers: Implications for Statistical Indicators and Innovation Policy* (MIT Sloan Sch. of Mgmt. Research Paper No. 4722-09, 2009), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1337232.

5 Particularly suggestive is an experiment conducted by Andrew W. Torrance & Bill Tomlinson, *Patents and the Regress of Useful Arts*, 10 COLUM. SCI. & TECH. L. REV. 130 (2009). In a simulation comparing invention in a patent-free universe, a mixed open and patent universe, and a patent-only universe, the completely open system produced far more unique inventions than did the other two.

6 *See, e.g.*, WILLLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 16-21 (2003).

7 *See, e.g.*, Sean M. O'Connor, *IP Transactions as Facilitators of the Globalized Innovation Economy*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY (Rochelle C. Dreyfuss et al. eds., forthcoming 2010).

8 *See, e.g.*, YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006); *cf.* Rochelle Cooper Dreyfuss, *Collaborative Research: Conflicts on Authorship, Ownership, and Accountability*, 53 VAND. L. REV. 1161 (2000) (suggesting that intellectual property rules must adapt to changes in the propensity to collaborate).

9 *See, e.g.*, Paul A. David, *The Economic Logic of "Open Science" and the Balance Between Private Property Rights and the Public Domain in Scientific Data and Information: A Primer* (Stanford Inst. for Econ. Policy Research, Discussion Paper No. 02-30, 2003) *available at* http://129.3.20.41/eps/dev/papers/0502/0502006.pdf; Siobhán O'Mahony & Fabrizio Ferraro, *Managing the Boundary of an 'Open' Project* (IESE Bus. Sch., Univ. of Navarra, Working Paper No. 537, 2004), *available at* http://www.iese.edu/research/pdfs/DI-0537-E.pdf.

10 *See, e.g.*, Ronald J. Mann, *Commercializing Open Source Software: Do Property Rights Still Matter?*, 20 HARV. J.L. & TECH. 1, 3 (2006); Jonathan Zittrain, *Normative Principles for Evaluating Free and Proprietary Software*, 71 U. CHI. L. REV. 265 (2004).

The time is thus ripe to consider whether and when intellectual property rights are needed. Part I of this Article provides a background on intellectual property law and open innovation. Part II develops a theme I introduced in response to a paper by Kal Raustiala and Chris Sprigman on fashion,[11] where I suggested that there are limits to creative production outside the intellectual property paradigm.[12] Ostensibly, open systems are sometimes functionally dependent on copyright, patent, trademark, or trade secrecy law. The operation of these systems can also be highly contingent—sometimes on the innovative industry at issue or the technological infrastructure supporting it, sometimes on the sensibilities of particular individuals. Much of the theoretical work treats the education of creative workers as exogenous to the problem of innovation, but the calculus can vary once the need to motivate the acquisition of human capital is taken into account. There are also normative problems: Open innovation may be non-optimal (too little *or* too much), it may lead to undesirable strategies for maintaining a competitive advantage, and it can be exploitative of knowledge workers. Part III therefore starts from the proposition that intellectual property rights will not soon disappear. It is intended to contribute to a new conversation on how intellectual property law ought to change in order to accommodate and sustain what might be called IP without IP (Intellectual Production without Intellectual Property).[13]

I. BACKGROUND

A. *Intellectual Property*

Since the end of the Second World War, an astonishing level of innovation has taken place. With advances in such fields as electronics, biotechnology, computer science, information technology, materials science, remote monitoring and imaging, digitization, and networking technologies, the so-called Third Industrial Revolution has ushered in a "Knowledge Economy" heavily dependent on the development of information and information goods.[14] As in the first two Industrial

11 *See* Raustiala & Sprigman, *supra* note 1.

12 Rochelle Dreyfuss, *Fragile Equilibria*, VA. L. REV. IN BRIEF (2007), http://www.virginialawreview.org/inbrief.php?s=inbrief&p=2007/01/22/dreyfuss.

13 *See also* Katherine J. Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467 (2008).

14 *See, e.g.*, JANET ABBATE, INVENTING THE INTERNET (1999); Philip Ball, *Introduction* to J.E. GORDON, THE NEW SCIENCE OF STRONG MATERIALS OR WHY YOU DON'T FALL THROUGH THE FLOOR (2006), *available at* http://press.princeton.edu/chapters/i8225.html; David C. Mowery, Plus ca change*: Industrial R&D in the "Third Industrial Revolution,"* 18 INDUS. & CORP. CHANGE 1 (2009), *available at* http://icc.oxfordjournals.org/cgi/reprint/18/1/1; Michael

Revolutions,[15] the advances made during this revolution can be costly to perfect and commercialize, and—especially in their earliest stages—these developments can represent rather risky investments. While many new fields began with government funding (either direct or channeled through universities),[16] government support suffers from many of the same disadvantages as other forms of patronage. Creators must curry favor with those who award grants, and progress is hostage to the quality of the grant makers' choices.[17] In cases where support extends only to initial discovery and not to later efforts at commercialization, there is little assurance of adequate diffusion.[18]

In the first two Industrial Revolutions, the problem of motivating investment in the face of potential free riders was solved by adopting intellectual property laws.[19] These laws protect creators and investors from those who would copy expensive innovations and then compete down the price to a point at which the initial investment cannot be recouped. As a result, they foster both disclosure and investment in creative production. Given their provenance, however, these laws are not necessarily well-tailored for the advances of today. They may have worked well for the mechanicals, small reactive molecules, physical processes, and printed publications that characterized earlier eras of innovation, but they are harder to implement when value resides mainly in pure informational content such as electronic signals, genetic code, and computer programs.[20]

As firms began to realize how vulnerable their assets were, demands for new forms of intellectual property rights exploded. In the

Pidwirny, *Remote Sensing*, THE ENCYCLOPEDIA OF EARTH (2009), http://www.eoearth.org/article/Remote_sensing.

15 The first Industrial Revolution, which took place in the middle of the eighteenth century, is associated with the discovery of machines such as the steam engine and cotton gin, which led to industrialization. The second, at the end of the nineteenth century, was marked by new forms of transportation (the railway), the use of electrical power, and improvements in industrial processes (such as developments in steel production). *See* PETER N. STEARNS, THE INDUSTRIAL REVOLUTION IN WORLD HISTORY (2d ed. 1998); Bradford L. Smith, *The Third Industrial Revolution: Policymaking for the Internet*, 3 COLUM. SCI. & TECH. L. REV. 1, 2-3 (2001).

16 *See* ABBATE, *supra* note 14; Mowery, *supra* note 14.

17 *See, e.g.*, Alina Ng, *The Social Contract and Authorship: Allocating Entitlements in the Copyright System*, 19 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 413, 418 (2009) (citing Sir Thomas Babington Macaulay, Speech Delivered in the House of Commons (Feb. 5, 1841), *in* FOUNDATIONS OF INTELLECTUAL PROPERTY 310 (Robert Merges & Jane Ginsburg eds., 2004)).

18 *See, e.g.*, Gary Pulsinelli, *Share and Share Alike: Increasing Access to Government-Funded Inventions Under the Bayh-Dole Act*, 7 MINN. J.L. SCI. & TECH. 393 (2006).

19 The U.S. Constitution, which gives Congress the authority to promote progress through the recognition of exclusive rights, U.S. CONST. art. I, § 8, is an example of this strategy.

20 *See, e.g.*, Microsoft Corp. v. AT&T Corp., 550 U.S. 437 (2007) (struggling with the question of when informational content is a "component" within the meaning of the Patent Act); Rescuecom Corp. v. Google, Inc., 562 F.3d 123 (2d Cir. 2009) (asking whether an internet search engine's "use" of a trademark is covered by the Lanham Act); *In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008) (determining when the manipulation of information qualifies as a patentable process), *cert. granted sub nom.* Bilski v. Doll, 129 S. Ct. 2735 (2009).

last two decades, legislatures and judges in the United States increased the term of copyright protection and enhanced rights over digitized products.[21] Trademark protection was transformed from a mechanism for preventing confusion into control over most aspects of trademark use, including use on the Internet.[22] The domain of patents was extended to encompass software and business methods,[23] genetically engineered microorganisms,[24] and even sports moves and legal strategies.[25] In other countries and through international law, exclusivity now reaches performances,[26] broadcasts,[27] sporting events,[28] databases,[29] plant varieties,[30] geographic indications, industrial designs, and topographies.[31] New types of protection—including rights over traditional knowledge, folklore, genetic resources, and celebrity images—are on the road to recognition.[32]

As rights have proliferated, so too have problems. Since knowledge is cumulative, exclusive rights have always had the paradoxical effect of slowing progress in the name of promoting it.

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[21] Sonny Bono Copyright Term Extension Act, Pub. L. No. 105-298, § 102, 112 Stat. 2827, 2827 (1998) (codified at 17 U.S.C. §§ 301-304 (2006)); Digital Millenium Copyright Act, Pub. L. No. 105-304, 112 Stat. 2863 (1998) (codified as amended at 17 U.S.C. §§ 1201-1205 (2006)).

[22] Federal Trademark Dilution Act of 1995, Pub. L. No. 104-98, 109 Stat. 985 (1996) (preventing dilution); Trademark Dilution Revision Act of 2006, Pub. L. No. 109-312, 120 Stat. 1730 (same); Intellectual Property and Communications Omnibus Reform Act of 1999, Pub. L. No. 106-113, § 1000(a)(9), 113 Stat. 1501, 1536 (codified at 15 U.S.C. § 8131 (2006)) (preventing cybersquatting).

[23] State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998).

[24] Diamond v. Chakrabarty, 447 U.S. 303 (1980).

[25] *See, e.g.*, U.S. Patent No. 5,616,089 (filed Mar. 29, 1996) (golf putting method); U.S. Patent No. 6,567,790 (filed Dec. 1, 1999) (grantor retained annuity trust). *See generally* Michal Risch, *Everything Is Patentable*, 75 TENN. L. REV. 591 (2008).

[26] World Intellectual Property Organization Performances and Phonograms Treaty, Dec. 20, 1996, 36 I.L.M. 76 (1997), *available at* http://www.wipo.int/export/sites/www/treaties/en/ip/wppt/pdf/trtdocs_wo034.pdf.

[27] Council Directive 93/83, 1993 O.J. (L 248) (EC).

[28] Owen J. Morgan, *Ambush Marketing—New Zealand Is in Search of Events to Host*, 30 EUR. INTELL. PROP. REV. 454 (2008); Owen J. Morgan, *Legislating to Control Ambush Marketing—The New Zealand Model*, 19 AUSTL. INTELL. PROP. J. 1 (2008).

[29] Council Directive 96/9, 1996 O.J. (L 77) (EC).

[30] International Convention for the Protection of New Varieties of Plants, Dec. 2, 1961, 33 U.S.T. 2703, 815 U.N.T.S. 89; *see also* U.S. Plant Variety Protection Act of 1970, 7 U.S.C. §§ 2321-2582 (2006).

[31] Agreement on Trade-Related Aspects of Intellectual Property Rights arts. 22-24 (geographical indications), 25-26 (industrial designs), 35-38 (layouts), Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 108 Stat. 4809, 1869 U.N.T.S. 299, *available at* http://www.wto.org/english/docs_e/legal_e/27-trips.pdf.

[32] World Intellectual Prop. Org. [WIPO], *Matters Concerning Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore—An Overview*, WIPO Doc. WIPO/GRTKF/IC/1/3 (Mar. 16, 2001); Roberta Rosenthall Kwall, *Fame*, 73 IND. L.J. 1 (1997); Sabrina Safrin, *Hyperownership in a Time of Biotechnological Promise: The International Conflict to Control the Building Blocks of Life*, 98 AM. J. INT'L L. 641 (2004); Katie Thomas, *College Stars See Themselves in Video Games, and Pause to Sue*, N.Y. TIMES, July 4, 2009, at A1.

Second-comers must pay the costs associated with identifying and negotiating with the holders of rights in the advances they seek to build upon. In the Knowledge Economy, this difficulty is magnified. Patent rights have moved upstream to cover fundamental building blocks of nature. These patents dominate such a broad swath of inventive opportunities that it is not clear whether right holders have the cognitive capacity to fully mine their claims.[33] The product-to-right ratio has also changed. In earlier eras, products were typically associated with one intellectual property right; now, products (and the products with which they must interoperate) involve orders of magnitude more rights. For example, bringing a video game to market can require licenses to copyrights, trademarks, celebrity images—and to hundreds of patented software subroutines.[34] In that environment, costs multiply and hold outs become increasingly likely.[35] The advent of new players such as universities and rights aggregators introduces further complications, for it is more difficult to reach agreements on licenses and settlements when the participants' incentives diverge radically.[36] For some advances, comprehensiveness is particularly important: Personalized medicine, for example, will not be a reality until it is possible to analyze the entire genome, including parts to which patent rights are attached.[37] Similarly, full-text searching of the world's literature requires the ability to digitize, search, and reproduce all copyrighted works.[38] In such cases, the opportunities for rent seeking are extraordinary.

Needless to say, there are many proposals for dealing with these problems, but they all have limitations. Strong fair use and research

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[33] Rochelle Dreyfuss, *Unique Works/Unique Challenges at the Intellectual Property/Competition Law Interface*, *in* EUROPEAN COMPETITION LAW ANNUAL 2005: THE INTERACTION BETWEEN COMPETITION LAW AND INTELLECTUAL PROPERTY LAW 119 (Claus-Dieter Ehlermann & Isabela Atanasiu eds., 2007).

[34] For a genetics example, see David W. Opderbeck, *The Penguin's Genome, or Coase and Open Source Biotechnology*, 18 HARV. J.L. & TECH. 167 (2004).

[35] *See generally* Graeme B. Dinwoodie & Rochelle Cooper Dreyfuss, *Intellectual Property Law and the Public Domain of Science*, 7 J. INT'L ECON. L. 431 (2004); *see also* eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 395-97 (2006) (Kennedy, J., concurring).

[36] *See, e.g.*, Rebecca S. Eisenberg, *Bargaining Over the Transfer of Proprietary Research Tools: Is This Market Failing or Emerging?*, *in* EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 223 (Rochelle Dreyfuss et al. eds., 2001) [hereinafter EXPANDING THE BOUNDARIES]; John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111 (2007).

[37] Less dramatically, but equally true, multiplex testing for specific diseases will require comprehensive testing of all of the genes related to each disease. *See generally* Lori Andrews & Erin Shaughnessy Zuiker, *Ethical, Legal, and Social Issues in Genetic Testing for Complex Genetic Diseases*, 37 VAL. U. L. REV. 793 (2003).

[38] Diane Leenheer Zimmerman, *Cultural Preservation: Fear of Drowning in a Licensing Swamp*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY, *supra* note 7; Michael J. Madison, *Information Governance*, 25 J. MARSHALL J. COMPUTER & INFO. L. 673 (2009).

exemptions would lower the cost of developing new products.[39] But these defenses are not available at the time of commercialization and in any event would not likely cover products aimed specifically at research (research tools). Many observers see collective rights organizations, clearing houses, and pooling as solutions to the transaction-cost problem.[40] Standard-setting organizations can similarly exert pressure on members to authorize necessary uses at reasonable rates.[41] However, because these arrangements require deals among rivals, they can easily be used to restrain competition.[42] Furthermore, pools are attractive to right holders that cannot exploit their assets individually; since many Knowledge Economy rights can be licensed on their own, there may be inadequate incentives to participate in collective management schemes. Another approach is to use compulsory licensing and other liability rules,[43] but they can be complex to administer and are often perceived as undermining the value of the rights in question. Given this context, it is easy to see why observers have begun to ask whether rights are too easily awarded[44]—and whether they are needed at all.

B. *Open Innovation*

The notion that intellectual production can occur in the absence of intellectual property rights is not new. In the middle of the last century, Robert Merton conducted an extensive analysis of academic science and demonstrated how a small set of norms—universalism, communalism, disinterestedness, and organized skepticism—allowed science to flourish in an open and cumulative environment (albeit one largely

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39 *See, e.g.*, Zimmerman, *supra* note 38; Maureen A. O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 COLUM. L. REV. 1177 (2000).

40 *See, e.g.*, Andrews & Zuiker, *supra* note 37; Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293 (1996); Geertrui Van Overwalle et al., *Models for Facilitating Access to Patents on Genetic Inventions*, 7 NATURE REVS. GENETICS 143 (2006), *available at* http://www.nature.com/nrg/journal/v7/n2/full/nrg1765.html. An example of patent management through pooling is provided by Public Intellectual Property Resource for Agriculture (PIPRA), which combines patents in the agricultural sector to facilitate the development of new plants. *See* About PIPRA, http://www.pipra.org/about (last visited Mar. 20, 2010).

41 *See, e.g.*, Stacey L. Dogan & Mark A. Lemley, *Antitrust Law and Regulatory Gaming*, 87 TEX. L. REV. 685 (2009).

42 *See, e.g.*, Carl Shapiro, *Setting Compatibility Standards: Cooperation or Collusion?*, *in* EXPANDING THE BOUNDARIES, *supra* note 36, at 81.

43 *See, e.g.*, J.H. Reichman, *Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation*, 53 VAND. L. REV. 1743 (2000).

44 *See, e.g.*, Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc., 548 U.S. 124, 125-39 (2006) (Breyer, J., dissenting) (disagreeing with the Court's dismissing writ of certiorari as improvidently granted and willing to hold certain business methods unpatentable); Diane Leenheer Zimmerman, *It's an Original! (?): In Pursuit of Copyright's Elusive Essence*, 28 COLUM. J.L. & ARTS 187 (2005).

supported by government funding).[45] In the early 1980s, Robert Allen identified a similar phenomenon within the private arena.[46] Studying the nineteenth century English iron industry, he found that competing firms in one region of England shared information about furnace design. Although these firms lost commercial advantage over one another, the shared information led to rapid improvements in the local technology and increased market share vis-à-vis remote competitors.

Contemporary interest in the potential for nonproprietary development was, however, largely sparked by the success of the free software movement. As Yochai Benkler demonstrated in his seminal article, *Coase's Penguin*,[47] networking on the Internet makes it possible for a multiplicity of contributors to coordinate their efforts and produce work of astonishing complexity. Benkler argued that peer-production projects like Linux, Apache, Perl, and BIND have considerable advantages over the kinds of production sustained by traditional mechanisms. Contributors self-select, and thus there is no need to guess whom to hire or whose work to support; participants already know the needs of the market because they largely form the marketplace. Projects develop rapidly because a diversity of knowledge and experience is brought to bear on such issues as identifying and fixing problems. Best of all, once a project is developed there are no high prices, reduced output, deadweight losses, or holdouts. Users have full freedom to customize the work to their own needs.

In the wake of *Coase's Penguin*, the legal literature has erupted with case studies of open innovation communities. Katherine Strandburg elaborated on the habits of "homo scientificus," researchers who share their findings and their research tools in an effort to discover how the world works.[48] In a generalization of that concept, Eric von Hippel is engaged in an extensive investigation of what he dubs "user innovation"—innovations led by users for their own needs and circulated to others in order to improve performance and lower the costs of production.[49] Outside the user category, Kal Raustiala and Christopher Sprigman showed how such industries as fashion, furniture,

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45 *See generally* Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177 (1987) (citing many of Merton's works, including ROBERT K. MERTON, *The Normative Structure of Science*, *in* THE SOCIOLOGY OF SCIENCE: THEORETICAL AND EMPIRICAL INVESTIGATIONS 267 (Norman W. Storer ed., 1973) (originally published as Robert K. Merton, *Science and Technology in a Democratic Order*, 1 J. LEGAL & POL. SOC. 115 (1942))).

46 Robert C. Allen, *Collective Invention*, 4 J. ECON. BEHAV. & ORG. 1 (1983).

47 Yochai Benkler, *Coase's Penguin, or, Linux and* The Nature of the Firm, 112 YALE L.J. 369 (2002).

48 Strandburg, *supra* note 3.

49 *See* Pamela D. Morrison, John H. Roberts & Eric von Hippel, *Determinants of User Innovation and Innovation Sharing in a Local Market*, 46 MGMT. SCI. 1513 (2000); sources cited *supra* note 4.

perfume, and hair styling actually benefit from what these authors call "copyright's negative space."[50] Other studies include investigations of cuisine,[51] magic,[52] stand-up comedy,[53] music,[54] and fan fiction.[55] Looking back, it is now possible to discern similar dynamics at play throughout modern history: in the developments of Bessemer steel and computer hardware;[56] in animal and plant breeding;[57] in traditional knowledge communities;[58] and in quilting and knitting.[59]

These case studies have encouraged innovation theorists to consider ways to shift more (if not all) creative production into an open paradigm.[60] On the assumption that innovation policy is driven at least in part by quantifiable measurements, Eric von Hippel and his coauthors are engaged in an effort to identify statistical indicators of the gains derived from user innovation.[61] Organizational theorists such as Siobhán O'Mahony are searching for managerial strategies for organizing and maintaining open communities.[62]

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50 Raustiala & Sprigman, *supra* note 1, at 1762.

51 Emmanuelle Fauchart & Eric A. von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 ORG. SCI. 187 (2008); *see also* Buccafusco, *supra* note 1; THE RECIPE READER: NARRATIVES, CONTEXTS, TRADITIONS (Janet Floyd & Laurel Forster eds., 2003).

52 Loshin, *supra* note 1.

53 Oliar & Sprigman, *supra* note 1.

54 Keith Aoki, *Distributive and Syncretic Motives in Intellectual Property Law (with Special Reference to Coercion, Agency, and Development)*, 40 U.C. DAVIS L. REV. 717 (2007); Mark F. Schultz, *Fear and Norms and Rock & Roll: What Jambands Can Teach Us About Persuading People to Obey Copyright Law*, 21 BERKELEY TECH. L.J. 651 (2006).

55 Rebecca Tushnet, *Legal Fictions: Copyright, Fan Fiction, and a New Common Law*, 17 LOY. L.A. ENT. L. REV. 651, 657 n.23 (1997).

56 Peter B. Meyer, *Episodes of Collective Invention* (U.S. Bureau of Labor Statistics, Working Paper No. 368, 2003), *available at* http://www.bls.gov/ore/pdf/ec030050.pdf.

57 Daniel J. Kevles, *Patents, Protections, and Privileges: The Establishment of Intellectual Property in Animals and Plants*, 98 ISIS 323 (2007).

58 Rakesh Agrawal, *Small Farms, Women and Traditional Knowledge—Experiences from Kumaon Hills* (2002), http://conference.ifas.ufl.edu/ifsa/papers/c/c1.doc (last visited Mar. 20, 2010); *cf.* Stephen D. Osborne, *Protecting Tribal Stories: The Perils of Propertization*, 28 AM. INDIAN L. REV. 203, 222 (2003) (noting the conflict between communal ideals and intellectual property protection).

59 Debora Halbert, *Feminist Interpretations of Intellectual Property*, 14 AM U. J. GENDER SOC. POL'Y & L. 431, 443 (2006).

60 *See, e.g.*, Stephen M. Maurer, Arti Rai & Andrej Sali, *Finding Cures for Tropical Diseases: Is Open Source an Answer?*, 1 PLOS MED. 183 (2004), http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0010056 (discussing open-source biomedical research); Arti Rai & James Boyle, *Synthetic Biology: Caught Between Property Rights, the Public Domain, and the Commons*, 5 PLOS BIOLOGY 0389 (2007), http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.0050058; David E. Winickoff, Krishanu Saha & Gregory D. Graff, *Opening Stem Cell Research and Development: A Policy Proposal for the Management of Data, Intellectual Property, and Ethics*, 9 YALE J. HEALTH POL'Y L. & ETHICS 52 (2009).

61 *See* Gault & von Hippel, *supra* note 4.

62 O'Mahony & Ferraro, *supra* note 9.

As important, lawyers and social scientists are attempting to distill from the case studies the conditions under which these communities thrive and the norms and procedures that motivate participation.[63] For example, Raustiala and Sprigman argue that the fashion industry flourishes because copying popularizes particular styles and then undermines their status-value, creating demand for successive waves of designs.[64] Von Hippel, in a study of cuisine, posits three social norms animating that community: (1) a chef must not copy another chef's recipe innovation exactly; (2) if a chef reveals recipe-related secret information to a colleague, that chef must not pass the information on to others without permission; and (3) colleagues must credit developers of significant recipes (or techniques) as the authors of that information.[65] Dotan Oliar and Chris Sprigman's investigation of stand-up comedy identifies an interest in originality, backed up by strong reputational and employment sanctions.[66] Catherine Fisk has demonstrated the role that attribution plays in a variety of pursuits, including academia,[67] and other authors have emphasized personal satisfaction in learning, discovering, and contributing,[68] as well as furthering specific social causes.[69]

Theory is also being translated into practice. Wikipedia has famously created an encyclopedia through open innovation, and there are now wikis in many fields of knowledge.[70] The Massachusetts Institute of Technology maintains an open resource for classroom materials.[71] Within science, there are many important open (or quasi open) databases, including the protein data bank,[72] a resource for open-source software,[73] and a registry for synthetic biology parts.[74] Even the

63 *See, e.g.*, Lerner & Tirole, *supra* note 1; Josh Lerner & Jean Tirole, *Some Simple Economics of Open Source*, 50 J. INDUS. ECON. 197, 217-20, 224-27 (2002) [hereinafter Lerner & Tirole, *Some Simple Economics*]; Jeffrey A. Roberts et al., *Understanding the Motivations, Participation, and Performance of Open Source Software Developers: A Longitudinal Study of the Apache Projects*, 52 MGMT. SCI. 984 (2006).

64 Raustiala & Sprigman, *supra* note 1.

65 Fauchart & von Hippel, *supra* note 51, at 188.

66 Oliar & Sprigman, *supra* note 1.

67 Catherine L. Fisk, *Credit Where It's Due: The Law and Norms of Attribution*, 95 GEO. L.J. 49 (2006).

68 Strandburg, *supra* note 3, at 101; Roberts et al., *supra* note 63, at 986-87; *see also* David, *supra* note 9, at 3-4 (discussing rewards such as "moral possession" of findings, esteem, and recognition).

69 *See* Miguel Helft, *For Mozilla and Google, Group Hugs Get Tricky*, N.Y. TIMES, July 26, 2009, at BU1 ("For Mozilla and its millions of fans, Firefox is not just cool software but also a cause: to ensure that no company, whether Microsoft, Google or anyone else, can tilt the Web to its advantage by tweaking its browser to favor its products or applications.").

70 *See* Wiki.com, http://www.wiki.com (last visited Mar. 20, 2010).

71 *See* MIT OpenCourseWare, http://ocw.mit.edu (last visited Mar. 20, 2010).

72 RCSB Protein Data Bank, http://www.rcsb.org (last visited Mar. 20, 2010). This database is open in the sense that information about proteins is available through it. However, entries may be patented and thus unavailable for use.

73 *See* Press Release, Brookhaven Nat'l Lab., Brookhaven Lab to Hold "Open Source/Open Science" Conference, Oct. 2 (Sept. 8, 1999), http://www.bnl.gov/bnlweb/pubaf/pr/1999/

business of examining patents may prove susceptible to this type of production.[75] Because of concerns that new and aggressive forms of intellectual property protection could allow materials in the public domain to be easily privatized (through digital rights management techniques, for example),[76] some shared advances have been conceptualized as a commons, and legal devices have been adopted to maintain—or in the case of viral licensing, force—availability for those participating in the open community. The "General Public License" (GPL), possibly the best known viral license, permits licensees to use the licensed work and to modify it, so long as the modification, if distributed, is also subject to the same open-use license.[77] The Creative Commons offers a variety of licenses, allowing creators to choose the degree to which their work can be utilized and the terms on which it can be shared.[78] A parallel Science Commons is also under construction.[79] Finally, there is an overflow of somewhat less coordinated user-generated content, including fan fiction and the free culture available on social networking cites and services such as YouTube.[80]

II. DOES IP NEED IP?

Given the enthusiasm for open production and its clear success in so many endeavors, the obvious question is whether intellectual property rights are ever necessary. As suggested earlier, there would be many benefits to shifting from the traditional intellectual property system to a fully open environment—prices would be lower, output and

bnlpr090899.html.

74 *See* Registry of Standard Biological Parts, http://partsregistry.org (last visited Mar. 20, 2010). *See generally* Stephen M. Maurer, *Open Source Drug Discovery: Finding a Niche (or Maybe Several)*, 76 UMKC L. REV. 405 (2007).

75 *See, e.g.*, CTR. FOR PATENT INNOVATIONS, N.Y. LAW SCH., PEER-TO-PATENT: SECOND ANNIVERSARY REPORT (2009), http://dotank.nyls.edu/communitypatent/CPI_P2P_YearTwo_hi.pdf; Peer-to-Patent Australia, http://www.peertopatent.org.au (last visited Mar. 20, 2010).

76 *See, e.g.*, Stephen M. Maurer & Suzanne Scotchmer, *Open Source Software: The New Intellectual Property Paradigm*, *in* ECONOMICS AND INFORMATION SYSTEMS 285, 302-03 (Handbooks in Information Systems Vol. 1, Terrence Hendershott ed., 2006); Opderbeck, *supra* note 34, at 176-77; J.H. Reichman & Paul F. Uhlir, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, LAW & CONTEMP. PROBS., Winter/Spring 2003, at 315.

77 *See* GNU Operating System, GNU General Public License (June 29, 2007), http://www.gnu.org/copyleft/gpl.html.

78 *See* Creative Commons, http://creativecommons.org (last visited Mar. 20, 2010).

79 *See* Science Commons, http://sciencecommons.org (last visited Mar. 20, 2010); *see also* International HapMap Project, Registration for Access to the HapMap Project Genotype Database, http://hapmap.ncbi.nlm.nih.gov/cgi-perl/registration (last visited Mar. 20, 2010). *See generally* Opderbeck, *supra* note 34.

80 *See, e.g.*, Debora Halbert, *Mass Culture and the Culture of the Masses: A Manifesto for User-Generated Rights*, 11 VAND. J. ENT. & TECH. L. 921 (2009); Tushnet, *supra* note 55.

choice would be higher, transaction costs would be dramatically reduced, and the possibility of holdouts eliminated.

In addition, there would no longer be friction between open and closed systems. Open innovators would not need to worry about exposing themselves to infringement suits without the ammunition (in the form of defensive rights) to forestall or settle cases. Viral licensing would be unnecessary because there would no longer be a danger of privatization. Nor would there be a risk that markets could tip in favor of an expensive—and heavily advertised—product (say, Windows), even when an open version (like Linux) was available.[81] Other concerns would also abate. Under the current regime, information that is subject to a viral license cannot be easily combined with proprietary information because the holder of the intellectual property right is unlikely to permit the unauthorized dissemination required by the viral license. For scientific information, such as that embodied in genes found in nature, this is a significant issue: Since these sequences cannot be invented around for the purpose of studying natural phenomena, compartmentalization could make it impossible to achieve certain advances.[82] But despite the obvious benefits of depending entirely on an open approach to innovation, there are both practical and normative reasons to be skeptical about its wide adoption.

A. *Practical Problems*

Clearly, there are many open projects that work. There are, however, issues as to whether these approaches are entirely independent of traditional intellectual property rights, whether they are as durable as they appear, and whether they can be generalized to promote the optimal level of progress overall.

1. Dependence on Intellectual Property Rights

One concern is whether these projects are more dependent on traditional intellectual property rights than initially meets the eye—that is, whether open forms of production could survive if legal rights to

[81] Tipping can occur for other reasons as well. For example, one reason Google supports Mozilla is that it is concerned about keeping the web open. *See* Helft, *supra* note 69.

[82] For example, the HapMap started out subject to a strongly viral license; that was later changed because intellectual property holders would not utilize the information. *See* Maurer, *supra* note 74, at 412-13; *cf.* Noam Cohen, *Wikipedia May Be a Font of Facts, but It's a Desert for Photos*, N.Y. TIMES, July 20, 2009, at C1 (noting that photographers cannot combine open and proprietary innovation easily, with the result that Wikipedia lacks illustrations).

exclusivity were eliminated. While the accounts of open innovation systems stress that core outputs—software, scientific discoveries, outfits, jokes, recipes, music—are not *directly* protected by intellectual property rights, a close examination of these practices often reveals fairly strong *indirect* relationships. Most obvious are the projects subject to viral licenses. These instruments are licenses: As such, they require something to license. In the case of software, the subject matter of the license is the copyright in the underlying work; in at least one biology project, it is patent rights.[83] Were intellectual property rights abolished, it might be possible to bind individual recipients to confidentiality-type agreements that limited utilization of the information transferred, but it would likely be impossible to bind remote users to the same obligations.[84] Of course, if intellectual property rights were eliminated, the risk of privatization could diminish and there would be less need to establish a commons. If that were so, then the need for viral licenses would disappear. Other dependencies on IP are not, however, so easily dismissed.

One issue is motivation. As Kathy Strandburg and Eric von Hippel have demonstrated, many open innovators have intrinsic reasons to participate. They derive pleasure from satisfying their curiosity about the world and find that sharing their knowledge allows others to verify it and build upon it.[85] In some cases, disseminating to others permits standardization, improves performance, and lowers prices. In other cases, participants may be working to further social or political goals.[86] These intrinsic motivations do not, however, explain all participation in open projects: Rather, many contributors are inspired extrinsically—and these extrinsic motivations are often highly dependent on intellectual property protection. Thus, many of the areas where innovation is "free" are based on a strong norm of attribution.[87] For example, open source software projects meticulously attribute code to specific programmers and move them along a hierarchy that calibrates supervisory authority to the quality of their contributions.[88] In the proprietary sector, these forms of recognition are not publicly available: Because copyrighted contributions are works for hire, they are attributed to the employer and not the employee.[89] As a result, working in the open community

83 *See* The CAMBIA BiOS License for Plant Enabling Technology, http://www.bios.net/daisy/PELicense/751/1169.html (last visited Mar. 20, 2010).

84 *See* Rai & Boyle, *supra* note 60, at 391-92.

85 *See* VON HIPPEL, DEMOCRATIZING INNOVATION, *supra* note 4, at 124; Strandburg, *supra* note 3; Strandburg, *supra* note 13.

86 *See* Helft, *supra* note 69.

87 *See supra* text accompanying notes 65-66. Plagiarism is, in some sense, the first and foremost academic sin.

88 *See*, *e.g.*, Roberts et al., *supra* note 63.

89 17 U.S.C. § 201(b) (2006).

provides a way for contributors to signal their competence and improve their employment prospects.[90] But since the segment of the market that pays for programmers is largely supported by intellectual property rights, there is reason to question whether, in the absence of an intellectual property regime, there would be such strong interest in participating in open source.

In other areas, the relationship to intellectual property is even more evident. Raustiala and Sprigman make a strong case for why fashion can function in the absence of *copyright*, but they largely ignore the role played by *trademarks*. Yet trademark protection appears to be extremely important in this industry. There are many lawsuits,[91] trademark piracy issues have reached the WTO,[92] and there is a pending treaty focused entirely on issues of piracy.[93] The same indirect dependence is true in other "open" industries. Chefs cannot protect the ingredients of individual recipes, but they can use copyright to protect compilations of recipes and the way that recipes are expressed—and, indeed, many chefs sell copyrighted cookbooks.[94] Chefs also protect the exclusivity of the trade dress in their restaurants.[95] While stand-up comedians may freely share their work in comedy clubs, many of them aspire to put out copyrighted albums, make copyrighted movies, or star in copyrighted television shows.[96] And while peer-to-peer file sharing

90 *See* Lerner & Tirole, *Some Simple Economics*, *supra* note 63, at 216-17.

91 *See, e.g.*, Louis Vuitton Malletier v. Dooney & Bourke, Inc., 454 F.3d 108 (2d Cir. 2006); Louis Vuitton Malletier v. Dooney & Bourke, Inc., 561 F. Supp. 2d 368 (S.D.N.Y. 2008); Tiffany (NJ) Inc. v. eBay, Inc., 576 F. Supp. 2d 457 (S.D.N.Y. 2007); Calvin Klein Trademark Trust v. Wachner, 129 F. Supp. 2d 254 (S.D.N.Y. 2001); *see also* Rob Walker, *The Acceptable Knockoff*, N.Y. TIMES, Dec. 12, 2004, § 6 (Magazine), at 46; Pete Wells, *Chef Sues over Intellectual Property (the Menu)*, N.Y. TIMES, June 27, 2007, at A1; Pete Wells, *Chef's Lawsuit Against a Former Assistant Is Settled Out of Court*, N.Y. TIMES, Apr. 19, 2008, at B1.

92 Panel Report, *China—Measures Affecting the Protection and Enforcement of Intellectual Property Rights*, WT/DS362/R (Jan. 26, 2009).

93 Anti-Counterfeiting Trade Agreement (ACTA): Request for Public Comments, 73 Fed. Reg. 8910 (Feb. 15, 2008). There are also attempts to enact protection for fashion. *See* C. Scott Hemphill & Jeannie Suk, *The Law, Culture, and Economics of Fashion*, 61 STAN. L. REV. 1147, 1155 (2009) ("[We propose a] new right [that] would protect original designs, but only from close copies. Our proposal takes an intermediate stand between permitting free copying of fashion designs and creating a broad right of exclusion.").

94 *See, e.g.*, Bobby Flay: The Official Web Site, http://www.bobbyflay.com (click "Shop"; then click "Cookbooks") (last visited Mar. 20, 2010); GaleGand.com, Gale's Books and Products, http://www.galegand.com/booksandproducts.asp (last visited Mar. 20, 2010); Jean-Georges Vongerichten—Authors—Random House, http://www.randomhouse.com/author/results.pperl?authorid=115931 (last visited Mar. 20, 2010); Mario Batali: Books and Products: Cookbooks, http://www.mariobatali.com/books_products_cookbooks.cfm (last visited Mar. 20, 2010).

95 Two Pesos, Inc. v. Taco Cabana, Inc., 505 U.S. 763 (1992); Fuddruckers, Inc. v. Doc's B.R. Others, Inc., 826 F.2d 837 (9th Cir. 1987); *see also* Corby Kummer, *Half a Loaf*, ATLANTIC MONTHLY, Oct. 2008, at 122 ("When bakers break up, who gets custody of the recipes?"); Adam Sternbergh, *Sweet and Vicious*, N.Y. MAG., Sept. 11, 2005 (discussing the feuds and lawsuits involving Magnolia Bakery, Buttercup Bake Shop, and Little Cupcake).

96 Examples include the recordings of Bob Newhart and Bill Cosby (both of whom later had television shows), the movies of Jerry Lewis and Danny Kaye, and the television shows of Jerry

may cut into the revenues from some of these endeavors,[97] comedians also protect their celebrity images assiduously.[98] Magicians can, of course, try to rely on trade secrecy law.[99]

There is yet another intersection between open projects and intellectual property law. Ron Mann has extensively studied the software sector and finds a symbiotic relationship between proprietary and open systems. The most successful open projects produce platform technologies (such as the operating system Linux) and receive considerable support from firms (like IBM) that develop proprietary technologies that run on the platform. For a proprietary firm, use of open source makes sense because the firm's interest in continuing use of the platform cannot be confounded by a right holder. In addition, because the platform is freely available, it can easily penetrate the market and thus maximize the potential customer base for the proprietary products that run on it. To keep these open platforms going, proprietary firms provide direct financial support, pay salaries to open-source contributors, and permit their own employees to write code for the open source project.[100] There are also other sources of support, including contributions from proprietary firms that write programs to link the open source software with the proprietary applications, as well as from firms (like Red Hat)[101] that offer maintenance services along

Seinfeld and Tim Allen.

97 *Compare* Stan J. Liebowitz, *Will MP3 Downloads Annihilate the Record Industry? The Evidence So Far*, *in* INTELLECTUAL PROPERTY AND ENTREPRENEURSHIP 229 (Advances in the Study of Entrepreneurship, Innovation and Economic Growth Vol. 15, Gary D. Libecap ed., 2004) (concluding that file sharing has contributed to the decline in CD sales), *with* Felix Oberholzer-Gee & Koleman Strumpf, *The Effect of File Sharing on Record Sales: An Empirical Analysis*, 115 J. POL. ECON. 1 (2007) (concluding that file sharing does not reduce CD sales). *See also* Organization for Economic Co-Operation and Development [OECD], Working Party on the Information Economy, *Digital Broadband Content: Music*, OECD Doc. DSTI/ICCP/IE(2004)12/FINAL (Dec. 13, 2005), http://www.oecd.org/dataoecd/13/2/34995041.pdf (summarizing recent surveys and empirical studies of effects of file sharing on CD sales and noting inconclusive and mixed results).

98 Mason v. Jews for Jesus, No. 06 Civ. 6433, 2006 WL 3230279, at *1 (S.D.N.Y. Nov. 8, 2006); Allen v. Nat'l Video, Inc., 610 F. Supp. 612 (S.D.N.Y. 1985); Comedy III Prods., Inc. v. Gary Saderup, Inc., 21 P.3d 797 (Cal. 2001); *see also* C.J. Hughes, *For $5 Million, Woody Allen Agrees to Drop Lawsuit*, N.Y. TIMES, May 18, 2009, at A21.

99 Harrison v. SF Broadcasting, No. Civ. A. 98-1107, 1998 WL 355462 (E.D. La. June 30, 1998); Goldin v. R.J. Reynolds Tobacco Co., 22 F. Supp. 61 (S.D.N.Y. 1938). In many cases, a combination of strategies is utilized. *See, e.g.*, Siobhán O'Mahony, *Guarding the Commons: How Community Managed Software Projects Protect Their Work*, 32 RES. POL'Y 1179 (2003).

100 Mann, *supra* note 10, at 11-13; *see also* John R. Allison et al., *Software Patents, Incumbents, and Entry*, 85 TEX. L. REV. 1579, 1611-12 (2007); Helft, *supra* note 69 (noting that Google paid Mozilla $75 million in 2007, accounting for 88% of Mozilla's budget). For search engine producers like Google, it is important to make sure that there are browsers available that do not disfavor their products.

101 For Red Hat's extensive trademark program, see Red Hat Trademark Guidelines and Policies, http://www.redhat.com/about/companyprofile/trademark (last visited Mar. 20, 2010).

with various proprietary programs.[102] Without these financial props, it is unclear whether open source projects could continue to flourish.

2. Social Structure

As suggested earlier, IP is produced without IP for a broad array of reasons. Although the social structures uncovered in the various case studies are likely capable of promoting innovation across a range of intellectual endeavors, it is far from clear that they would yield optimal levels of creativity in all fields.

Consider, for example, the dynamic Raustiala and Sprigman describe for the fashion industry: Copying "anchors" a style, then makes it obsolete. That works well when there are fads and fans (or, more precisely, fickle fans). Thus, this dynamic can spur development in areas where keeping abreast of trends matters to consumers—but not in areas where stylishness is irrelevant. Similarly, while von Hippel makes an important case for recognizing the power of user innovation, not all users are capable of advancing their own interests. For example, the sick—and even their treating physicians—cannot be counted on to create new medicines and bring them through the regulatory process. The availability of other intrinsic rewards is similarly limited: Presumably, these rewards require activities that are inherently pleasurable. But despite the nomenclature, much "intellectual" production involves a great deal of slogging—boring, repetitive work with an uncertain outcome.[103]

Admittedly, the great advantage of peer production is that it makes even the hard slog possible because it can adjust the level of contribution demanded to the degree of satisfaction available. However, peer production also has rigorous requirements that not every project can fulfill. According to Benkler:

> [P]eer production will thrive where projects have three characteristics. First, they must be modular. That is, they must be divisible into components, or modules, each of which can be produced independently of the production of the others. This enables production to be incremental and asynchronous, pooling the efforts of different people, with different capabilities, who are available at different times. Second, the granularity of the modules is important and refers to the sizes of the project's modules. For a peer production process to pool successfully a relatively large number of contributors, the modules should be predominately fine-grained, or

102 *See* Allison et al., *supra* note 100; Mann, *supra* note 10.

103 Indeed, the obvious-to-try cases in patent law differentiate between work in which the conclusion is quick and predictable and work that involves many alternatives, none of which have a clear payoff. *See, e.g.*, *In re* Kubin, 561 F.3d 1351, 1358-60 (Fed. Cir. 2009).

> small in size. This allows the project to capture contributions from large numbers of contributors whose motivation levels will not sustain anything more than small efforts toward the project. . . . In addition, a project will likely be more efficient if it can accommodate variously sized contributions. Heterogeneous granularity will allow people with different levels of motivation to collaborate by making smaller- or larger-grained contributions, consistent with their levels of motivation. Third, and finally, a successful peer production enterprise must have low-cost integration, which includes both quality control over the modules and a mechanism for integrating the contributions into the finished product.[104]

There are many innovation opportunities that are not susceptible to this type of division or integration.[105] For example, David Opderbeck has considered the application of this model to research in biotechnology and finds it unlikely to work effectively. He notes that biotechnology research differs from software development (which was Benkler's inspiration) in that it often requires expensive and specialized equipment. Even if the work could be divided, it is unlikely that access to such equipment could be distributed as easily as, say, laptop computers.[106] Opderbeck also notes that science tends to move forward discontinuously. It is doubtful that dividing work into granular modules will allow anyone to acquire the knowledge and experience that would yield the major insights that push the frontiers of knowledge significantly.[107] Lack of appropriate experience is also relevant in another way: Work does not modulate and granularize itself—nor does it self-integrate. In many science projects, considerable ingenuity is required both in the preparation of the project and at its consummation. While those parts of a project might offer more significant intrinsic rewards, they also require considerable skill, which raises the question of leadership.

3. Leadership and Human Capital

Some forms of IP production outside the IP paradigm are decentralized—academia, user-innovations, user-generated content, fashion, comedy, and cuisine are examples. But other forms—most notably (and ironically) so-called "peer" production—require strong

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104 Benkler, *supra* note 47, at 378-79 (footnotes omitted).

105 Indeed, Benkler himself mentions novels as nongranular. *Id.* at 379.

106 Opderbeck, *supra* note 34, at 182-84.

107 *Id.* at 189-90 (citing THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 160-73 (2d ed. 1970)). Lerner and Tirole similarly suggest that open source initiatives in the software sector may be inefficient at encouraging "major breakthroughs." Lerner & Tirole, *Some Simple Economics*, *supra* note 63, at 222. They also question the possibility of granulating work in areas outside software. *Id.* at 227.

leaders. The leader demonstrates the plausibility of a project by developing and revealing its core features; a charismatic leader also inspires the earliest workers to join and attracts new ones. In addition, the leader also organizes the project and—in hierarchical systems—controls the rating mechanism.[108]

Benkler largely treats the initial development of intellectual capital by participants as exogenous to the problem of peer production. That may be appropriate for the average worker and for projects (like Linux and Wikipedia) where the level of contribution is such that most members of the community can, with sufficient diligence, become skilled enough to lead. However, Benkler also discusses peer production as a viable strategy for "big science," such as space exploration.[109] For these projects, as well as the kind of work that Opderbeck considered, finding leaders is more problematic. Intensive—and expensive—training is required and, in many areas, so is extensive experience. Where will the motivation to acquire the needed skills come from? If the average worker in the field works for free, remunerative opportunities could diminish to a point that significantly discourages entry. Since not every person who enters a field winds up excelling, raising the bar to entry could easily diminish the pool of effective leaders. High salaries for leaders might ameliorate that problem, but huge salary disparities would introduce distortions in the labor market that are undesirable.[110] More important, volunteering may seem less desirable if the work is to be performed for highly paid organizers.

There is also the question of where the high salaries would come from. In Benkler's NASA example, the work is supported by the government. In other cases, the problem collapses into the IP-dependence issue. Linus Torvalds, the mind behind Linux, donated his time and intellect in the early years, but he has now moved to Silicon Valley and is paid by the Open Source Development Labs, the consortium that promotes Linux.[111] Similarly, Drew Endy, the proselytizer of the open registry for synthetic biology parts,[112] owns part of Codon Devices, a company that holds patent rights in the equipment needed to put the parts together.[113]

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108 Lerner & Tirole, *Some Simple Economics*, *supra* note 63, at 221-23; *see also* Meyer, *supra* note 56, at 11 (describing Alexander Holley, who organized the development of the Bessemer steel development, as an "inspirational figure").

109 Benkler, *supra* note 47, at 384-85 (discussing NASA Clickworkers).

110 In basketball, for example, the high salaries paid to stars attract an inefficiently large number of entrants.

111 Steve Lohr, *R.I.P.: The Counterculture Aura of Linux*, N.Y. TIMES, May 25, 2004, at C11.

112 Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 TEX. L. REV. 1745, 1747 (2007) (citing Matthew Herper, *Architect of Life: Drew Endy Aims to Reinvent the Biotechnology Industry*, FORBES, Oct. 2, 2006, at 63, 63).

113 *See, e.g., Codon Devices Files Lawsuit Against Blue Heron for Patent Infringement*,

Finally, there is the issue of succession. To the extent that peer production requires inspired leadership, it becomes vulnerable to collapse should the leader move on. Without the leader's capacity to signal quality, to make credible commitments to continued openness, and to prevent the project from forking into incompatible versions, highly-valued participants may leave. Furthermore, without the leader's firm hand, low quality contributions might be amalgamated into the work and dilute its overall value.

Some communities have avoided this problem. Thus, Linus Torvalds has groomed lieutenants and sub-lieutenants,[114] who are presumably poised to succeed him when needed. Other projects are highly sophisticated and have created formal institutional structures—they write constitutions and they incorporate. While these organizational and governance forms are mainly intended to coordinate contributions and mediate between the interests of participants and sponsors, they may also enable the community to outlast its initial leader.[115] Unfortunately, however, the conditions that facilitate this institutional development may not be universally present in all peer production communities.[116] Indeed, for a variety of reasons, some projects may not even be able to sustain an adequate community of ordinary participants.[117]

4. Industry Maturity

Although some forms of IP without IP appear to be sustainable throughout the life of an industry, the success of others may be highly sensitive to the developmental state of the field. For example, peer production appears to require a fairly high degree of focus on a specified product or approach. Thus, the Linux community formed around Linus Torvald's initial introduction of a kernel. It also developed after the general contours of the programming problem were

PR NEWSWIRE, Mar. 14, 2007, *available at* http://www.biospace.com/news_story.aspx?NewsEntityId=49198.

114 Lerner & Tirole, *Some Simple Economics*, *supra* note 63, at 210; Kurt Luther & Amy Bruckman, *Leadership in Online Creative Collaboration*, *in* PROCEEDINGS OF THE 2008 ACM CONFERENCE ON COMPUTER SUPPORTED COOPERATIVE WORK 343, 344 (2008).

115 *See* O'Mahony, *supra* note 99; O'Mahony & Ferraro, *supra* note 9.

116 *See* O'Mahony, *supra* note 99 (suggesting that organizational capacity depends on criteria such as cohesiveness, monitorability, and the extent to which participants value the sustainability of the project); *id.* at 1194-95.

117 *See, e.g.*, Eric Goldman, *Wikipedia's Labor Squeeze and Its Consequences*, 8 J. ON TELECOMM. & HIGH TECH. L. 157 (2010) (suggesting that growing xenophobia of outsiders to the wiki community hinders recruitment, that extrinsic motivations are actively discouraged, and that intrinsic rewards are insufficient to attract new participants).

well understood.[118] When such focus is absent, this form of production can fail. An interesting example is a "bakeoff" arranged in Silicon Valley as an experiment in peer production. Three teams were created and given the challenge of developing a new cookie. Two were structured to mimic the hierarchies of typical commercial enterprises; the third was an open source "dream team" composed of fifteen top food-industry bakers. Although peer production theorists had expected the open source project to win, it did not: The fifteen experts could not coordinate their activities, in part because there was no obvious leader and in part because the goals of the project were not clearly defined.[119] Some of these problems may be ameliorated by good governance structures,[120] but, as noted earlier, creating such a structure involves a degree of commitment—a commitment that could be lacking at a project's inception.

In some cases, there may also be a natural ending point to open projects. For example, Peter Meyer posits that collective invention occurs most readily at a time when a technology's future is not certain. Sharing during the period of uncertainty enables the field to develop without any one firm needing to invest too heavily in expensive research. However, as the field clarifies and commercial applications become better understood, the need to spread risks declines. The value of sharing decreases, while the cost of revealing information to rivals climbs. Collective development may come to a halt as the parties involved rely increasingly on secrecy and intellectual property rights.[121] Even if sharing continues, there can be problems. Among other things, it is sometimes difficult for open projects to coexist with proprietary production in the same technological space. The open projects lack the IP ammunition needed to prevent or settle lawsuits.[122] Proprietary projects may be able to afford more advertising or use other business to install a customer base that benefits from network effects. When that

118 *See, e.g.*, Steve Lohr, *The Crowd Is Wise (When It's Focused)*, N.Y. TIMES, July 18, 2009, at BU4 (giving the example of the NetFlix Prize, which crowd-sourced the development of a system for predicting consumer preferences).

119 Malcolm Gladwell, *The Bakeoff: Competing to Create the Ultimate Cookie*, NEW YORKER, Sept. 5 2005, at 124, 132.

120 *See* Thomas W. Malone, Robert Laubacher & Chrysanthos Dellarocas, *Harnessing Crowds: Mapping the Genome of Collective Intelligence* (MIT Ctr. for Collective Intelligence, Working Paper No. 2009-001, 2009), http://cci.mit.edu/publications/CCIwp2009-01.pdf.

121 Meyer, *supra* note 56, at 12-14 (describing, among other examples, the "Homebrew Computer Club," which was the "spawning ground" of many Silicon Valley computer firms); *see also* Goldman, *supra* note 117 (suggesting that as projects mature, the intrinsic payoff from participation decreases). Furthermore, since maintaining a project may require different skill sets than those needed to initiate a project, communities that cannot recruit effectively tend to break down.

122 *See supra* text accompanying note 10.

occurs, the market may tip in favor of the proprietary product even when the open project is free and its output is superior.[123]

5. Technological Change

The success of intellectual production outside the intellectual property paradigm can also depend on the technological environment, particularly copying technologies. These are double-edged swords. On the one hand, the easier it is to distribute information, the easier it is for participants to collaborate. On the other hand, if information is easily copied, then a strategy that is not based on intellectual property protection gives rise to free riders. The issue for open innovation is which effect dominates.

International News Service v. Associated Press (*INS v. AP*),[124] the case that led the Supreme Court to create the tort of misappropriation, furnishes an illustration. The classic account is that, prior to the lawsuit, newspapers were able to operate without intellectual property protection because there was a strong norm that allowed morning papers to appropriate stories from the editions sold the previous evening and vice versa, but it did not allow papers published at the same time to copy from one another. The practice saved money and did no real damage because morning and evening news were separate markets. Under the exigencies of World War I, however, that norm broke down. Copying then ensued, and the parties were driven to rely on intellectual property protection to sustain production.[125] Doug Baird, however, sees these events differently. According to him, prior to the time of *INS*, news was distributed on large networks of leased telegraph lines. Because the cost of maintaining these networks was so high, a newspaper that owned them enjoyed a strong competitive edge. But in the early twentieth century, technological improvements reduced distribution costs. As a result, the advantage of owning leased lines disappeared, and the industry shifted its attention to the ownership of content. According to Baird, the *INS* case was constructed in order to create a property right in news, which all of the papers then needed to recover their costs and earn a profit.[126] Baird's version has some credence in that a similar dynamic led to the first copyright act, the Statute of Anne: The invention of the printing press (coupled with the demise of

123 *See supra* note 81 and accompanying text.

124 248 U.S. 215 (1918).

125 *See generally* Richard A. Epstein, International News Service v. Associated Press*: Custom and Law as Sources of Property Rights in News*, 78 VA. L. REV. 85 (1992).

126 Douglas G. Baird, *The Story of* INS v. AP*: Property, Natural Monopoly, and the Uneasy Legacy of a Concocted Controversy*, *in* INTELLECTUAL PROPERTY STORIES 9 (Jane C. Ginsburg & Rochelle Cooper Dreyfuss eds., 2006).

censorship) created a new need to protect authors and printers from copyists.[127]

Of course, it may take a while for the industry to understand how circumstances have changed. Thus, there is currently considerable controversy in the fashion field over the need for protection. Raustiala and Sprigman believe that, even though substantial changes have occurred in the technology of copying clothing designs, the benefits of operating without intellectual property continue to dominate. But this may be wrong, or merely a temporary state of affairs. Designs can now be copied quickly, but they are not copied well—knock-offs are cheaper because they use inferior materials and less labor. Thus, they are not likely to appeal to a designer's own customers. Furthermore, as Scott Hemphill and Jeannie Suk argue, the designs introduced later are often intentionally not meant as exact copies. Rather, they adapt—"remix"—the designs to meet the aesthetics of new (generally, younger) customers. These authors argue that as copies can be made more exact, intellectual property protection becomes necessary. And, indeed, there are now designers who are lobbying quite vigorously for formal intellectual property protection.[128]

6. Fragile Norms

Another way of putting some of this is to say that any system that depends on norms is vulnerable to their breakdown. The classic *INS* story illustrates the point[129]: When the exigencies of war made copying necessary in order to retain customers, the norm against copying quickly disintegrated. Disintegration can occur for other reasons as well. The stand-up comedy norms observed by Oliar and Sprigman are easily enforced because—as the authors point out—the comedy community is tightly knit and comedy is performed in the presence of other comedians.[130] As communities increase in size, detection costs may increase as well, and the efficacy of informal enforcement techniques may then decline.[131]

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127 MARK ROSE, AUTHORS AND OWNERS: THE INVENTION OF COPYRIGHT 3-4 (1994). For a historical look at the Statute of Anne, see Justin Hughes, *Copyright and Incomplete Historiographies: Of Piracy, Propertization, and Thomas Jefferson*, 79 S. CAL. L. REV. 993, 1009-21 (2006).

128 *See* Hemphill & Suk, *supra* note 93; C. Scott Hemphill & Jeannie Suk, *Remix and Cultural Production*, 61 STAN. L. REV. 1227 (2009).

129 *See supra* Part II.A.5.

130 Oliar & Sprigman, *supra* note 1, at 1813.

131 The story of Wikipedia is instructive, for it demonstrates the difficulty of imposing norms as the number of participants increases. *See* Andrea Forte, Vanessa Larco & Amy Bruckman, *Decentralization in Wikipedia Governance*, J. MGMT. INFO. SYS., Summer 2009, at 49; Seth Finkelstein, *Inside, Wikipedia Is More Like a Sweatshop than Santa's Workshop*, GUARDIAN

Norm maintenance is also contingent on the homogeneity of the community. For example, Fiona Murray has closely documented the fight over access to the oncomouse, an important tool for engaging in certain types of medical research.[132] Rebecca Eisenberg suggests that academic norms of sharing are difficult to sustain as the interests of the parties diverge.[133] Similar problems may occur in communities where some participants are paid and others volunteer their labor. The monetary rewards crowd out the benefits that are more psychic or hedonic: Contributors feel foolish donating their time to work for which others are paid, or they may derive less pleasure if they know that their output is commercially motivated.[134]

Costs and benefits also matter. Thus, Wes Cohen and John Walsh have shown that norms of sharing in academia are weaker with respect to physical materials—where withholding is easy—than for patented information, where legal enforcement may be needed to protect exclusivity.[135] The authors also suggest that sharing is reduced as the benefits of refusing to share increase. Thus, they posit that as the size of National Institutes of Health (NIH) grants grow, university scientists may become increasingly unwilling to participate in an open environment.[136] In this regard, the current mix of both IP and non-IP production is especially problematic, for the availability of intellectual property rights means that participants in an open community forego significant benefits that colleagues are enjoying. It is, thus, no surprise that as academic research becomes more easily converted into

(London), Dec. 6, 2007, § 4 (Technology), at 2, *available at* http://www.guardian.co.uk/technology/2007/dec/06/wikipedia; *see also* Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 FORDHAM L. REV. 2237, 2246 (2009).

132 Fiona Murray, *The Oncomouse That Roared: Hybrid Exchange Strategies as a Source of Productive Tension at the Boundary of Overlapping Institutions*, 116 AM. J. SOC. (forthcoming 2010), *earlier draft available at* http://fmurray.scripts.mit.edu/docs/THE_ONCOMOUSE_THAT_ROARED_FINAL.pdf; Fiona Murray, *Patenting Life: How the Oncomouse Patent Changed the Lives of Mice & Men*, *in* CONTEXTS OF INVENTION: CREATIVE PRODUCTION IN LEGAL AND CULTURAL PERSPECTIVE (M. Biagioli et al. eds., forthcoming), *available at* http://www.bus.wisc.edu/insite/events/seminars/documents/Oncomouse_Chapter_Short_09242007.doc.

133 Rebecca S. Eisenberg, *Costs, Norms, & Inertia: Avoiding an Anticommons for Proprietary Research Tools*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY, *supra* note 7.

134 *See* David, *supra* note 9; O'Mahony & Ferraro, *supra* note 9; *cf.* Wendy J. Gordon, *Render Copyright unto Caesar: On Taking Incentives Seriously*, 71 U. CHI. L. REV. 75 (2004) (noting the problems that arise when reciprocity of gifting is not present). *But see* Roberts et al., *supra* note 63, at 24 (showing that while crowding out occurs, it is not a significant problem).

135 Wesley M. Cohen & John P. Walsh, *Access—or Not—in Academic Biomedical Research*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY, *supra* note 7; Wesley M. Cohen & John P. Walsh, *Real Impediments to Academic Biomedical Research*, 8 INNOVATION POL'Y & ECON. 1 (2007) [hereinafter Cohen & Walsh, *Real Impediments*].

136 *See also* Katherine J. Strandburg, *Norms and the Sharing of Research Materials and Tacit Knowledge*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY, *supra* note 7.

inventions that are readily commercialized and patented, the Mertonian norms appear to be breaking down.[137]

B. *Normative Objections*

Most scholars writing about open innovation have taken a fairly descriptive approach. It is somewhat awkward to make normative judgments about creative output; nonetheless, there are several reasons to worry about the implications of a shift toward open production.

1. Nonoptimal Production

The thrust of the earlier part of this paper is to question whether non-IP-based IP is capable of producing the full range of innovations that society would wish to promote. There are many reasons to believe that, in fact, production would sometimes be suboptimal. This could be true at both the discovery stage, where the work is too unfocused for peer production, and also at the time of development and diffusion, when privatization is especially tempting. Certain types of work (nongranular/boring) projects may not be undertaken at all. When work has been granularized, the workers may miss the kinds of major insights that open new innovative opportunities.

There may also be circumstances where production will be supraoptimal. Fashion is one example: Raustiala and Sprigman make a convincing case for the existence of design cycles; what they do not explore at length is whether cycling is socially beneficial. After all, keeping up with fashion is costly, yet because clothing conveys information to potential associates, employers, and mates, it is often necessary. New styles must thus be purchased even when new clothing is not needed, and old clothes are discarded before they are worn out. In earlier times, sumptuary laws prevented the masses from utilizing social resources in this way, and Barton Beebe has argued that trademark law sometimes functions as a substitute by raising prices for "branded" goods and putting them out of the reach of would-be purchasers.[138]

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137 *See, e.g.*, Fiona Murray & Scott Stern, Learning to Live with Patents: Assessing the Dynamic Adaptation to the Law by the Scientific Community (November 2008) (unpublished manuscript), http://fmurray.scripts.mit.edu/docs/Murray.Stern_LearningtoLivewithPatents.pdf; *cf.* Pierre Azoulay et al., *The Determinants of Faculty Patenting Behavior: Demographics or Opportunities?*, 63 J. ECON. BEHAV. & ORG. 599 (2007) (noting that scientists who have collaborated with someone who holds patents are more likely than their peers to depart from the classic norms of science and become patentees themselves).

138 Barton Beebe, *Intellectual Property Law and the Sumptuary Code*, 123 HARV. L. REV. 809

More controversially, one might question the social value of promoting massive amounts of user-generated content. Debra Halbert notes that an unauthorized Internet posting of Michael Jackson's "Thriller" has been viewed over 34,000,000 times and has generated 8000 comments.[139] She may be right that it constitutes an "important cultural moment," but the clip is thirteen minutes and forty-one seconds long: If the clip is watched in its entirety, these viewings diverted close to 900 *years* of human attention—and that does not count the effort it took to write the 8000 comments that follow the posting. Time has also been spent on creating a multitude of "Thriller" knock-offs (including the one by 1500 inmates at the Cebu Provisional Detention and Rehabilitation Center in the Philippines)[140] and on many other cultural moments that have attracted huge viewerships. It is not, for example, clear that society needs "White and Nerdy Lego" (an unauthorized re-choreographing of a video using Lego action figures),[141] thousands of other Lego remakes,[142] the reenactment of every film in a video store by its employees,[143] or 11,200 sleeping kittens.[144]

Formerly, the high cost of copying led peer reviewers, publishers, and editors—that is, the copyright industry—to weed through submissions and thus to discourage overproduction. The absence of that sort of intervention not only encourages creativity of questionable value, it also generates a new kind of transaction cost: It is harder to identify the meritorious work that deserves further attention. To be sure, search engines are becoming increasingly powerful at sorting information. However, because they are not regulated and their algorithms are not transparent, accessing information may not be as efficient as is assumed.[145] Nor do search engines verify the veracity of the information they find.[146] While there is certainly appeal to the argument that it is better for people to produce their own information than to passively consume the work of others, the consumption of certain types of information (also known as "learning") is what makes it possible for a society to progress. As suggested earlier, an analysis of

(2010).

139 Halbert, *supra* note 80, at 934.

140 *Id.* at 939.

141 *Id.* at 943.

142 *See* YouTube, http://www.youtube.com (search "lego") (last visited Mar. 20, 2010).

143 Halbert, *supra* note 80, at 941 n.80.

144 *See* Google, http://www.google.com (search "sleeping kittens site:youtube.com") (last visited Mar. 20, 2010).

145 *See, e.g.*, Oren Bracha & Frank Pasquale, *Federal Search Commission? Access, Fairness, and Accountability in the Law of Search*, 93 CORNELL L. REV. 1149 (2008); Lucas D. Introna & Helen Nissenbaum, *Shaping the Web: Why the Politics of Search Engines Matters*, 16 INFO. SOC'Y 169 (2000).

146 Admittedly, not everything that is in print is true either, but—as the influence of the blogosphere suggests—the problem of sorting truth from fiction seems to be harder on the Internet.

innovation is not complete so long as education and training are treated as exogenous to the problem.

2. Alternative Protection Mechanisms

Were intellectual property laws abolished, intellectual products would not necessarily end up in a publicly-accessible domain, for control over information can often be retained in other ways. Before social policies shift in favor of open innovation, it is important to compare the costs of the intellectual property system against the dysfunctions produced by alternative strategies.

Secrecy is one problem. Even if trade secrets could not be enforced, "real" secrets could still be kept (torture, presumably, would remain illegal). Innovators who attempted to rely on secrecy would, however, be required to restrict information about valuable advances to workers of unimpeachable loyalty. Since the number of such workers is likely to be small, this strategy would sharply reduce output, leading to rising prices. In addition, the loyal workers' mobility would necessarily diminish, possibly to a point where their labor was not put to its best use.[147] Knowledge production would also slow, for it is hard to build on secret information. Moreover, some information would inevitably be repeatedly reinvented. Since secret information is also difficult to sell or license, investment would be suboptimal.[148] And, indeed, empirical evidence suggests that formal intellectual property rights are particularly important for new entrants, at least in certain fields.[149] Finally, because secrecy is not possible for innovations that are easily reverse engineered from commercial embodiments, intellectual production might skew toward innovations that can be kept secret, to the detriment of other socially valuable activities (such as drug discovery).[150]

In some cases, strategies even more objectionable than secrecy are available. Consider plant and animal breeding. Although farmers now complain that patenting is raising their costs, entry was far from free

147 ALAN HYDE, WORKING IN SILICON VALLEY: ECONOMIC AND LEGAL ANALYSIS OF A HIGH-VELOCITY LABOR MARKET (2003) (summarizing the law affecting employee mobility and trade secrets in the "high velocity" labor market of Silicon Valley).

148 Oren Bar-Gill & Gideon Parchomovsky, *A Marketplace for Ideas?*, 84 TEX. L. REV. 395, 398 (2005).

149 *See, e.g.*, Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. (forthcoming 2010); Bronwyn H. Hall, *Exploring the Patent Explosion*, 30 J. TECH. TRANSFER 35 (2004).

150 WILLIAM VAN CAENEGEM, INTELLECTUAL PROPERTY LAW AND INNOVATION (2007). *But see* Mark A. Lemley, *The Surprising Virtues of Treating Trade Secrets as IP Rights*, 61 STAN. L. REV. 311, 333-36 (2008) (suggesting that trade secrecy can serve equivalent functions to patent rights).

prior to 1980, when the Supreme Court announced that utility patents were available for living things.[151] According to Dan Kevles, breeders maintained control over stocks through sharp limits on distribution, highly restrictive contracts, and rigorous monitoring programs. Animals were sometimes infected before they were sold to butchers so that they could not be used for reproduction.[152] These practices constrained husbandry decisions, endangered public safety, and led to severe inbreeding. Patenting, in contrast, gives farmers a measure of autonomy and avoids the other problems. Similarly, open software is often supported by companies, like Red Hat, that provide maintenance services.[153] The contracts imposed by these organizations may be as restrictive as intellectual property rights and they can endure for far longer.

The work of Wes Cohen and John Walsh discussed earlier is also suggestive in that the authors demonstrate that, even in the absence of patents, work can sometimes by privatized by withholding the physical objects necessary to utilize the underlying discovery.[154] Where standardization or peer verification is important, these practices inhibit progress. They also narrow the field of those who can build on the work to those with whom the creator is willing to share. Further, this practice can prevent collaborators from making the best use of their training.[155]

3. Exploitation of Knowledge Workers

The last point is particularly worrisome, for it points to another general problem, especially in environments where there are hierarchies of workers (which, as we saw, is common for peer production) and in mixed systems: The workers at the low end may get an unfair share of the rewards. Not only are the workers short changed, the public interest may also be negatively affected. For example, in cases involving access to materials, the collaborators who lose out are often research and teaching assistants.[156] These are people who lack clout because they are at the beginning of their careers; denying them access can undermine their ability to pursue the work that would have established their reputations. Lower employment opportunities waste human capital,

151 Diamond v. Chakrabarty, 447 U.S. 303 (1980).

152 Kevles, *supra* note 57.

153 *See supra* notes 101-102 and accompanying text.

154 *See supra* Part II.A.6.

155 *See, e.g.*, Steven Bachrach et al., *Who Should Own Scientific Papers?*, 281 SCI. 1459 (1998); Barbara Mishkin, *Urgently Needed: Policies on Access to Data by Erstwhile Collaborators*, 270 SCI. 927 (1995).

156 *See, e.g.*, Weissmann v. Freeman, 868 F.2d 1313 (2d Cir. 1989).

along with the expensive educational resources (some of which may have been publically funded) that were used to create it.[157]

The informalities of shared development can also lead more directly to financial under-compensation. *Thomson v. Larson*[158] is an example. Lynn Thomson, a professor of advanced playwriting at New York University, had been hired at a modest salary by the New York Theatre Workshop, a nonprofit theater company, to substantially revise a long and sprawling play by Jonathan Larson. The play, *Rent*, eventually made it to Broadway, where it earned extremely substantial revenues. But since the work of a dramaturg is not protected by intellectual property laws, and since Thomson was not regarded as the "dominant" contributor under copyright law, she was denied a reward for her work and perhaps even a right to utilize it.[159]

In fact, it is somewhat suspicious that many traditional areas of open innovation involve work by marginalized groups, such as women and indigenous people: cooking;[160] sewing, knitting, and quilting;[161] fan-fiction;[162] and farming.[163] To be sure, there are often other motivations at play in these situations.[164] In Debora Halbert's words, these projects allowed women "[a] different method of constructing knowledge—one not contingent upon the abstract individual and original author, but one centered in relationships of care."[165] Nonetheless, these workers would also benefit from recognition and payment. It thus remains important to consider whether the participants

157 *See generally* Dreyfuss, *supra* note 8.

158 147 F.3d 195 (2d Cir. 1998). *See generally* Roberta Rosenthal Kwall, *"Author-Stories:" Narrative's Implications for Moral Rights and Copyright's Joint Authorship Doctrine*, 75 S. CAL. L. REV. 1, 43-59 (2001).

159 *Thomson*, 147 F.3d at 200-02. The parties did, however, eventually settle in a confidential agreement that awarded a portion of the earnings to Thomson and gave her credit in the playbill. Jesse McKinley, *Family of "Rent" Creator Settles Suit over Authorship*, N.Y. TIMES, Sept. 10, 1998, at B3.

160 Buccafusco, *supra* note 1, at 1145 ("[T]he lowly status of cuisine was further cemented by the fact that women, either in their capacity as housewives or as domestic servants, performed the cooking in most households. . . . Accordingly, it would have been asking quite a lot of Victorians—or even of twenty-first century copyright law, mired as it is in Romantic notions of originality, creation, and authorship—to recognize the expressive potential of such a dismal affair as food preparation." (footnotes omitted)). *See generally* THE RECIPE READER, *supra* note 51.

161 Halbert, *supra* note 59.

162 Tushnet, *supra* note 55, at 657 n.23.

163 Agrawal, *supra* note 58.

164 Much of the work is done to support families, but there are other motivations as well. As Andrea Newlyn put it, compiling books of household hints and recipes "enabled women to become agents of their own histories." Andrea K. Newlyn, *Redefining "Rudimentary" Narrative: Women's Nineteenth-Century Manuscript Cookbooks*, *in* THE RECIPE READER, *supra* note 51, at 31, 44. Or in Rebecca Tushnet's words, "Fan fiction . . . gives authors and readers meaning and enjoyment, allowing them to participate in the production of culture." Tushnet, *supra* note 55, at 654.

165 Halbert, *supra* note 59, at 443.

in open innovation projects understand how their work is being used and fully agree to the terms of their involvement.

III. ACCOMMODATING IP WITHOUT IP

So far, this Article has suggested that while the potential for intellectual production outside the intellectual property paradigm can potentially solve many of the problems associated with exclusivity, it is unlikely to produce optimal levels of innovation across a full range of intellectual endeavors. At the same time, however, mixed IP/non-IP systems have problems of their own: There can be friction among the workers, infringement litigation will be lopsided, and markets may tip in favor of the proprietary product. As a prescriptive matter, then, it is imperative to modify the current legal regime so that it can foster intellectual production in both environments simultaneously. The following is a far from comprehensive account of issues that law and policy makers should consider.

1. Giving Open Innovation Its Due

One reason that tensions between IP and non-IP systems are becoming evident is that increasing numbers of intellectual products—including ones that were formerly put in the public domain—are coming under the umbrella of intellectual property protection.[166] Partly, of course, this represents deep convictions about the incentive function of intellectual property rights. But, partly, there is a political economy story at play: Those advocating for new rights tend to be wealthier and better organized than user groups.[167] Intellectual property rights may also appeal to legislators because they increase revenue and, for net exporters like the United States, contribute to its balance of payments. Rights to traditional knowledge and genetic resources assuage the guilt associated with imposing intellectual property obligations on developing countries.[168] As I suggested in earlier work, lawmakers also have a propensity to jump from the recognition of value to the assumption that some entity—other than users—must have the right to

166 *See supra* Part I.A and notes 21-32.

167 *See, e.g.*, Viktor Mayer-Schönberger, *In Search of the Story: Narratives of Intellectual Property*, 10 VA. J.L. & TECH. 11, 21-25 (2005) (suggesting that strong intellectual property protection has been partly attributed to the ability of interest groups to influence the legislature).

168 *See, e.g.*, Doris Estelle Long, *Crossing the Innovation Divide*, 81 TEMP. L. REV. 507 (2008).

capture it.[169] Now that open innovation is emerging as a form of production with its own important associated benefits, the rush to protect outlined in Part I needs to be reconsidered. One way to avoid the problems associated with a mixed system would be to resist the creation of exclusive rights in areas where IP without IP is capable, on its own, of sustaining intellectual progress.

As a political matter, this approach appears quite feasible. Open communities are different from typical users. Like commercial enterprises, they are often extremely well organized; as we saw, many depend on strong leadership and enjoy considerable financial backing. Thus, they have the clout necessary to exert a strong influence on the legislative agenda. With help from the theoretical work done by Benkler, Strandburg, Sprigman and others, they also have the capacity to dislodge the faith currently placed in the IP system. Economic indicators will continue to matter, but Eric von Hippel's new metrics for measuring the gains from innovation can make an important contribution to law- and policy-makers' thinking. What does need more attention is the identification of areas that are independent enough of the intellectual property regime to develop in a pure non-IP environment.

User innovation may well be one example. Indeed, regarding user innovation as an IP-free zone would not even require a radical change from current thinking: The Supreme Court's decision in *Feist Publications, Inc. v. Rural Telephone Service Co.*[170] and the European Court of Justice's decision in *British Horseracing Board, Ltd. v. William Hill Organization, Ltd.*[171] both represent implicit recognition of the user-innovation phenomenon. In *Feist*, the Supreme Court denied copyright protection to telephone numbers on the ground that they are facts and not expression. After that decision, many observers suggested that collecting facts required IP incentives,[172] and the European Communities quickly enacted database protection with the objective of giving the Europeans a competitive advantage over Americans.[173] In

169 Rochelle Cooper Dreyfuss, *Expressive Genericity: Trademarks as Language in the Pepsi Generation*, 65 NOTRE DAME L. REV. 397 (1990).

170 Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340 (1991).

171 Case C-203/02, British Horseracing Bd. Ltd. v. William Hill Org. Ltd., 2004 E.C.R. I-10415.

172 *See, e.g.*, Jane C. Ginsburg, *U.S. Initiatives to Protect Works of Low Authorship*, *in* EXPANDING THE BOUNDARIES, *supra* note 36, at 55.

173 *See supra* note 29; *see, e.g.*, J.H. Reichman & Pamela Samuelson, *Intellectual Property Rights in Data?*, 50 VAND. L. REV. 51, 73-74 (1997) (noting that the European Commission (EC) proposed the relevant Directive after finding that European database producers had to overcome several comparative disadvantages in order to expand their share of the world market and catch up with the American industry); Debra B. Rosler, *The European Union's Proposed Directive for the Legal Protection of Databases: A New Threat to the Free Flow of Information*, 10 HIGH TECH. L.J. 105 (1995) (arguing that the EC Directive was created to help the faltering E.U. database industry compete with the fast-growing American database industry).

practice, however, European database producers have not thrived[174] and in *William Hill*, the European Court of Justice (ECJ) severely limited the reach of the Database Directive.[175] It did so on the ground that investments made to further the database holder's core business did not count as recoverable investments under the Directive. In other words, the court recognized that protection is unnecessary when developers have reasons intrinsic to their business interests to generate the information in question. Significantly, the facts in *Feist* were almost identical to the facts in *William Hill*: The ECJ case involved information about racing conditions that the Horseracing Board had to compile in order to organize races, while the Supreme Court case involved telephone numbers that Rural Telephone had to compile to run a telephone company.

A fairly large number of contentious areas arguably fall within this category. As von Hippel has demonstrated, surgical techniques are developed by surgeons for their own use.[176] Although patents on surgical techniques are available, since 1997 these patents have been unenforceable against medical practitioners.[177] Yet there has not been a public outcry of insufficient innovation in this field. Business methods, including methods for diagnosing diseases and constructing legal arguments, should similarly be regarded skeptically.[178] They are also subject to a patent infringement exemption, this time for prior use,[179] and some might eventually be held unpatentable.[180] Yet it seems unlikely that innovation will decrease in this area either: Before the

174 Commission of the European Communities, *DG Internal Market and Services Working Paper: First Evaluation of Directive 96/9/EC on the Legal Protection of Databases*, at 5 (Dec. 12 2005), *available at* http://ec.europa.eu/internal_market/copyright/docs/databases/evaluation_report_en.pdf.

175 *See, e.g.*, Charles R. McManis, *Database Protection in the Digital Information Age*, 7 ROGER WILLIAMS U. L. REV. 7 (2001) (arguing that there is no reason for the United States to follow the European Union's lead and suggesting an alternate legislative approach to database protection); James Boyle, *A Natural Experiment*, FT.COM, Nov. 22, 2004, http://www.ft.com/cms/s/2/4cd4941e-3cab-11d9-bb7b-00000e2511c8.html (arguing that a *sui generis* right is unnecessary because the United States' database industry has grown steadily despite such a right and stating that the EC Directive merely led to a one-time boost for the database industry); Stephen M. Maurer, *Across Two Worlds: Database Protection in the United States and Europe*, *in* INTELLECTUAL PROPERTY AND INNOVATION IN THE KNOWLEDGE-BASED ECONOMY ch. 13 (Jonathan Putnam ed., 2005), *available at* http://www.ic.gc.ca/eic/site/ippd-dppi.nsf/vwapj/13-EN2%20Maurer.pdf/$file/13-EN2%20Maurer.pdf (concluding that although the EC Directive may have given the European database industry a one-time boost, generally the Directive was and is unnecessary and ineffective).

176 VON HIPPEL, DEMOCRATIZING INNOVATION, *supra* note 4, at 30-31.

177 35 U.S.C. § 287(c) (2006).

178 *See* Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc., 548 U.S. 124, 125-39 (2006) (Breyer, J., dissenting) (disagreeing with the Court's dismissing writ of certiorari as improvidently granted and willing to hold certain business methods unpatentable).

179 35 U.S.C. § 273 (2006).

180 *See* Bilski v. Doll, 129 S. Ct. 2735 (2009), *granting cert. to In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008).

Federal Circuit held that business methods were patentable in 1998,[181] there was no shortage of business methods being produced.[182] Innovations that lend themselves to academic inquiry may also fall into this rubric: Naturally-occurring genetic sequences and research tools are two examples of advances where the value of public accessibility will often outweigh the incentive value of intellectual property protection.[183] Traditional knowledge, although arguably worthy of protection on a distributive-justice rationale, is similarly better classified as user innovation for the purpose of deciding whether incentives to invent are needed.

More modest changes may be appropriate in certain situations. Benkler has made a convincing case for peer production in the case of projects that can be granularized. If he is correct, then intellectual property laws ought to be construed to deny protection to marginal advances. In this case, the goal would not be to isolate fields into an IP-free zone; rather, the system as a whole would benefit by avoiding patent thickets that raise the transaction costs of cumulative innovation. So long as protection remains available for major advances, these patents will shelter investments along the quality ladder.[184] Again, the change would not be radical, as *KSR International Co. v. Teleflex Inc.*[185] represents a move in this direction: It holds that advances that are predictable and the products of ordinary creativity are not patentable. Diane Zimmerman has made a similar argument in copyright, claiming that the standard of originality should be enhanced so that copyright protects only works of "special quality of creativity or imaginativeness."[186]

There is one caveat. As we saw, attribution is an important element in motivating many of the participants in open innovation projects.[187] Squeeze-out is, however, always a danger.[188] Thus, it may be worthwhile to develop a formal right of attribution, which would serve to protect those participants who are at risk of losing the benefits of their work. Currently, U.S. law offers very little protection along

181 State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998).

182 *See, e.g.*, Rochelle Cooper Dreyfuss, *Are Business Method Patents Bad for Business?*, 16 SANTA CLARA COMPUTER & HIGH TECH. L.J. 264 (2000).

183 *See* SECRETARY'S ADVISORY COMM. ON GENETICS, HEALTH, & SOC'Y, U.S. DEP'T OF HEALTH & HUMAN SERVS., REVISED DRAFT REPORT ON GENE PATENTS AND LICENSING PRACTICES AND THEIR IMPACT ON PATIENT ACCESS TO GENETIC TESTS (2010), http://oba.od.nih.gov/oba/SACGHS/SACGHS%20Patents%20Report%20Approved%202-5-20010.pdf; Strandburg, *supra* note 13.

184 *See, e.g.*, Suzanne Scotchmer, *Protecting Early Innovators: Should Second-Generation Products Be Patentable?*, 27 RAND J. ECON. 322 (1996).

185 KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007).

186 Zimmerman, *supra* note 44, at 210.

187 *See, e.g.*, *supra* Parts I.B, II.A.1.

188 *See supra* Part II.B.3.

these lines. Patent law requires that inventors be named.[189] However, employers are deemed the authors of copyrighted works made for hire,[190] and reliance on trademark law was severely circumscribed by the Supreme Court.[191] Significantly, however, the Creative Commons—the most popular of the constructed commons for copyrightable work—emphasizes the right to receive credit for works donated to the commons.[192] That provision is very popular;[193] it apparently works quite well and could act as a template for legislation. Similarly, legislation could be adopted to protect participants' rights of access to material objects.[194]

2. Protecting Open Innovation

Given the uncertainties in determining which kinds of endeavors can be safely left to open innovation, it is likely that a dual system will be operative in many technological fields. As we saw, and as simulation studies suggest, this is arguably the worst possible result.[195] While the problems engendered by a mixed system cannot be fully avoided, there are several steps that can be taken to minimize the problems.

Most critically, there is a need to expand the experimental use defense to patent infringement. This defense was always highly limited in that it only ever applied to work conducted "for the sole purpose of gratifying a philosophical taste, or curiosity, or for mere amusement."[196] However, until the Federal Circuit's 2002 decision in *Madey v. Duke University*,[197] it had been thought sufficient to shelter academic pursuits.[198] But in that case the Federal Circuit held that Duke

189 35 U.S.C. § 116 (2006).

190 17 U.S.C. § 201(b) (2006).

191 Dastar Corp. v. Twentieth Century Fox Film Corp., 539 U.S. 23 (2003).

192 *See* Creative Commons, License Your Work, http://creativecommons.org/choose (last visited Mar. 20, 2010) ("With a Creative Commons license, *you keep your copyright* but allow people to copy and distribute your work provided they give you credit . . . .").

193 Niva Elkin-Koren, *Exploring Creative Commons: A Skeptical View of a Worthy Pursuit*, *in* THE FUTURE OF THE PUBLIC DOMAIN: IDENTIFYING THE COMMONS IN INFORMATION LAW 325 (Lucie Guibault & P. Bernt Hugenholtz eds., 2006) (exploring the legal strategy of Creative Commons and analyzing its potential for enhancing the sharing, distribution, and reuse of creative works).

194 *See* Dreyfuss, *supra* note 8.

195 *See supra* Part I.A and note 5; *supra* Part II.A.6 and text accompanying notes 10, 122.

196 Poppenhusen v. Falke, 19 F. Cas. 1048, 1049 (C.C.S.D.N.Y. 1861).

197 Madey v. Duke Univ., 307 F.3d 1351, 1362 (Fed. Cir. 2002).

198 Jennifer Miller, *Sealing the Coffin on the Experimental Use Exception*, 2003 DUKE L. & TECH. REV. 12 (2003) (discussing the *Madey* case and the chilling effect it will have on academic research); *see also* Madey v. Duke Univ., 266 F. Supp. 2d 420, 424 (M.D.N.C. 2001) ("Although the 'basic law of patents establishes that unauthorized use of a patented product or process constitutes infringement,' for well over a century, United States 'patent jurisprudence has paid

University had no right to use a laser patented by a former faculty member without authorization for either research or teaching. There is continuing controversy over whether the court meant to prevent universities from relying on this defense in all cases or only when the invention in question is a research tool. Either way, the result is difficult to square with the account of IP without IP. After all, research tools are a quintessential example of user innovation—at least in situations where disclosure is inevitable, there is little need for intellectual property rights to spur their creation, and therefore little need to provide anyone with the right to interfere with the work of the paradigmatically open community: the research academy.

Once again, the change should not be considered radical. As noted above, prior to *Madey*, it was thought universities enjoyed this defense, and, as Cohen and Walsh show, academic scientists largely continue to ignore patents.[199] Furthermore, both the NIH and a coalition of universities recommend that academics reserve the right to conduct academic research in all of their patent licenses.[200] Similar reservations could also be made in copyright licenses. They would create a way for students and academics to avoid the soaring cost of educational and research materials.[201]

More could also be done in the area of remedies. In *eBay Inc. v. MercExchange, L.L.C.*,[202] the Supreme Court held that since an injunction is an equitable remedy, it should not be automatically available—before such relief is awarded, the courts must consider the balance of hardships, the public interest, and the availability of monetary relief.[203] That analysis would be particularly useful in the distorted litigation environment in which open innovators find themselves. Quality control is quite difficult in peer production, and

homage to . . . an exception from infringement liability for . . . unauthorized uses of patented inventions[,]' where the uses were solely for research, academic, or experimental purposes." (alterations in original)), *rev'd*, 307 F.3d 1351 (Fed. Cir. 2002).

199 Cohen & Walsh, *Real Impediments*, *supra* note 135, at 11.

200 *See, e.g.*, Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources: Final Notice, 64 Fed. Reg. 72,090, 72,093 (Dec. 23, 1999) ("Access to research tools is a prerequisite to continuing scientific advancement. Ensuring broad access while preserving opportunities for product development requires thoughtful, strategic implementation of the Bayh-Dole act [sic]. The NIH urges Recipients to develop patent, license, and material sharing policies with this goal in mind, realizing both product development as well as the continuing availability of new research tools to the scientific community."); ASS'N OF UNIV. TECH. MANAGERS, IN THE PUBLIC INTEREST: NINE POINTS TO CONSIDER IN LICENSING UNIVERSITY TECHNOLOGY 8 (2007), http://www.autm.net/Nine_Points_to_Consider.htm (Point 9).

201 *Cf.* Daniel L. Rubinfeld & Theodore C. Bergstrom, *Alternative Economic Designs for Academic Publishing*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY, *supra* note 7.

202 eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388 (2006).

203 *Id.* at 390; *see also* N.Y. Times Co. v. Tasini, 533 U.S. 483, 505 (2001); Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 578 n.10 (1994).

infringing material can easily creep into a final product. Given the strategic disadvantages of the defendant in such a case, a court might consider delaying the award of injunctive relief until the "peers" can remove the offending work from the project.

On the patent side, it would also be helpful to tweak the novelty standard. Secret information rarely renders later advances unpatentable.[204] If information that is tightly held and available only to those who join the project is not considered "public," then it would be possible for participants in a non-IP project to discover that another inventor could patent their work. To eliminate that possibility, it should be made clear that information that is in a commons is nonetheless "public" enough to be considered prior art.

3. Protecting Open Innovators

Arguably, there is also a need for law crafted specifically for the open environment. As suggested earlier, participants would benefit from attribution rights of the type available at the Creative Commons. Rights of access and control of physical materials may also be appropriate in some circumstances. As projects become more ambitious and communities grow and become more heterogeneous, other problems may arise: disputes over ratings, over the incorporation of contributions, and about the influence that commercial sponsors exercise over the direction of open projects.[205] A fair amount of scholarship has been directed at the various mechanisms for dealing with these and other governance issues—at boundary organizations[206] and pooling mechanisms,[207] for example. To a large extent, the rules of these systems are cobbled together from existing corporate and contract law, but new organizational forms may do a better job at mediating the complex arrangements in such systems. There is, for instance, considerable concern about the use of California corporate law to govern the Internet Corporation for Assigned Names and Numbers (ICANN), a quasi-peer production project (with Jon Postel as its charismatic founder) with many commercial dimensions.[208]

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204 *See, e.g.*, 35 U.S.C § 102(a)-(b) (2006). *But see id.* § 102(e) (applications are prior art even before they are laid open, so long as they are eventually made public); *id.* § 102(g)(2) (inventions made by other inventors are prior art so long as they were not abandoned, suppressed, or concealed).

205 *See, e.g.*, Forte, Larco & Bruckman, *supra* note 131.

206 *See* O'Mahony, *supra* note 99; O'Mahony & Ferraro, *supra* note 9.

207 *See, e.g.*, Elkin-Koren, *supra* note 193; Niva Elkin-Koren, *What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 FORDHAM L. REV. 375, 407-22 (2005) (explaining the limits of a Creative Commons license in creating a governance regime for creative works).

208 *See, e.g.*, Scott P. Sonbuchner, Note, *Master of Your Domain: Should the U.S. Government*

In particular, the enforceability of the viral licenses that hold many software projects together is something of a mixed bag. On the one hand, if viral licenses are enforceable, the perpetuation of openness is assured. But since these licenses are regarded as similar to agreements that waive the public-regarding provisions of intellectual property law, supporting their enforceability can have the downside of permitting others to restrict access to intellectual products.[209] A reconceptualization of licensing practices that clarified the differences between these situations would be very helpful. By the same token, the skepticism that antitrust law traditionally accords to collective concerted action may need to be reconsidered to promote the viability of common pools.[210]

4. Protecting IP with IP

Some discretion also needs to be shown in the opposite direction, for open innovation can also threaten commercial ventures. After all, it produces work that is usually freely available, and it can be difficult to compete with free. In situations where commercialization is ultimately needed to bring products to market at affordable prices, or with standardized specifications, or of an assured purity, it is important to make sure that open arrangements do not undermine manufacturers' ability to capture financial returns.

Viral licenses are particularly problematic because they directly restrict future uses of the licensed information,[211] but it may prove difficult to combine information in one protected commons with information subject to another form of control. Thus, the Creative Commons has worked very well at putting works in a form where they can be made a part of another creation—a mash-up or a parody, for example. Whether it will work as well for third-generation works—works that are based on material derived from material in the Creative Commons—remains to be seen. The accumulation of viral licenses, attribution rights, and such could give rise to difficult problems. The move to abolish old forms of estates in land and to prevent new ones

Maintain Control over the Internet's Root?, 17 MINN. J. INT'L L. 183 (2008).

209 *See, e.g.*, Peter Lee, *Contracting to Preserve Open Science: Consideration-Based Regulation in Patent Law*, 58 EMORY L.J. 889, 917 (2009); Molly Shaffer van Houweling, *The New Servitudes*, 96 GEO. L.J. 885, 934 (2008).

210 *See, e.g.*, Merges, *supra* note 40, at 1355 ("[N]ot only should the government exercise restraint in banning pools as violations of antitrust policy, but also . . . the government may consider assisting the creation of patent pools. Even if this bolder suggestion is rejected, the government should at least maintain a neutral and permissive stance towards patent pools.").

211 For an example, see the discussion of the HapMap, *supra* note 82.

from forming was extraordinarily difficult;[212] discretion in the use of these devices could avoid the need to go through a virtual version of the same upheaval.

CONCLUSION

The discovery of IP without IP is an exciting development. The proliferation of case studies is testament to the fun involved in tracking these projects—in thinking about cooking, clowning, mountain biking, and windsurfing. The development of this field is also a relief to observers, like me, who have long harbored suspicions about expanding the reach of intellectual property protection. Not only do theoretical developments reinforce our intuitions, but the experience of open communities and the scholarship of those who follow them are already exerting a strong influence on legal developments.

But IP without IP does not mean that intellectual property law is never necessary. Norms are fragile; altruism is limited; leaders fail; technologies change; markets tip in unforeseeable directions. Furthermore, not every intellectual product—or creative worker—is equally susceptible to open production methods. Furthermore, some strategies are highly, albeit indirectly, dependent on intellectual property rights. Nor is open production always desirable. Knowledge workers can be exploited, overproduction is possible, and alternative ways of retaining control can be much worse than the costs of intellectual property rights. Likely, then, mixed regimes will be a fixture of the future. Unfortunately, however, the mixture can also be dysfunctional, producing worse results than both open and closed environments. Lawmakers therefore need to closely consider ways to accommodate these dual forms of creative development. The prescriptive section of this Article was meant to start a discussion on the methodologies that might be considered.

[212] *See, e.g.*, Joseph William Singer, *Democratic Estates: Property Law in a Free and Democratic Society*, 94 CORNELL L. REV. 1009 (2009).