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In Praise of an Incentive-Based Theory of Intellectual Property Protection

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> The Congress shall have the Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries . . . [1]

With knowledge production becoming increasingly significant in the economy, more attention needs to be paid to the impact of intellectual property rights on human rights, culture, and development. As the above quotation from the United States Constitution suggests, intellectual property rights are traditionally justified as a mechanism for generating incentives to innovate.[2] Inherent in this instrumental rationale for creating *private* rights to exclude is the idea that the ultimate goal is the *public* good: promoting progress for the benefit of society. The law, in short, has long been premised on balance, balance among generations of innovators and between creators and those who would benefit from the works they produce.[3] Thus, so long as the creative industries can capture enough return to recoup costs

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[1] U.S. CONST., art. I, § 8, cl. 8.

[2] *See generally*, William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325 (1989). *See also* ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY (2011) (discussing the role of utilitarian theory in justifying intellectual property protection); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEXAS L. REV. 1031 (2005); Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1595–615 (2003); Mark A. Lemley, *Taking the Regulatory Nature of IP Seriously*, 92 TEX. L. REV. 107, 108 (2014).

[3] *See, e.g.,* Mazer v. Stein, 347 U.S. 201, 219 (1954): "The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors." *See also* Golan v. Holder, 565 U.S. 302, 347–51 (2012) (Breyer, J., dissenting).

and earn a significant profit,[4] the United States has always considered itself free to promote other public goals, such as health, education, and free expression. But in a study of successive international intellectual property instruments, including the World Trade Organization's (WTO) TRIPS Agreement (TRIPS), free trade agreements (FTAs), and bilateral investment treaties (BITs),[5] Susy Frankel and I concluded that the linkage of intellectual property with trade – and even more so, with investment – is triggering a reconceptualization of this fundamental principle at the international level. The *quantitative* approach underlying the incentive theory, which asked how much exclusivity is necessary to promote innovation, has given way to a *qualitative* approach, which treats intellectual property as equivalent to a commodity or an investment asset and considers any impairment of value a taking, with its effect largely calculated from the perspective of the right holder.[6]

Intriguingly, at the same time that commodification (through trade agreements) and assetization (through investment treaties) were eclipsing the incentive-based approach within the international community, the legal academy was beginning to challenge the idea that intellectual property incentives are necessary at all. Pointing, as one example, to the flourishing fashion industry, where intellectual property rights are ineffective and copying is rampant, theorists such as Chris Sprigman and Kal Raustiala argue that in many sectors there are other dynamics that can spur creativity and protect private gains from

[4] To be sure, these profits must be significant because the payoff must compensate for the cost and risk associated with dry holes (innovative activity that does not result in a commercializable product): *see* F. M. Scherer, *The Innovation Lottery: The Empirical Case for Copyright and Patents*, in EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 3–21 (Rochelle Cooper Dreyfuss et al. eds., 2001).

[5] Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Legal Instruments—Results of the Uruguay Round, vol. 31, 33 I.L.M. 81 (1994) [hereinafter TRIPS]; for a sample list of free trade agreements (FTAs), see Office of the United States Trade Representative, *Free Trade Agreements*, OUSTR, www.ustr.gov/trade-agreements/free-trade-agreements; for a list of sample bilateral investment treaties (BITs), see Office of the United States Trade Representative, *Bilateral Investment Treaties*, OUSTR, http://tcc.export.gov/Trade_Agreements/Bilateral_Investment_Treaties/index.asp.

[6] Rochelle Cooper Dreyfuss & Susy Frankel, From Incentive to Commodity to Asset: How International Law is Reconceptualizing Intellectual Property, 36 *Mich. J. Int'l L.* 557 (2015). *See also* Peter K. Yu, *Intellectual Property and Human Rights in the Nonmultilateral Era*, 64 FLA. L. REV. 1045 (2012).

innovation.[7] To these commentators, intellectual property rights can often be unnecessary. Thus strengthening them is largely misguided.

Given these opposing challenges to the incentive-based approach, the time appears ripe to reconsider it. In Section I of this chapter, I examine the evidence on intellectual production outside standard intellectual property regimes. While it is easy to agree that considerable creativity occurs in that realm, I conclude that exclusive intellectual property rights remain important in the modern economy. In Section II I suggest, however, that a return to incentive theory would protect public-regarding values without unduly sacrificing the benefits derived from linking intellectual property with trade and investment in international agreements.

I Are IP Incentives Necessary?

Certainly, there is much to what Sprigman and Raustiala say. It is now clear that there are many fields where significant progress can occur without strong intellectual property rights. As Eric von Hippel showed in a series of articles and books, users (or "lead users") make advances because they need them for their own projects and thus are not typically driven by the profits generated through exclusivity.[8] Von Hippel also demonstrated that there are sectors in which strong norms support a no-copying regime, making exclusive legal rights unnecessary to capture the financial benefits of creative production.[9] Developing on this work, Kathy Strandburg examined innovation in the academic sector, where

[7] Kal Raustiala & Christopher Jon Sprigman, The Knockoff Economy: How Imitation Sparks Innovation (2012). *See also* Michele Boldrin & David K. Levine, Against Intellectual Monopoly (2008); Jonathan M. Barnett, *Shopping for Gucci on Canal Street: Reflections on Status Consumption, Intellectual Property, and the Incentive Thesis*, 91 Va. L. Rev. 1381 (2005).

[8] Eric Von Hippel, Democratizing Innovation (2005), http://web.mit.edu/evhippel/www/democ1.htm; Eric Von Hippel, The Sources Of Innovation (2008), http://web.mit.edu/evhippel/www/sources.htm; Eric von Hippel, Jeroen P. J. de Jong & Stephen Flowers, *Comparing Business and Household Sector Innovation in Consumer Products: Findings from a Representative Study in the UK*, 58 Mgmt. Sci. 1669–81 (2012); Jeroen P. J. de Jong & Eric von Hippel, *Measuring User Innovation in Dutch High Tech SMEs: Frequency, Nature and Transfer to Producers* (MIT Sloan Research Paper No. 4724–09, 2009), http://evhippel.files.wordpress.com/2013/08/jeroeneric-user-to-producer-transfer-mar-2–09.pdf; Dietmar Harhoff, Joachim Henkel & Eric von Hippel, *Profiting from Voluntary Information Spillovers: How Users Benefit by Freely Revealing Their Innovations*, 32 Res. Pol'y 1753 (2003).

[9] *See, e.g.,* Emmanuelle Fauchart & Eric von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 Org. Science 187 (2008).

norms, user needs, and curiosity combine to create a strong impetus to advance science.[10] Other spurs to innovation have also been considered. For example, Brian Wright, Joseph Stiglitz, and others have shown that prizes can function effectively.[11] Indeed, even before most of these commentators entered the picture, the need for exclusive rights was questioned. In the mid-1980s, Edwin Mansfield surveyed industry and found that, in most sectors, corporate research managers list secrecy and lead time well ahead of patents as a tool for appropriation.[12] Others showed that sharing can create comparative sectorial advantages that compensate for the lack of exclusivity.[13] To be sure, in his classic work on the patent system, Fritz Machlup suggested that "volunteer" innovators would never be well enough organized to make complicated inventions on an enduring basis.[14] However, Yochai Benkler decisively demonstrated that modern technologies (principally the internet) can structure cumulative research extremely effectively.[15]

This work is more than theoretical: many important advances have been made through novel modes of creative production that do not rely on formal patent or copyright protection. Wikipedia, Apache, Linux, and

[10] Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, in UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY 93 (Gary D. Libecap ed., 2005). *See also* Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 FORDHAM L. REV. 2237 (2009); Katherine J. Strandburg, *Legal But Acceptable: Pallin v. Singer and Physician Patenting Norms*, in INTELLECTUAL PROPERTY AT THE EDGE: THE CONTESTED CONTOURS OF IP (R. C. Dreyfuss & J. Ginsburg eds., 2013).

[11] Brian D. Wright, *The Economics of Invention Incentives: Patents, Prizes, and Research Contracts*, 73 AM. ECON. REV. 691 (1983). *See also* Joseph E. Stiglitz, *Economic Foundations of Intellectual Property Rights*, 57 DUKE L.J. 1693 (2008). *See generally,* DAVA SOBEL, LONGITUDE: THE TRUE STORY OF A LONE GENIUS WHO SOLVED THE GREATEST SCIENTIFIC PROBLEM OF HIS TIME (1995).

[12] Edwin Mansfield, *Patents and Innovation: An Empirical Study*, 32 *MGMT. SCI.* 173 (1986). *See also* Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)* 32 tbl.1 (Nat'l Bureau of Econ. Research, Working Paper No. 7552, 2000), www.nber.org/papers/w7552.

[13] *See, e.g.,* Robert C. Allen, *Collective Invention*, 4 J. ECON BEHAV. & ORG. (1983). *See also* Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. 657 (2010).

[14] STAFF OF SUBCOMM. ON PATENTS, TRADEMARKS, & COPYRIGHTS, S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM 45 (Comm. Print 1958) (prepared by Fritz Machlup).

[15] YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006).

Firefox are well-known examples, but there are many others,[16] ranging from open source library and educational systems,[17] to open source attempts to prevent bee colony collapse.[18] As with fashion, the work of chefs, comedians, magicians, and athletes is not directly appropriable through conventional intellectual property rights, yet society continues to enjoy new recipes, jokes, tricks, and sports moves.[19] Commons-based innovation is also growing in importance,[20] as are collaborations between open and proprietary projects;[21] there is similarly renewed interest in

[16] *See, e.g.,* AXEL BRUNS, BLOGS, WIKIPEDIA, SECOND LIFE, AND BEYOND (2008); Black Duck Open Hub, *Discover, Track and Compare Open Source*, BLACK DUCK, www.openhub.net/. For information on Apache, an open-source HTTP server, see https://httpd.apache.org/; for Linux, an operating system, see Ubuntu, www.ubuntu.com/; for Firefox, a free desktop browser, see www.mozilla.org/en-US/firefox/desktop/.

[17] Nicole C. Engard, *Getting Started with Koha, An Open Source Library System*, OPENSOURCE.COM (Mar. 4, 2013), https://opensource.com/education/13/3/koha-library-system; MITOPENCOURSEWARE, http://ocw.mit.edu/index.htm; Robert Terry & Robert Kiley, *Open Access to the Research Literature: A Funder's Perspective*, in OPEN ACCESS: KEY STRATEGIC, TECHNICAL AND ECONOMIC ASPECTS 101 (Neil Jacobs ed., 2006).

[18] Tristan Smith, *The Open Source Solution to the Bee Colony Collapse Problem*, OPENSOURCE.COM (Dec. 11, 2013), http://opensource.com/life/13/12/open-source-beehive.

[19] *See* 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: How Magicians Protect Intellectual Property Without Law*, in LAW AND MAGIC: A COLLECTION OF ESSAYS (Christine A. Corcos ed., 2008), http://ssrn.com/abstract=1005564; 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); Carl A. Kukkonen, III, *Be a Good Sport and Refrain from Using my Patented Putt: Intellectual Property Protection for Sports Related Movements*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 808 (1998) (reviewing attempts to protect sports moves).

[20] *See, e.g.,* Ryan G. Vacca et al., *Intellectual Property and Public Health – A White Paper*, 7 AKRON INTELL. PROP'Y J. (2013); David E. Winickoff et al., *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); Paul A. David & Paul F. Uhlir, *Creating the Information Commons for e-Science: Toward Institutional Policies and Guidelines for Action*, CODATA Newsletter 91, Int'l Council for Sci., Paris, France (July 2005), www.codata.org/resources/newsletters/newsltr91A4.pdf. *See generally*, BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES (2012).

[21] *See* Yochai Benkler, *Commons and Growth: The Essential Role of Open Commons on Market Economies*, 80 CHI. L. REV. 1499 (2013) (describing various collaborative regimes); Dan Phair, *Orphan Drug Programs, Public-Private Partnerships and Current Efforts to Develop Treatments for Diseases of Poverty*, 4 J. HEALTH & BIOMEDICAL L. 193 (2008). For examples, see Global Alliance for Vaccines and Immunization, www.gavialliance.org; Global Fund to Fight AIDS, Tuberculosis and Malaria, www.theglobalfund.org/en/; Stop TB Partnership, www.stoptb.org/; Roll Back Malaria Partnership, www.rbm.who.int.

prizes and tax incentives.[22] With this ferment have come numerous efforts to study and develop methods for governing the relationships among project participants and between proprietary and sharing regimes.[23]

Because the advances attributable to open innovation span so many intellectual endeavors, it is easy to understand why students of "IP without IP" (intellectual production without intellectual property) have begun to ask whether there is any real need for intellectual property protection. But as I have suggested in earlier work,[24] the intellectual property system is not likely to disappear in the near future. First, these projects are not always as free from intellectual property protection as they may appear. Fashion relies heavily on trademark law;[25] chefs depend, at least in part, on copyright to protect their cookbooks and some even patent methods of food preparation;[26] comedians (along with many chefs) hope to star in copyrighted movies and television shows.[27]

[22] On prizes, see, for example, Michael J. Burstein and Fiona E. Murray, *Governing Innovation Prizes*, abstract available at http://law.scu.edu/wp-content/uploads/Burstein-Governing-Innovation-Prizes-abstract.pdf; Petra Moser & Tom Nicholas, *Prizes Publicity and Patents: Non-Monetary Awards as a Mechanism to Encourage Innovation*, 61 J. INDUS. ECON. 763 (2013); Heidi Williams, *Innovation Inducement Prizes: Connecting Research to Policy*, 31 J. POL'Y ANALYSIS & MGMT. 752, 757 (2012); Liam Brunt, Josh Lerner & Tom Nicholas, *Inducement Prizes and Innovation*, 60 J. INDUS. ECON. 657 (2012). On tax incentives, see, for example, Daniel Jacob Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prizes Debate*, 92 TEX. L. REV. 303 (2013).

[23] GOVERNING KNOWLEDGE COMMONS (Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg eds., 2014); Open Access Policy, *Wellcome Trust,* www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm; Siobhan O'Mahony & Fabrizio Ferraro, *Managing the Boundary of an "Open" Project*, *IESE Business School, WP N* 537 (2004), www.iese.edu/research/pdfs/DI-0537-E.pdf; Siobhan O'Mahoney & Beth A. Bechky, *Boundary Organizations: Enabling Collaboration among Unexpected Allies*, 53 ADMIN. SCI. Q. 422–59 (2008).

[24] *See* Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 CARDOZO L. REV. 1437 (2010); Rochelle Cooper Dreyfuss, *Fragile Equilibria*, VA. L. REV. – In Brief (Jan. 22, 2007), http://ssrn.com/abstract=964242.

[25] *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).

[26] *See, e.g.,* Bobby Flay: The Official Web Site, www.bobbyflay.com (click "Shop"; then click "Cookbooks"). *See also* U.S. Pat. No. 9, 690, 294 (Cooking and serving system and methods) & U.S. Pat. No. 7,307,249 (System and methods for preparing substitute food items), both held by Homaro Cantu, chef at Moto, a renowned Chicago restaurant.

[27] See, e.g.,Seinfeld, www.imdb.com/title/tt0098904/; Louie, www.imdb.com/title/tt1492966; Iron Chef America, www.foodnetwork.com/shows/iron-chef-america.html.

At least some participation in developing computer projects such as Linux, Apache, and Firefox is aimed at establishing a reputation that can be cashed out in the for-profit computer sector, where copyrights and patents are of major significance.[28] Some of these efforts are also supported by firms and industries dependent on intellectual property rights. For example, IBM supports Linux because it wants a free operating system on which to run its proprietary software. That way, IBM need not worry about renewing its licenses to the underlying system. And because the operating system is free, it is highly likely to command a significant market share (and thus make IBM's software valuable to more users).[29]

Second, the norms necessary to maintain these communities can be fragile. Many of these projects are heavily dependent on philanthropic motivation. Consider, for example, work in the life sciences that is aimed at curing the diseases of nonmarket economies (dengue fever, malaria, and the like).[30] Since there is little chance of earning a profit in these markets, those who participate likely reap hedonic benefits, in the form of feeling good about volunteering. By the same token, some projects are begun when an industry is immature and it is unclear whether the work will be commercializable; sharing mitigates the risk that the work will never yield profits. However, as soon as profits do become available for this work, cooperation often collapses,[31] especially in cases where some members begin to earn money but others do not.[32] Norms can break down for other reasons as well. Technological change can alter the

[28] *See* RAUSTIALA & SPRIGMAN, *supra* note 7, at 188.

[29] *See e.g.,* Ronald J. Mann, *Commercializing Open Source Software: Do Property Rights Still Matter?*, 20 HARV. J.L. & TECH. 1, 3 (2006).

[30] *See, e.g.,* Lorrae van Kerkhoff & Nicole Szlezák, *Linking Local Knowledge with Global Action: Examining the Global Fund to Fight AIDS, Tuberculosis and Malaria through a Knowledge System Lens*, 84(3) BULLETIN OF THE WORLD HEALTH ORGANIZATION 629 (2006), www.scielosp.org/pdf/bwho/v84n8/v84n8a14.pdf.

[31] Peter B. Meyer, *Episodes of Collective Invention* 12–14 (US Department of Labor, Bureau of Labor Statistics, Working Paper 368, 2003), www.bls.gov/osmr/pdf/ec030050.pdf (describing the home brew computer club).

[32] *See* O'Mahony & Ferraro, *supra* note 23; 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,* (SIEPR, Discussion Paper No. 02-30, 2003), http://129.3.20.41/eps/dev/papers/0502/0502006.pdf. *Cf.* Wendy J. Gordon, *Render Copyright unto Caesar: On Taking Incentives Seriously*, 71 U. CHI. L. REV. 75 (2004) (noting the problems arising when reciprocity of gifting is not present). But this does not always occur. Linus Torvalds is reported to be a multi-millionaire, see The Richest, www.therichest.com/celebnetworth/celebrity-business/tech-millionaire/linus-torvalds-net-worth/. Yet Linux continues to flourish.

efficacy of the appropriation mechanisms on which the project relied or drastically reduce the benefits of sharing.[33] Legal changes can have unanticipated ramifications. For example, the Bayh Dole Act, which encourages universities to take patent rights in the fruits of federally funded research, has led to greater faculty interest in proprietary research models and created conflicts of interest within universities that can undermine traditional sharing norms.[34]

Third, there are good reasons to be concerned about the kinds and numbers of works that are likely to be produced outside the standard systems. Many of the open projects cited by commentators like Benkler and Sprigman have low upfront costs. Software engineers, for example, are often self-taught and the only real expense they incur at the outset is the cost of buying a computer to program. In contrast, there are socially valuable projects that depend on participants with significant education and the availability of expensive equipment; without intellectual property protection it is doubtful the acquisition costs will be sunk. Pharmaceutical research, for example, requires doctors, pharmacologists, and chemists with advanced degrees, labware, complex instrumentation, and eventually, facilities to conduct clinical trials. While there are many open life sciences projects, they are usually intimately related to the efforts of proprietary firms.[35] Here, the motivation to acquire the

[33] The story behind *International News Service v. Associated Press,* 248 *U.S.* 215 (1918), where the Supreme Court created the tort of misappropriation to protect news stories is instructive. *See, e.g.,* 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)(arguing that the norms undergirding sharing broke down when the papers could no longer rely on the exclusivity provided by the high cost of telegraphy) and 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) (arguing that the norms broke down because of the exigencies of World War I).

[34] 35 U.S.C. §§ 200–212 (2006). *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), 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).

[35] *See, e.g.,* Katherine Strandburg, Brett Frischmann & Can Cui, *The Rare Diseases Clinical Research Network and the Urea Cycle Disorders Consortium as Nested Knowledge Commons*, in GOVERNING KNOWLEDGE COMMONS, *supra* note 23, at 155, 161–2. For an example of a firm that supports research and education, *see* the Burroughs Wellcome Fund, www.bwfund.org/.

appropriate training may well derive from the prospect of a position in the for-profit sector or the private partnership half of the collaboration – a firm that may be planning to acquire patents.[36] Furthermore, curiosity can take things only so far: in some cases, commercialization is so expensive, it will not always be undertaken without an assurance of exclusivity.[37]

Besides, not all projects are susceptible to the organizational structure that Benkler envisioned in his path-breaking work. His insight is based on the idea that work is granular: the Linux operating system, for example, can be segmented into subroutines that are coded de-centrally and asynchronously.[38] Where work cannot be divided so neatly or where contributors must interact dynamically, a more complex organization may be required. But as soon as hierarchy is introduced, it can produce tension among participants that threaten the operation as a whole.[39] A charismatic leader may be able to hold things together, but it is not always clear that the effort will survive if that leader disappears.[40]

There can also be problems at the back end of the creative process: in some fields, it is relatively easy to appropriate the gains attributable to innovation. New techniques (magic tricks, recipes) can be kept secret. The techniques themselves may be extremely difficult to reproduce (novel sporting maneuvers and cooking methods are examples). In cases where the main market for the work is performance, the ability to control physical access can be sufficient to capture the value of the work.[41] But not all intellectual production can benefit from these factors.

[36] *See, e.g.,* David Blumenthal, *Academic-Industrial Relationships in the Life Sciences*, 349 NEW ENG. J. MED. 2452 (2003); Anne M. Readel, *Finding A Cure: Incentivizing Partnerships Between Disease Advocacy Groups and Academic and Commercial Researchers*, 26 J.L. & HEALTH 285, 287 (2013).

[37] *See generally* Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341 (2010).

[38] Yochai Benkler, *Coase's Penguin, or, Linux and the Nature of the Firm*, 112 YALE L.J. 369, 378–9 (2002).

[39] *See, e.g.,* Aniket Kittur et al., *He Says, She Says: Conflict and Coordination in Wikipedia*, CHI PROCEEDINGS 453, 453 (2007), http://dl.acm.org/citation.cfm?id=1240698&bnc=1 ("direct work (on articles) is decreasing, while indirect work such as discussion, procedure, user coordination, and maintenance activity (such as reverts and anti-vandalism) is increasing"). *See also* O'Mahoney & Bechky, *supra* note 23, at 435.

[40] Josh Lerner & Jean Tirole, *The Simple Economics of Open Source* 21–4 (HBS Finance Working Paper No. 00-059, 2000), http://ssrn.com/abstract=224008.

[41] *See, e.g.,* Peter Dicola, *Money from Music: Survey Evidence on Musicians' Revenue and Lessons about Copyright Incentives*, 55 ARIZ. L. REV. 301, 304 (2013) (reporting on a survey finding that musicians earn 12% of their revenue from sources directly related to copyright).

As Justice White put it in a case involving the unauthorized transmission of the act of being shot out of a cannon, intellectual property protection can be necessary to "provide an economic incentive . . . to make the investment required to produce a performance of interest to the public."[42]

While the main concern with eliminating intellectual property protection is likely the fear of underproduction, overproduction is also a significant threat. Fashion is a good example. In Sprigman and Raustiala's telling, fashion benefits from copying because proliferation initially makes certain styles desirable, but ubiquity later makes them obsolescent, thereby inducing people to buy newer outfits. But is it socially desirable to discard clothing that is still wearable? Is it environmentally sustainable?[43] Because style can affect perception,[44] there is an element of social coercion in continuous style changes. Furthermore, the user-generated content that might supplant professional production in a world without intellectual property may be of uneven quantity. Certainly, the upward of 100,000 sleepy kittens available on YouTube suggests that not all knowledge production is equally valuable. And as Steve Maurer has demonstrated, copyright supports not only the production of the initial work, but also important curating and quality-enhancing functions on the part of publishers and editors. In the absence of exclusive rights, those seeking information need to sift through much more material and there is less of a guarantee that the search will yield the best works.[45]

Finally, if intellectual property were eliminated, there would likely be many significant social costs. In the absence of legal protection against free riders, technical information that would otherwise be revealed in a patent might be hoarded. Rather than promote greater

[42] Zacchini v. Scripps-Howard Broad. Co., 433 U.S. 562, 576 (1977) (permitting the "human cannonball" to bring a right of publicity claim when his performance was transmitted in a newscast).

[43] See Pamela Ravasio, *How Can We Stop Water from Becoming a Fashion Victim?*, The Guardian (Mar. 7, 2012), https://www.theguardian.com/sustainable-business/water-scarcity-fashion-industry (noting the industry's heavy use of water and pollution of water resources).

[44] See, e.g., Dorothy U. Behling & Elizabeth A. Williams, *Influence of Dress on Perception of Intelligence and Expectations of Scholastic Achievement*, 9(4) Clothing and Textiles Research Journal 1–7 (1991); Damhorst, M. L., *In Search of a Common Thread: Classification of Information Communicated through Dress*, 8(2) Clothing and Textiles Research Journal 1, 1–12 (1990).

[45] Stephen M. Maurer, From Bards to Search Engines: Finding What Readers Want from Ancient Times to the World Wide Web, 66 S.C. L. Rev. 495 (2014).