

Enabling Patentless Innovation

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ENABLING PATENTLESS INNOVATION

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ABSTRACT

Do patents promote innovation? Many in open innovation communities—or those that collaborate to create and make technology publicly available under permissive terms—have long argued that patents stifle rather than promote innovation. Indeed, it has become nearly conventional wisdom in open innovation circles that the patent system imposes undue burdens on open innovation communities in particular. This may be especially true because, for a variety of reasons, open innovation communities have traditionally failed to pursue patents on their technologies. Consequently, some argue that the best way for these communities to protect themselves is by bucking this trend and acquiring significant numbers of patents for defensive purposes. Some in open innovation communities have begun to follow this approach.

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* Associate Professor of Law, BYU Law, JD, Stanford Law. Thanks to Mark Lemley, Jud Matthews, Lisa Larrimore Ouellette, Dara Purvis, Jason Rantanen, Steven Ross, Rachel Sachs, Norm Spaulding, and Christopher Walker for helpful comments on this Article and the ideas presented in it. I am also indebted to participants at the 2013 Big Ten Untenured Conference, 2013 IP Scholars Conference, and workshops hosted at BYU Law, Penn State Law, and Stanford Law for helpful feedback on the Article. Last, I am grateful to my research assistant, Jim Peavler, for his help on this Article as well as Penn State Law for a summer research grant that enabled much of this research.

What remains underexplored in this discussion, however, is the extent to which patents actually threaten open innovation communities. Previous assessments treat these communities monolithically in terms of patent risk, but open innovation communities by definition consist of a broad spectrum of participants with distinct risk profiles. This Article disaggregates open innovation communities and assesses the actual risks that patents may pose to different categories of participants in those communities. It argues that several factors diminish the actual patent risks in some cases, at least as they are generally presented. However, the Article also highlights certain previously unexamined patent risks that arise based on incompatibilities between the decentralized nature of open innovation and the centralized nature of patent rights. These risks suggest that using patents to combat patent risks may not be a viable long-term strategy for open innovation communities. Based on these conclusions, the Article then assesses other possibilities for better reconciling the patent system with the phenomenon of open innovation. In particular, it suggests as one such possibility a two-track patent system that would grant open innovators an independent invention defense to patent infringement in exchange for an agreement not to assert patents except defensively. The Article concludes by suggesting that such a system would not only benefit open innovation communities, but may also help address broader concerns with the patent system as well.

INTRODUCTION

Do patents promote innovation and thereby satisfy their constitutional justification?¹ Many prominent scholars conclude that the patent system often fails in this quest.² Instead, some claim that patents frequently play the opposite role: they stymie innovation by taxing it.³ The patent wars in

1. See U.S. CONST. art. I, § 8, cl. 8 (indicating that the purpose of granting inventors exclusive rights in their discoveries is “[t]o promote the Progress of Science and [the] useful Arts”).

2. See generally DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* (2009) (arguing that courts should treat different technology sectors differently in terms of patent law in order to elide significant hindrances to innovation that the current patent system causes); JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK* (2008) (arguing that the patent system imposes more costs than benefits in most technology sectors).

3. Larry Popelka, *Only Lawyers Win in Patent Wars*, BLOOMBERG BUSINESSWEEK (Apr. 24, 2012), <http://www.businessweek.com/articles/2012-04-24/patent-wars-lawyers-are-the-only-winners> (“[P]atents have simply become a tax on innovation, a necessary evil for defensive purposes . . .”); James Bessen & Michael J. Meurer, *What’s Wrong with the Patent System? Fuzzy Boundaries and the Patent Tax*, FIRST MONDAY (June 4, 2007), <http://firstmonday.org/ojs/index.php/fm/article/view/1867/1750> (arguing that patents often tax

the world of smartphones are often cited in the popular press as evidence of this “patent tax” hindering innovation.⁴ The growing phenomenon of patent trolls—or owners of patents that do not make products or services but sue others that do—is yet another.⁵

Many in open innovation communities—or those that collaborate to create and make technologies such as Linux, Android, and countless others available to the public under permissive terms—have long believed that patents stifle rather than promote innovation.⁶ Indeed, it seems to have become nearly conventional wisdom in open innovation circles that patents impose undue hardships on open innovation communities in particular.⁷ Patents may have this effect because, with limited exceptions, patent law

rather than spur innovation); David Drummond, *When Patents Attack Android*, GOOGLE OFFICIAL BLOG (Aug. 3, 2011), <http://googleblog.blogspot.com/2011/08/when-patents-attack-android.html> (“A smartphone might involve as many as 250,000 (largely questionable) patent claims, and our competitors want to impose a ‘tax’ for these dubious patents that makes Android devices more expensive for consumers.”).

4. Glenn Chapman, *Patent Wars Plague Internet Age, Add ‘Innovation Tax,’* SYDNEY MORNING HERALD (Apr. 16, 2012), <http://www.smh.com.au/it-pro/business-it/patent-wars-plague-internet-age-add-innovation-tax-20120416-1x2ej.html>; Drummond, *supra* note 3; Popelka, *supra* note 3 (suggesting that only the lawyers win in the patent wars and citing Oracle’s patent assertions against Google as one example of this tax on innovation).

5. Complaints about patent trolls and the adverse effects they have on innovation are legion. For a brief sampling, see *When Patents Attack!*, THIS AMERICAN LIFE (July 22, 2011), <http://www.thisamericanlife.org/radio-archives/episode/441/when-patents-attack>; Charles Duhigg & Steve Lohr, *The Patent, Used as a Sword*, N.Y. TIMES (Oct. 7, 2012), <http://www.nytimes.com/2012/10/08/technology/patent-wars-among-tech-giants-can-stifle-competition.html>; Ashby Jones, *Patent ‘Troll’ Tactics Spread*, WALL ST. J. (July 8, 2012), <http://online.wsj.com/news/articles/SB10001424052702303292204577514782932390996>.

6. KARL FOGEL, PRODUCING OPEN SOURCE SOFTWARE (2013), available at <http://producingoss.com/en/patents.html#idp9475120> (describing patents as the “lightning rod issue” for the free and open source software movement and discussing the general anathema developers have for patents); Florian Mueller, *Patents as a Threat to Free and Open Source Software*, FOSS PATENTS BLOG (Apr. 3, 2010), <http://www.fosspatents.com/2010/04/patents-as-threat-to-free-and-open.html> (reviewing some of the more common reasons that free and open source software communities dread patents); Robert McMillan, *Torvalds Comes Out Against EU Patent Directive*, MACWORLD (Nov. 24, 2004), <http://www.macworld.com/article/1041004/torvalds.html> (quoting Linus Torvalds, founder of the Linux kernel, as saying that patents pose a particular burden to open innovation communities because such communities often do not have the resources with which to defend themselves against “spurious patent claims”); Bruce Perens, *The Open-Source Patent Conundrum*, SILICON TAIGA (Feb. 2, 2005), <http://www.silicontaiga.org/home.asp?artId=3168> (including a description by a long-time leader of the free and open source software movement of the risks that patents pose to both open source developers and small application programmers).

7. See *supra* note 6; see also Yochai Benkler, *Coase’s Penguin, or, Linux and The Nature of the Firm*, 112 YALE L.J. 369, 445 (2002) (decrying strengthened intellectual property protection that threatens to destroy a “robust peer production sector”); James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 LAW & CONTEMP. PROBS. 33, 38, 48–51 (2003) (warning that an intellectual property rights regime that is too strong will diminish the public domain of ideas, destroy the promise of collaborative innovation, and threaten the American system of science); James Ernstmeier, Note, *Does Strict Territoriality Toll the End of Software Patents?*, 89 B.U. L. REV. 1267, 1276 (2009).

can be viewed as a strict liability regime: someone with a patent whose claims cover a particular technology can prevent anyone from using that technology, even if others independently invented the technology at roughly the same time.⁸ Consequently, open innovation communities are vulnerable to third-party patent claims, even absent any sort of wrongdoing or copying on their part.

But for open innovation communities, the story gets worse: historically, these communities have been less likely to seek patents on their technologies than a typical proprietary enterprise.⁹ Open innovation communities are decentralized networks of participants, often without the financial resources or incentives to pursue costly patents or defend against patent assertions.¹⁰ Many in open innovation communities also have strong normative leanings against the patent system.¹¹ Consequently, in many cases open innovation communities have no defensive patent portfolios with which to defend themselves and no patents generally to help guarantee their freedom to operate.

In response, open innovation communities have adopted a number of measures to address the perceived patent risks. To some extent, each of these measures depends on these communities acquiring significant numbers of patents. The intellectual property licenses upon which the communities rely to make their innovations publicly available often include terms meant to limit patent aggression from anyone that uses the licensed technology.¹² Open innovation communities have also in some cases combined their resources to create pools of patents upon which anyone in the community can rely.¹³ Other supporters of open innovation have pledged not to assert their patents against users of openly innovated technologies.¹⁴ Some

8. Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475, 476–81 (2006) (laying out the current state of patent law in this regard, some proposed justifications for it, and arguing in favor of a general, independent invention defense to patent infringement).

9. Jason Schultz & Jennifer M. Urban, *Protecting Open Innovation: The Defensive Patent License as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament*, 26 HARV. J.L. & TECH. 1, 2–3 (2012) (arguing that historically open innovation communities have struggled to determine what role patents should play in their communities, with the answer often being “none at all”).

10. *Id.* at 3.

11. *Id.* at 3–4.

12. See, e.g., Clark D. Asay, *The General Public License Version 3.0: Making or Breaking the FOSS Movement?*, 14 MICH. TELECOMM. & TECH. L. REV. 265, 286–91 (2008).

13. The most prominent example of such an approach is the Open Invention Network, which is intended to protect the Linux ecosystem. See OPEN INVENTION NETWORK, <http://www.openinventionnetwork.com/> (last visited May 13, 2013).

14. One of the more well-known of such pledges was made by International Business Machines in 2005. See Press Release, IBM Pledges 500 U.S. Patents to Open Source in Support of Innovation and Open Standards (Jan. 11, 2005), <http://www-03.ibm.com/press/us/en/pressrelease/7473.wss>.

open innovation companies have even begun to more aggressively acquire patents on their technologies, despite their normative misgivings about patents in general.¹⁵

More recently, some scholars argue that such measures are not enough.¹⁶ They urge open innovation communities to opt back into the patent system by acquiring more patents and adopting private ordering solutions meant to more thoroughly address patent risk in open innovation communities.¹⁷

What remains underexplored in this discussion, however, is the extent to which patents actually threaten and undermine open innovation. Assertions of patent risk to open innovation communities are common,¹⁸ but deep analyses of the actual risks and effects are not.¹⁹ Furthermore, the standard explanations of why patents pose particular risks to open innovation often treat open innovation communities monolithically.²⁰ But open innovation communities by definition typically consist of a diverse set of participants with significantly different risk profiles. This Article addresses these gaps by disaggregating open innovation communities into the most typical categories of participants and assessing the actual patent risks that each generally faces.

As detailed later in this Article, this risk analysis suggests that the actual patent risks that participants in open innovation communities face are in some cases fewer and in others greater than is often suggested. In particular, this Article identifies previously unexamined patent risks to open innovation communities that result from incompatibilities between the patent system and open innovation: that is, the decentralized, incremental, and cumulative nature of open innovation makes obtaining valid patents on openly innovated technologies more difficult than in other contexts for both informal and formal patent law reasons.

15. See, e.g., *Red Hat Patent Portfolio Gains Independent Recognition for Its Strength*, RED HAT BLOG (Mar. 17, 2011), <http://www.redhat.com/es/about/blog/red-hat-patent-portfolio-gains-independent-recognition-for-its-strength> (summarizing the company's general discomfort with the current patent system while also touting its own growing defensive patent portfolio).

16. See generally Schultz & Urban, *supra* note 9.

17. *Id.*

18. See *supra* note 6.

19. For one recent attempt to do so, see Debra Brubaker Burns, *Titans and Trolls Enter the Open-Source Arena*, 5 HASTINGS SCI. & TECH. L.J. 33 (2013), which provides a useful overview of many patent litigation suits against open innovation companies and some of the measures that open innovation communities might take to address these risks. This account, however, still falls short of disaggregating open innovation communities and assessing the actual patent risks that the component parts face, which this Article argues is crucial to both understanding the actual patent risks and assessing potential solutions.

20. For one such account, see James Boyle, *Open Source Innovation, Patent Injunctions, and the Public Interest*, 11 DUKE L. & TECH. REV. 30, 32–34 (2012).

Informally, the likelihood and desirability of these decentralized networks jointly pursuing and maintaining patents on what are often joint inventions is low; open innovation communities would need to increasingly take on firm-like coordination in order to do so, but the decentralization of such communities is typically viewed as one of their key virtues.

Formally, both the novelty and non-obviousness requirements under patent law may also pose challenges to patenting openly innovated technologies. For instance, the incremental, cumulative nature of open innovation increases the likelihood that others in the community have already implemented the technological concepts for which patents are sought (thereby in many cases defeating patent law's novelty requirement). And this may be so even in cases where the follow-on developer significantly improves the technology's overall performance. In other words, if others within an open innovation community have already implemented some form of the general concept for which patent protection is sought, in many cases it will not matter if another member of the community later significantly improves the concept's implementation if that implementation implicates the same general inventive concepts. In such cases, that second member of the community technically cannot obtain patent protection for their efforts since the second member's efforts are not new or "novel," as defined under patent law. And the cumulative, incremental nature of open innovation may make such results more likely since innovation within these communities often consists of members incrementally iterating on the contributions of the overall community.

But perhaps even more problematically, the cumulative, incremental nature of open innovation may mean that open innovation communities face heightened patenting hurdles because of patent law's non-obviousness requirement. This requirement generally prohibits patents for innovations that are obvious in light of what is already available to the public. Because open innovation communities make their innovations publicly available and often focus on incrementally and collectively iterating on those innovations, it may be more likely that many of those incremental contributions are obvious in light of what the rest of the community has already cumulatively contributed to the public. Indeed, this may be true even if the collective contributions of the community do cover significant inventive concepts that otherwise would be patentable (i.e., because, collectively, those concepts are non-obvious, even if the individual, incremental contributions to the general concept on their own are obvious).

This Article thus argues that using patents to combat patent risks may not be a viable long-term solution for open innovation communities because many of their innovations may not be practically or legally patentable. Indeed, so long as the patent system retains its bias in favor of centralized in-

novation at the firm level, open, decentralized models of innovation will remain at a distinct disadvantage in terms of patent protection.

Unlike the more uncompromising positions of patent abolitionists and patent hawks, however, this Article argues that open innovation and the patent system are not inherently mutually exclusive. One mode of innovation need not be chosen over the other.²¹ Instead, patent law can and should be reformed to better accommodate open innovation, while preserving patent rights where they matter most.

This Article suggests as one possible solution a two-track patent system that would grant open innovators and others an independent invention defense to patent infringement—a defense that exists today under copyright and trade secret law, but not under patent law—in exchange for an agreement not to assert patents against others except defensively. That is, for those willing to give up their right to assert patents against others, patent law's liability regime would be relaxed so long as the technology in question was independently developed, i.e., not copied.

Others have previously proposed an independent invention defense to patent infringement. But commentators have worried that such a defense may significantly weaken patent rights and thereby reduce incentives to invent and innovate.²² This Article argues that making the defense conditional helps address this concern by ensuring that the defense will only apply in contexts where patent rights are less important, as evidenced by inventors in those contexts giving up the right to assert patents offensively in exchange for the defense. In essence, the conditional nature of the defense would mean that industries would self-select depending on the actual role that patents play in any given industry.

This Article proceeds as follows. Part I lays out the theoretical framework for assessing patent risk in open innovation communities. It does so by first briefly introducing the predominant theories of patent law that may justify the current patent system, followed by an exploration of how open innovation appears to defy the logic of such theories. In short, the open innovation story may suggest that, in some technological fields, the benefit of a patent is unnecessary; parties will and do innovate without the need of a patent all the time. The Article will then lay out more fully the historical perception in open innovation communities that patents are not only unnecessary, but that they also impose undue hardships on open innovation that threaten to undermine it and its many benefits.

21. Accord Liza S. Vertinsky, *Making Room for Cooperative Innovation*, 41 FLA. ST. U. L. REV. 1067 (2014) (arguing in favor of modifying patent law remedies in order to better accommodate cooperative innovation while also preserving sufficient patent rights).

22. See, e.g., Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525 (2007) (questioning whether such a defense would too significantly weaken patent rights); Vermont, *supra* note 8 (advocating an independent invention defense to patent infringement).

Part II then analyzes to what extent these perceptions are true. It argues that, historically, assessments of patent risks to open innovation communities are flawed because they often treat “open innovation communities” uniformly in terms of the patent risks that they face. In reality, those that participate in open innovation range from the Microsofts of the world to individual non-commercial developers. The patent risks for these various types of actors differ. Consequently, in order to understand and address the risks that patents may or may not pose to open innovation, as an initial matter it is necessary to differentiate between such actors and identify the actual risks each faces.

The Article argues that patent risk lies primarily where open innovation projects have been significantly commercialized. Consequently, the story of the small, non-commercial developer being at risk is largely a myth. Non-commercial developers and open innovation foundations, which play an increasingly important role in open innovation communities, face few actual patent risks, even if in theory they do.

Conversely, what I call “Open Innovation Companies,” as well as other commercial users of open innovation projects, face patent risks from patent trolls and commercial competitors alike. While much of this risk is common to any enterprise engaged in commercial activity, some of the patent risk arises due to the decentralized, incremental, cumulative nature of open innovation itself. Indeed, this Article argues that the nature of open innovation means that both informal factors and formal patent law make patenting in open innovation communities more difficult than in the proprietary context. This difficulty, in turn, entails patent risks to open innovation communities because they are at a fundamental disadvantage in protecting themselves in a patent system built for innovators that do not share their open philosophy of innovation.

Part III then examines the various patent-centric strategies that others have advocated in order to address the patent risks that open innovation communities purportedly face. Based on the Article’s assessment of the actual risks as well as the current conflict between the patent system and open models of innovation, it finds that many of these strategies are misguided. In particular, it argues that strategies that rely on open innovation communities acquiring significant numbers of patents are likely not viable in the long term so long as the patent system retains its bias in favor of centralized innovation at the firm level.

Part IV briefly revisits patent law theory in light of the Article’s findings. It concludes that, while open innovation is at odds with many of the foundational assumptions of current patent law, the differences are arguably reconcilable. It then assesses possible solutions for addressing the actual patent risks that open innovation communities face which, if successfully implemented, may help reconcile the patent system with open innovation.

It suggests as a promising solution the above-mentioned two-track patent system that would allow open innovators and others to partially opt out of the patent system altogether.

In short, such a system would grant open innovators and others an independent invention defense to patent infringement—thus altering patent law’s liability regime to be more in line with copyright and trade secret law—in exchange for an agreement not to assert patents except defensively. How such a system might work, and its potential advantages and disadvantages, is assessed. The Article concludes by suggesting that the proposed solution holds promise not only for open innovation communities, but also for the broader patent system in general.

I. PATENT LAW THEORY

A. *Traditional Patent Law Theory*

The most conventional theory of patent law, often referred to as the “utilitarian” or “economic incentives” theory, holds that a potential inventor will not develop an invention without the promise of a patent.²³ If “free riders” were able to copy and redistribute the invention once available to the public and thereby appropriate much of its value, the initial inventor would not have sufficient ex ante incentives to develop the invention.²⁴ Society, therefore, would lose the benefit of the invention.²⁵ To address this perceived problem, patent law grants inventors exclusive rights in their inventions, thereby providing the inventor with improved opportunities to appropriate the value of it.²⁶ While the grant of these rights imposes significant costs on society,²⁷ it is the necessary tradeoff, the theory runs, to incentivize inventors to create and make their inventions available to the public.

Others have critiqued this school of thought by proposing alternative theories as the more appropriate justification for patent law. For instance, Edward Kitch’s “prospect theory” generally argues that patent law is justified as a means to efficiently channel and coordinate post-invention research and development.²⁸ That is, granting an inventor broad monopoly rights early on leads to more effective development and commercialization later on. As with granting mining rights, granting patent rights to inventors

23. See, e.g., Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 736–38 (2012).

24. See *id.* at 736 nn.158–59.

25. *Id.* at 736.

26. Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 993–94 (1997).

27. Lemley, *supra* note 23, at 736–37; see also Lemley, *supra* note 26; Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031 (2005).

28. Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977).

provides them with every incentive necessary, according to this theory, to further develop, license, and commercialize the invention.²⁹ Consequently, patent law satisfies its constitutional mandate by providing inventors the incentives necessary to develop their patented inventions for the benefit of society.

More recently, some scholars have advocated a related theory of patent law based more directly in the “commercialization” of patented inventions.³⁰ These scholars generally argue that the current patent system fails to provide sufficient incentives for inventors to further develop and commercialize their inventions, whereby society as a whole suffers and patent law’s constitutional mandate remains unmet. Such scholars, therefore, propose a number of reforms to the patent system that would provide inventors with greater incentives to commercialize their patented inventions. Mark Lemley has identified the prospect and commercialization theories as “ex post” theories of patent law, in contrast to the utilitarian “ex ante” theory of patent law.³¹

Another approach, disclosure theory, argues generally that patents benefit society and thereby meet their constitutional mandate by encouraging disclosure of inventions to the public.³² In this bargain between the inventor and society, the inventor gets exclusive rights in the invention in exchange for disclosing the invention to the public.³³ The public benefits from these disclosures, the theory goes, by obtaining both a new invention and new information that the inventor might have otherwise held secret.³⁴

All of these patent law theories have received significant criticism over the years. More recently, Mark Lemley has critiqued each of them on the basis of how technologies are actually invented and disclosed.³⁵ In a survey of hundreds of significant technologies, he found that most inventions are developed simultaneously by two or more teams working independently of each other.³⁶ This phenomenon of independent, simultaneous invention

29. *Id.*

30. See generally Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065 (2007); Michael Abramowicz & John F. Duffy, *Intellectual Property for Market Experimentation*, 83 N.Y.U. L. REV. 337 (2008); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697 (2001); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341 (2010).

31. Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129 (2004).

32. Lemley, *supra* note 23, at 745–46.

33. See, e.g., *Eldred v. Ashcroft*, 537 U.S. 186, 225 (2003) (Stevens, J., dissenting) (referring to a patent as a “*quid pro quo*” for disclosure); *Aronson v. Quick Point Pencil Co.*, 440 U.S. 257, 262 (1979) (identifying the “promot[ion of] disclosure of inventions” as a key function of the patent system); see also Lemley, *supra* note 23, at 745.

34. Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 541–42 (2009).

35. Lemley, *supra* note 23.

36. *Id.* at 711.

may suggest that the utilitarian theory of patent law is dubious; if in most cases several teams simultaneously come up with an invention independent of each other, then the canonical story where the sole genius capable of developing the invention needs the lure of a patent before undertaking that effort is largely a “myth.”³⁷ Patents may therefore be imposing unnecessary costs on society.

According to Lemley, the same phenomenon casts significant doubts on prospect and commercialization theories as well.³⁸ It may make little sense to grant strong exclusive rights to one inventor in order to facilitate effective post-invention research and development—the idea behind prospect theory—if the inventions are likely to be happened upon by any number of independent inventors. In other words, we might be imposing excessive and ultimately unnecessary costs on society through a patent if that patent were unnecessary to incent the activity in the first place and instead primarily acts to prevent follow-on innovation.

Indeed, Lemley’s survey finds that first inventors, armed with patent rights, often exercise those rights to delay product development and commercialization rather than facilitate it.³⁹ Other simultaneous, independent inventors are thereby prevented from pursuing follow-on inventive activities. Commercialization and prospect theories, therefore, are found lacking in light of how inventive activity typically happens.

Lastly, disclosure theory also arguably does not support patent law in its current incarnation. Significant evidence suggests that many follow-on inventors do not read patents.⁴⁰ And, even if they did, certain patent doctrines encourage disclosures that fail to provide valuable information, which may be one of the reasons that many follow-on inventors do not read patents in the first place.⁴¹ Furthermore, so many patents now issue each year that it is virtually impossible to read all patents that may implicate what potential inventors are researching, even if they wanted to.⁴²

Lemley proposes as a possible substitute for these theories a “patent racing” theory of patent law.⁴³ According to this theory, the current patent system may be justified because it encourages multiple actors to race each other to obtain the patent, whereby inventions are brought to the public

37. *Id.* at 710–12, 736–38.

38. *Id.* at 738–45.

39. *See generally id.*

40. *Id.* at 745–46.

41. *See, e.g.,* Alan Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. & TECH. 401, 403 (2010); Benjamin N. Roin, Note, *The Disclosure Function of the Patent System (or Lack Thereof)*, 118 HARV. L. REV. 2007, 2023 (2005).

42. The U.S. Patent and Trademark Office issued 277,835 patents in 2013. *U.S. Patent Statistics Chart Calendar Years 1963–2013*, U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm (last modified July 24, 2014).

43. Lemley, *supra* note 23, at 749–60.

more quickly than they otherwise might be.⁴⁴ Furthermore, such racing may mean better inventions as inventors compete to outdo each other.⁴⁵ While some have critiqued patent racing as wasteful because it encourages multiple actors to chase a prize that only one of them will ultimately claim, Lemley suggests that the benefits of racing may counterbalance any such waste.⁴⁶

B. The Open Innovation Challenge to Patents

The story of open innovation may present an even more fatal challenge to each of these theories: a patent system, in whatever form, may be unnecessary to obtain the societal benefits that these theories all argue a properly constituted patent system helps encourage.

This is the argument of some in open innovation communities in its strongest form,⁴⁷ and in many contexts, it appears to hold some credence. The free and open source software movement, for instance, is the flagship open innovation movement from which many other fledgling open innovation communities draw their inspiration. It has proven incredibly successful in yielding some of the most popular technologies in the world.⁴⁸ And, much of this development activity has been pursued without seeking patent rights on the inventions. Other incentives appear to motivate such inventors than the right to exclude others from the invention in order to commercially exploit it themselves.⁴⁹ In fact, the very purpose of open innovation movements is to make the technology as widely available as possible, with few restrictions.

The licenses upon which these open innovation movements rely clearly illustrate this permissive intent. In addition to granting broad copyright licenses, many of the most important open licenses also include broad patent licenses.⁵⁰ While many in open innovation communities do not pursue patents for ideological reasons, many of the most important licenses guarantee that, if the developers do own patents covering the technology, they will not assert them against subsequent users of the technology. Some of the licenses do not include explicit patent terms, although even these arguably

44. *Id.*

45. *Id.*

46. *Id.*

47. See, e.g., *Patents*, ELEC. FRONTIER FOUND., <https://www EFF.ORG/patent> (last visited May 14, 2013) (arguing in favor of eliminating the current patent system and citing the free and open source software movement as an example of a movement that does not rely on patents in order to invent and innovate).

48. An exhaustive list of such technologies is impossible, but some of the more popular ones include Linux, Android, Apache Webserver software, Mozilla Firefox, Chrome, among others.

49. For an overview of the different types of motivations behind open innovation, see Clark D. Asay, *A Case for the Public Domain*, 74 OHIO ST. L.J. 753, 762–65 (2013).

50. For an overview of typical terms, see *id.* at 759–62.

include an implied patent license given the distinctly permissive wording and nature of such licenses.⁵¹

Each of the traditional patent law theories flounders to some extent when taking into account the paradigmatic account of open innovation. Utilitarian patent theory is perhaps the least justifiable. Indeed, in open innovation communities, inventive activities typically occur in spite of patent rights, not because of them. As discussed more fully below, patents may function more as a disincentive to open innovation rather than as an *ex ante* incentive.

Prospect theory also faces a stiff challenge from the story of open innovation. On first glance, open innovation movements may seem to lend some credence to prospect theory. After all, if open innovation communities would simply aggressively pursue patents, patents could play a similar role in these movements as copyright does, *i.e.*, by providing a basis by which to license and further deploy the technology, free of entanglements. In fact, arguably some form of this intuition might be gleaned from recent proposals arguing that open innovation communities should pursue patents more aggressively in order to better guarantee their freedom to operate.⁵²

But to suggest open innovation movements lend credence to prospect theory misapprehends both prospect theory and the nature of open innovation. The point in open innovation communities is not that patents yield significant benefits by allowing intellectual property owners to control subsequent research and development. Instead, the point is to grant other users significant freedoms so that they can further develop the technologies without the control and supervision that intellectual property rights owners often exercise. Patents, therefore, are unnecessary and are in fact an obstruction to open innovation insofar as they threaten these freedoms. Patents may become helpful in some cases—for instance, to defend oneself from patent aggression—simply because open innovation communities exist in a world where their innovation model is not always the norm. But to argue that the experience of open innovation supports prospect theory is circular reasoning at best.

Direct commercialization theory also runs into difficulties in accounting for open innovation. Google's Android, Linux, Apache web server software, Mozilla's Firefox, among many other significant commercial technologies, all provide strong evidence that patents are unnecessary in many contexts for the successful commercialization of inventions. In fact,

51. Christian H. Nandan, *Closing the Loophole: Open Source Licensing & the Implied Patent License*, 26 THE COMPUTER & INT. LAW. 1 (2009), available at <http://www.scribd.com/doc/46088081/Closing-the-Loophole-Open-Source-Licensing-amp-the-Implied-Patent-License-Nandan> (indicating that some FOSS licenses include express patent licenses, while the others may contain implied patent licenses).

52. See Schultz & Urban, *supra* note 9.

precisely the opposite conclusion may be more reasonable: improved commercialization of technologies results in the absence of exclusive patent rights.

It is true that some contributors to openly innovated technologies that have experienced commercial success have obtained patents reading on them.⁵³ But it is hard to seriously argue that they have done so because of the ability to exclude. Indeed, the point of releasing such technologies as open innovation is to encourage free and widespread use, without the concern of being sued for patent infringement. For this reason, as mentioned, many of the more significant open innovation licenses include patent licenses to downstream users, thereby assuaging potential patent concerns of those users.

Disclosure theory fares no better in the face of open innovation. If nothing else, open innovation movements show that inventors are often willing to disclose everything—even the “secret sauce” of source code in the free and open source software world—without the benefit of a patent. Indeed, in the open innovation world the disclosures are often significantly more useful than what may be found in a patent application. A patent application for a software program, for instance, typically will not include source code details⁵⁴ and may, in fact, include very little useful information for subsequent inventors.⁵⁵

Patent racing theory and its intersection with open innovation movements is perhaps the most complicated theoretical story. The story of open innovation appears to synchronize well with many of the findings and recommendations of Lemley’s study. For instance, open innovation is another instance of inventive activity being a “social phenomenon” rather than something lone geniuses pursue in isolation;⁵⁶ central control of inventive activity is the very antithesis of open innovation movements.⁵⁷ Open innovation movements include significant examples of second comers effectively implementing inventions in ways that eventually surpass those of the first mover.⁵⁸ And the effective diffusion of knowledge that such movements encourage helps lead to significant innovation.⁵⁹

53. See, e.g., *supra* note 15.

54. Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1162 (2002) (“[A] series of recent Federal Circuit decisions has all but eliminated the enablement and best mode requirements. In recent years, the Federal Circuit has held that software patentees need not disclose source or object code, flow charts, or detailed descriptions of the patented program.”).

55. See *supra* note 41 and accompanying text.

56. Lemley, *supra* note 23, at 750.

57. *Id.*

58. *Id.*

59. *Id.*

But at least the paradigmatic open innovation story has a hard time squaring with much of Lemley's patent racing theory. Participants in open innovation communities are typically either patent agnostic or patent averse; patents, in short, are not what motivates their inventive activity and in fact may threaten it. If any sort of racing is involved, it might better be described as "technology racing"; users often adopt openly developed technologies because they believe in the model itself in terms of producing higher quality technology more quickly.⁶⁰ Open innovation is thus a model by which users may seek development advantages over their competitors.⁶¹

But as open innovation has increased in its commercialization, "patent racing" may also increasingly join the "technology racing" advantages of open models of innovation as important "sticks" to be obtained. In open innovation communities, patents are almost always "sticks" rather than "carrots"; most such communities that do pursue patents have explicitly indicated that their purpose in doing so is to help prevent their innovations from being excluded from the marketplace.⁶² Furthermore, a core tenet of recent proposals calling for open innovation communities to more diligently pursue patents is that such patents should only be used for defensive purposes.⁶³ And none of this is surprising given such communities' general purpose of making their technologies freely available for society's use.

If open innovation communities do, in fact, begin to pursue patents more aggressively, could such a move help justify patent law based on a patent racing theory? After all, such patenting could mean that open innovation communities develop better inventions more quickly as they race to obtain "sticks" with which to protect their innovative environments. But as this Article will argue, even in such a case, patent racing theory breaks down under scrutiny. The patent system, in such an account, becomes its own justification. If the patent system is the world open innovators are forced to live in, then opting out may simply be a form of technological suicide. And so they pursue patents. But to justify the patent system by highlighting the fact that open innovation communities prefer life over death is hardly a strong justification at all. In short, current patent law and the traditional theories behind it almost certainly fall short in accounting for alterna-

60. See, e.g., Katherine Noyes, *10 Reasons Open Source Is Good for Business*, PCWORLD (Nov. 5, 2010), http://www.pcworld.com/article/209891/10_reasons_open_source_is_good_for_business.html; David A. Wheeler, *Why Open Source Software / Free Software (OSS/FS, FLOSS, or FOSS)? Look at the Numbers!*, DWHEELER.COM (May 8, 2014), http://www.dwheeler.com/oss_fs_why.html.

61. See Noyes, *supra* note 60; Wheeler, *supra* note 60.

62. See, e.g., *Statement of Position and Our Promise on Software Patents*, RED HAT (2014), http://www.redhat.com/legal/patent_policy.html; *About OIN*, OPEN INVENTION NETWORK (2014), <http://www.openinventionnetwork.com/about.php>.

63. Schultz & Urban, *supra* note 9.

tive theories and modes of innovation. But, as this Article will argue, this need not remain so.

C. *The Patent Challenge to Open Innovation*

According to many in open innovation communities, patents are not only unnecessary to trigger inventive activity, they are the avowed enemy.⁶⁴ In the free and open source software world, for instance, many free and open source software luminaries argue vociferously against software being patentable at all.⁶⁵ The “computational ideas” for which patents are often sought and obtained are the basic building blocks of software programs;⁶⁶ they are mathematical formulas, in essence “laws of nature,” that should fall outside of patentable subject matter.⁶⁷ Taking them out of the public domain through a patent grant prevents others, including specifically those in open innovation communities, from using these basic concepts to create additional technology. Consequently, future developers, users, and society in general suffer.⁶⁸

Other patent-related risks to open innovation communities may arise based on how the patent system is administered. For instance, those in open innovation communities have long voiced concerns over the breadth and indeterminate scope of issued patents, especially in the software and infor-

64. See RUSSELL C. PAVLICEK, EMBRACING INSANITY: OPEN SOURCE SOFTWARE DEVELOPMENT 161 (2000) (“The use of software patents has been a real problem in the Open Source world.”); DONALD K. ROSENBERG, OPEN SOURCE: THE UNAUTHORIZED WHITE PAPERS 240 (2000) (describing software patents and the threat of patent infringement as the “monster hiding under every software developer’s bed”); Heather J. Meeker, *Open Source and the Age of Enforcement*, 4 HASTINGS SCI. & TECH. L.J. 267, 274–75 (2012) (summarizing the significant open source software case, *Jacobsen v. Katzer*, 535 F.3d 1373 (Fed. Cir. 2008), and noting that, because the case was originally filed as a patent case, it fed “on fears that the existence of software patents spell death for open source projects”); Richard Stallman, *The GNU Operating System and the Free Software Movement*, in OPEN SOURCES: VOICES OF THE OPEN SOURCE REVOLUTION 53, 67 (Chris DiBona et al. eds., 1999) (“The worst threat we face comes from software patents, which can put algorithms and features off-limits to free software for up to twenty years.”), available at <http://www.gnu.org/gnu/thegnuproject.html>; *Statement of Position*, *supra* note 62 (indicating that software patents generally impede innovation and are inconsistent with free and open source software).

65. See, e.g., RICHARD M. STALLMAN, FREE SOFTWARE, FREE SOCIETY: SELECTED ESSAYS OF RICHARD M. STALLMAN 21 (2d ed. 2010).

66. *Id.* at 143; McMillan, *supra* note 6; Joe Mullin, “Your Criticisms Are Completely Wrong”: Stallman on Software Patents, 20 Years in, ARS TECHNICA (Nov. 21 2012), <http://arstechnica.com/tech-policy/2012/11/your-criticisms-are-completely-wrong-stallman-on-software-patents/>.

67. BEN KLEMENS, MATH YOU CAN’T USE: PATENTS, COPYRIGHT, AND SOFTWARE 44–72 (2006), available at http://www.e-read-ing.org.ua/bookreader.php/133502/Math_You_Can%20t_Use%3A_Patents,_Copyright_and_Software.pdf.

68. See *supra* note 66.

mation technology industries.⁶⁹ Richard Stallman, the founder of the free software movement, argues that in many contexts it is impossible to determine what software any given patent covers; nor is it feasible to read all relevant patents, even if they were understandable.⁷⁰ Consequently, avoiding the patent by simply designing around it becomes nearly impossible.⁷¹ Other options, such as licensing the patent or seeking to overturn it in court, also come with significant challenges such as an unwilling licensor and, in many cases, resource constraints on the part of the developer.⁷² As a result, for some developers opting out of inventive activity may be the only rational route.

Many in open innovation communities also take issue with how obvious and “unnovel” they perceive many issued patents to be. For a patent to be issued, the Patent Statute requires that an invention be, among other requirements, both “novel” and “non-obvious.”⁷³ Novelty generally requires that the invention be something that others have not yet invented and publicly disclosed; it must be new to the consuming public, and a patent technically may not issue if each of the claim elements in a patent application is found in a single prior art reference.⁷⁴ The non-obvious requirement generally requires that the invention cannot be an obvious improvement on, or change to, the prior art based on the knowledge of someone who has ordinary skill in the relevant art.⁷⁵ Yet, many issued patents cover concepts that, according to those in open innovation communities, have either been in use for some time or would have been so obvious to anyone in the field

69. See, e.g., Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905 (2013) (arguing that a primary problem with software patents is that they are drafted to cover functions rather than the specific software invention, and suggesting courts can correct this problem by limiting software claims to the means described in the patent of implementing the function).

70. See RICHARD M. STALLMAN, *FREE SOFTWARE, FREE SOCIETY: SELECTED ESSAYS OF RICHARD M. STALLMAN* 98 (1st ed. 2002), available at <http://www.gnu.org/philosophy/fsfs/rms-essays.pdf> (“The first thing you might want to try to do, to deal with the patent system, is find out what patents may cover the program you want to write. This is impossible.”); accord BESSEN & MEURER, *supra* note 2, at 46–94 (explaining how patent claims fail to provide sufficient notice of the boundaries of the invention).

71. STALLMAN, *supra* note 70, at 98.

72. *Id.* at 103–07.

73. 35 U.S.C. §§ 102–03 (2012) (specifying the novelty requirement and the non-obvious requirement, respectively).

74. Richard H. Stern, *The Bundle of Rights Suited to New Technology*, 47 U. PITT. L. REV. 1229, 1249 (1986) (“The subject matter of a patent must be novel, [that is] . . . not disclosed in any prior publication or commercial product . . .”).

75. Gregory N. Mandel, *Another Missed Opportunity: The Supreme Court’s Failure to Define Nonobviousness or Combat Hindsight Bias in KSR v. Teleflex*, 12 LEWIS & CLARK L. REV. 323, 324–25 (2008).

that patenting such an idea is viewed by many in the open innovation world (and elsewhere) as unjust.⁷⁶

According to many commentators, open innovation communities experience the risks associated with such problems even more acutely than others.⁷⁷ Open innovation communities are often widely dispersed networks of contributors without the traditional incentives or resources to obtain patents.⁷⁸ Consequently, individual contributors in those networks can be more easily stopped in their inventive tracks because they typically lack resources or patents with which to protect themselves from patent aggressors through, for instance, a defensive patent portfolio, cross-licensing, or challenging the asserted patents' validity in court.⁷⁹ Because of the cumulative nature of open innovation, "royalty stacking"—where literally thousands of patents may read on a particular technology—and "patent holdup"—where each such patent holder is able to extract a higher fee than is warranted because of the threat of an injunction—also may become more likely. Such issues thus further exacerbate the patent risks for many of the resource-constrained participants in open innovation communities.⁸⁰

Consequently, despite the significant benefits of open innovation, it is, according to many, in constant peril. Accordingly, many that subscribe to an open model of innovation have called for significant reforms to patent law to protect these communities from aggressive patent holders that, it is argued, only stymie innovative activity. Often the call is simply one of patent abolition.⁸¹ Others have set forth serious proposals that rely on private ordering solutions to address the perceived patent nemesis; these private ordering solutions typically rely on these communities aggressively pursuing patents in order to better defend themselves.⁸² Without doing something, the argument goes, open innovation and its many virtues are in danger.

76. Richard Stallman, *The Anatomy of a Trivial Patent*, GNU OPERATING SYSTEM (Apr. 12, 2014), <http://www.gnu.org/philosophy/trivial-patent.html>.

77. Boyle, *supra* note 20, at 32–33 (arguing that, because no one contributor in the network internalizes all the costs and benefits of the cumulative innovation, each of the contributors fails to have the right set of incentives to pursue patents); McMillan, *supra* note 6 (quoting Linus Torvalds, the creator of Linux, who said “[c]learly the open source ‘way of life’ is much less amenable to software patents than proprietary software is”); Mueller, *supra* note 6.

78. Boyle, *supra* note 6, at 32–33.

79. *Id.*; STALLMAN, *supra* note 70 at 103–04; McMillan, *supra* note 6; Mueller, *supra* note 6.

80. Boyle, *supra* note 20; *see generally* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

81. *See, e.g.*, END SOFTWARE PATENTS, <http://endsoftpatents.org/> (last visited May 14, 2013); Vivek Wadhwa, *Why We Need to Abolish Software Patents*, TECHCRUNCH (Aug. 7, 2010), <http://techcrunch.com/2010/08/07/why-we-need-to-abolish-software-patents/>; Accord Michele Boldrin & David K. Levine, *The Case Against Patents*, 27 J. ECON. PERSP. 3 (2013), available at <http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.27.1.3>.

82. Schultz & Urban, *supra* note 9.

II. ASSESSING PATENT RISKS TO OPEN INNOVATION COMMUNITIES

So far this Article has laid out the predominant theories behind patent law; the open innovation challenge to those theories; and how patent law, according to the open innovation challenge, not only fails to incent innovative activity in important technology sectors, but instead may directly threaten what many perceive as a better model of innovation.

But are the alleged patent risks to open innovation communities real? Does the rhetoric match reality? While allegations of patent risk to open innovation are common, less common are nuanced analyses of what the risks actually are and how such risks may affect different participants in the open innovation world.

Open innovation communities, after all, are not monolithic—those that participate in open innovation are as varied as they are numerous. Thus, patents do not affect all participants the same way. Describing patent risks in broad strokes, without breaking down the risks that patents pose to different categories of participants in the open innovation world, thus runs the risk of misapprehending the problems as well as possible solutions. The following sections describe more specifically the general categories of participants in open innovation communities and the patent risks that each may face.

A. *Non-Commercial Developers*

Non-commercial developers—whether individual developers or a group of individuals—often play the starring role in the narrative of how patents threaten open innovation.⁸³ The paradigmatic non-commercial developer has all the virtues necessary to inspire significant sympathy: cash-strapped, yet willing to freely contribute significant amounts of innovation, all for the love of creativity and a strong streak of idealism. Threatened with a patent suit, the resource-restrained developer is forced to shut down.⁸⁴ And society loses.

There are several problems with this narrative, however. First, increasingly more openly innovated technologies are developed by those paid to do so.⁸⁵ While certainly much open innovation results absent direct economic incentives, increasingly much of it does not, at least not anymore. Second, even those that contribute absent direct economic incentives often have significant indirect economic incentives as motivation.⁸⁶ In short, the

83. See generally STALLMAN, *supra* note 65.

84. See STALLMAN, *supra* note 70, at 105–07.

85. For instance, by some estimates, seventy-five percent of Linux code is written by developers paid to do so. See, e.g., *75% of Linux Code Now Written by Paid Developers*, APC (Jan. 20, 2010), <http://apcmag.com/linux-now-75-corporate.htm>.

86. See Asay, *supra* note 49, at 763–75.

independent developer who engages in open innovation purely out of idealism or altruism may be increasingly a rare species.

But more importantly for purposes of this Article, the patent risks that non-commercial developers face are negligible. Patent trolls have few if any incentives to come after them, since non-commercial developers may be both hard to find and cash-strapped.⁸⁷ Patent trolls better serve their interests asserting their patents against downstream commercial users of openly innovated technologies, since they have resources with which to pay a toll⁸⁸ and expensive commercial products that make their likely returns higher.⁸⁹

Patent trolls could pursue actions against both non-commercial and commercial developers. But if trolls sued non-commercial developers and a patent license from the troll were the result,⁹⁰ the trolls might be prevented on the basis of that license from pursuing more lucrative actions against downstream commercial users of the same technologies.⁹¹

Furthermore, typically non-commercial developers simply release technology in raw form, not as well-developed, documented, fully functioning products. Consequently, patent trolls may face increased difficulty in discerning what the technology of non-commercial developers actually does and, accordingly, whether it is related to the claims of their patents.⁹²

So far, patent troll litigation bears out these intuitions. While patent trolls have sued small software application developers that utilize openly innovated technologies in their products,⁹³ such developers are, ultimately,

87. Indeed, for such reasons, patent trolls have recently relented in pursuing litigation against cash-strapped podcasters. See, e.g., Nilay Patel, *Patent Troll Drops Suit Against Adam Carolla After Discovering Podcasts Don't Make Any Money*, THE VERGE (Aug. 20, 2014), <http://www.theverge.com/2014/8/20/6048303/patent-troll-drops-suit-against-adam-carolla>.

88. For a useful study of the patent troll industry, including a breakdown of the different types of trolls and the typical tactics used by each, see generally Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117 (2013).

89. *Id.* at 2164.

90. It may seem unlikely that non-commercial developers would be savvy enough to negotiate the license agreement such that downstream users of the technology were protected. One can imagine, however, that if patent trolls did begin to come after non-commercial developers, access to pro bono counsel and the like would become available.

91. Lemley & Melamed, *supra* note 88, at 2164 & n.197.

92. Indeed, openly innovated technologies often fail to serve well as prior art in invalidating new patent applications. For instance, in the free and open source software world, where projects are often simply hosted as raw source code, patent examiners typically lack the expertise, time, or a combination of both to assess what inventive concepts the source code covers. For this very reason, the Linux Defenders group has begun an effort to better document what inventive concepts various free and open source software projects cover. See *Our Mission*, LINUX DEFENDERS, http://linuxdefenders.org/?page_id=167 (last visited May 15, 2013).

93. Burns, *supra* note 19, at 64–72. Patent trolls are also increasingly targeting start-up companies, while traditionally they focused on larger companies. See Colleen V. Chien, *Startups and Patent Trolls* (Santa Clara Univ. Legal Studies Research Papers Series, Paper No. 09-12, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2146251.

still commercial enterprises that have something patent trolls want. It is possible that patent trolls have asserted patents against non-commercial developers and have simply settled quietly with them in a manner that forbade disclosure of the assertion or settlement. But the low likelihood of patent assertions in the first place makes the likelihood of such confidential settlements similarly low. Furthermore, if such assertions did exist, it seems almost certain that the resource-constrained non-commercial developers would turn to the broader open innovation world for assistance, which would almost certainly lead to significant publicity. But so far, such publicity has not occurred. In short, non-commercial developers face little actual patent risks from patent trolls. If the non-commercial developer does ultimately commercialize the technology, the analysis, of course, changes.⁹⁴

Do non-commercial developers face patent risks from commercial entities, whose products and services compete with the non-commercial developers' freely available technology? Many in the free and open source software world have long worried about the menacing stance of Microsoft with respect to Linux, whose codebase includes significant contributions from non-commercial developers.⁹⁵ Others share anecdotal stories about commercial competitors wielding their patents in ways that ultimately forced non-commercial developers to stop developing some technology altogether.⁹⁶

But though such patent risks are credible in theory, in reality they have generally not materialized. For instance, Microsoft appears to have never asserted its patents against non-commercial contributors to Linux.⁹⁷ In fact, more recently the company has gone so far as to pledge not to assert its patents against individual non-commercial developers.⁹⁸ Microsoft has wield-

94. For an example of a non-commercial developer facing increased patent risk once it attempted to commercialize the technology, see Florian Mueller, *IBM Breaks the Taboo and Betrays Its Promise to the FOSS Community*, FOSS PATENTS BLOG (Apr. 6, 2010), <http://www.fosspatents.com/2010/04/ibm-breaks-taboo-and-betrays-its.html> (discussing the case of TurboHercules, an open source software company facing patent assertions from IBM despite having existed as a non-commercial product for nearly eleven years prior to the assertions); see also Dana Blankenhorn, *Linux Tries to Quiet the TurboHercules Mob for IBM*, ZDNET (Apr. 8, 2010), <http://www.zdnet.com/blog/open-source/linux-tries-to-quiet-the-turbohercules-mob-for-ibm/6212>.

95. Burns, *supra* note 19, at 58–61.

96. See STALLMAN, *supra* note 65; Adam Back, *PGP Timeline*, CYBERSPACE, <http://www.cyberspace.org/adam/timeline/> (last visited May 16, 2013) (reconstructing one such anecdote).

97. Microsoft has asserted its patent portfolio against commercial users of Linux extensively. See Steven J. Vaughan-Nichols, *Microsoft Profits from Linux Patent FUD*, ZDNET (July 25, 2012), <http://www.zdnet.com/microsoft-profits-from-linux-patent-fud-7000001598/>. But thus far no known evidence suggests they regularly go after non-commercial developers. And if such assertions had been made, it seems highly likely that significant publicity would result.

98. See *Microsoft and Novell Announce Broad Collaboration on Windows and Linux Interoperability and Support*, MICROSOFT NEWS CTR. (Nov. 2, 2006), <http://news.microsoft.com/2006/11/02/microsoft-and-novell-announce-broad-collaboration-on->

ed its patents against commercial developers and users of Linux and Android.⁹⁹ But that is a different class of actors that faces a different patent risk profile, as discussed below. Other commercial actors also appear to have largely abstained from asserting patents against non-commercial developers.¹⁰⁰

Part of the reason for commercial entities' forbearance is likely due to open innovation's maturation as a model of innovation. Open models of innovation have proven sustainable and credible in yielding significant amounts of freely available technology, despite some early prognostications that success was unlikely.¹⁰¹ Commercial enterprises use such technology extensively, and in some cases they use the openly innovated technologies rather than expending resources to build or continue their own product lines.¹⁰² In other words, it typically makes little sense to assert patents against non-commercial developers and thereby sour relations with the wider developer community; they provide free development efforts that often reduce the company's own research and development expenditures.

This factor manifests itself in other ways as well.¹⁰³ For instance, in many cases technology companies depend on good relationships with developer communities, both in terms of hiring and in terms of developers creating ancillary products and services for the company's core products and services. The software application marketplaces of Apple, Google, Microsoft, and Amazon are just a few such examples. Other technology companies also often provide developers with software and hardware develop-

windows-and-linux-interoperability-and-support/ (discussing the newfound partnership between Microsoft and Novell as well as Microsoft's agreement to "not assert its patents against individual noncommercial open source developers").

99. Vaughan-Nichols, *supra* note 97.

100. See Burns, *supra* note 19, at 56–72 for a general overview of the known patent actions brought against users of free and open source software, for instance. Again, it is impossible to know whether this is entirely true because the threatened developers may not have publicized the event or may have been prevented from doing so based on settlement terms. It seems quite likely, however, that if such assertions of patents were anything approaching routine, those in the open innovation world would know about them and use them extensively in their ongoing campaign against patents in general. But other than a few anecdotes, reports of such incidents are non-existent.

101. See Asay, *supra* note 49, at 765–68.

102. See, e.g., Arik Hesseldahl, *IBM Makes a Big Bet on OpenStack in the Cloud*, ALL THINGS D (Mar. 4, 2013), <http://allthingsd.com/20130304/ibm-makes-a-big-bet-on-openstack-in-the-cloud/> (summarizing IBM's decision to adopt OpenStack as the engine powering its Cloud solutions and analogizing the move to when IBM abandoned its own operating system development efforts in favor of Linux).

103. See BLACK DUCK, OPEN SOURCE GOVERNANCE IN HIGHLY REGULATED COMPANIES 5 (2013), *available at* http://www.blackducksoftware.com/noindex/salesforce/pdfs/OSS_Governance_UL.pdf (discussing the "brand" risk firms face when failing to abide by FOSS requirements and discussing a specific example of Microsoft's failure to adhere to FOSS license requirements and the resulting damage to Microsoft's relationship with the developer community).

ment kits aimed at encouraging developers to create products and services that interoperate with the company's platform or service.¹⁰⁴ One sure-fire way to create bad rapport with developer communities is to threaten them with patents.

Lastly, the possibility that license agreements with the upstream non-commercial developers may foreclose actions against more strategic downstream users may also play a role in reducing the risk that non-commercial developers face from commercial actors. In most cases, commercial competitors are likely better served in targeting the downstream commercial user or producer of the competitive technology, not the upstream, non-commercial originator of it.

Consequently, except perhaps in unique circumstances, patent assertions from commercial competitors are unlikely, notwithstanding the fact that commercial enterprises may own patents covering technologies that open innovation communities develop. Indeed, in the case of non-commercial developers, strategic reasons for commercial enterprises to assert patents against them may rarely, if ever, exist.

None of this is to say that patents do not affect non-commercial developers. The perceived risk may still be significant enough to deter some would-be non-commercial developers from pursuing a line of development. Again, some anecdotal evidence suggests that this has happened.¹⁰⁵ But anecdotal evidence also suggests that other non-commercial developers do not worry about patents at all.¹⁰⁶ And such behavior falls in line with what some recent studies suggest in general: most developers largely ignore patents in their development efforts.¹⁰⁷ For non-commercial developers in the world of open innovation, such behavior results in little actual patent risk.

104. For a few such examples, see *Android Studio*, ANDROID, <http://developer.android.com/sdk/index.html> (providing a link to download the software development kit to the Android operating system) (last visited May 29, 2013); *Developing Apps for iPad*, APPLE, <https://developer.apple.com/ipad/sdk/> (providing the same for developing software apps for the iPad) (last visited May 29, 2013); *SAK Hardware Development Kit*, MICROSOFT, [http://msdn.microsoft.com/en-us/library/gg130920\(v=winembedded.0\).aspx](http://msdn.microsoft.com/en-us/library/gg130920(v=winembedded.0).aspx) (providing links to a Microsoft server hardware development kit).

105. See FOGEL, *supra* note 6; STALLMAN, *supra* note 65.

106. Mark Hachman, *Open Source File System Takes on Microsoft's exFAT Patents*, READWRITE (Jan. 22, 2013), <http://readwrite.com/2013/01/22/open-source-file-system-takes-on-microsofts-exfat-patents> (indicating that a developer who purportedly designed around some Microsoft technologies, when asked if his solution was free of patent risk, responded, "I don't know You should consult a lawyer. I run this project just for fun and don't care about patents because I'm not a U.S. resident.").

107. Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19 (2008) (indicating that available evidence suggests that most enterprises ignore patents in their development efforts).

B. Foundations

Foundations have become an increasingly important way by which open innovation projects are managed.¹⁰⁸ Foundations provide diverse contributors to an open innovation project a variety of benefits, including ensuring that no one company owns or controls the contributed technology.¹⁰⁹ For instance, in cases where the project is run and owned by a single company, contributors to the project have less certainty about how that company might use their contributions in the future, including the possibility that the company will “close” the project at some point.¹¹⁰ Such possibilities, in fact, may drive potential contributors away from the project.¹¹¹

Foundations help solve this and related issues by decentralizing power and decisionmaking authority.¹¹² All contributors to a foundation-run project either license or assign their rights in their contributions to the foundation, which then manages the project on behalf of the contributors.¹¹³ A variety of different types of foundations exist, from non-profit charitable organizations that largely rely on donations and volunteer work to non-profit trade associations that employ some staff.¹¹⁴ Some of the more well-known foundations include the Apache Software Foundation (managing various Apache-licensed software projects),¹¹⁵ the Linux Foundation (managing Linux-related projects),¹¹⁶ the Free Software Foundation (managing various software projects relating to the GNU operating system),¹¹⁷ and the Open Compute Project (started by Facebook, and managing permissively licensed hardware specifications).¹¹⁸

Based on their management, use, and distribution of openly innovated technologies, foundations could be subject to patent assertions from both patent trolls and commercial competitors. Consequently, these increasingly important organizations could in theory face significant patent risks.

108. Paula Hunter & Stephen Walli, *The Rise and Evolution of the Open Source Software Foundation*, 5 INT’L FREE & OPEN SOURCE SOFTWARE L. REV. 31 (2013), available at <http://www.ifosslr.org/ifosslr/article/view/64>.

109. *Id.* at 32–34.

110. *Id.* at 34 (reviewing as an illustration of this issue the example of MySQL, a popular open source database program, and its subsequent acquisition by Oracle).

111. *Id.*

112. *Id.* at 33–34.

113. *Id.*

114. *Id.* at 32–33.

115. *See generally* THE APACHE SOFTWARE FOUNDATION, <http://www.apache.org/> (last visited Nov. 14, 2014).

116. *See generally* THE LINUX FOUNDATION, <http://www.linuxfoundation.org> (last visited Nov. 14, 2014).

117. *See generally* FREE SOFTWARE FOUNDATION, <http://www.fsf.org/> (last visited Nov. 14, 2014).

118. *See generally* OPEN COMPUTE PROJECT, <http://www.opencompute.org/> (last visited Nov. 14, 2014).

Several factors limit the potential risks, however. First, foundations generally do not make attractive targets for patent trolls for much the same reason that non-commercial developers do not: they often have very little in the way of resources with which to satisfy a troll's monetary demands.¹¹⁹ And, as with non-commercial developers, trolls are less likely to target foundations since they are neither users nor makers of expensive, complex commercial products that make higher returns more likely.¹²⁰

Furthermore, even in cases where foundations do possess greater resources, the foundations may face reduced risk from patent trolls because the projects that they manage are not self-evident in terms of what they do. For instance, in the case of free and open source software, it may not be self-evident from the source code, or human-readable version of the software, what inventive concepts the source code covers.¹²¹ And projects often are simply released as source code, with very little in the way of documentation regarding the overall inventive concepts.¹²² Consequently, in many cases patent trolls will have difficulty determining whether, in fact, open innovation projects may infringe upon their patent claims.

Some foundation-managed open innovation projects that have been incorporated into popular commercial projects may be more self-evident in terms of what patents may read on such projects. But in such scenarios, patent trolls are still more likely to go after the downstream commercial users of the openly innovated technology than the foundation because they will likely obtain higher rewards in doing so.¹²³ Indeed, if a patent troll sued a foundation and the foundation obtained a patent license from the patent troll in resolution of the patent dispute, the license may be negotiated in such a way as to preclude the patent troll from pursuing more lucrative actions against downstream commercial users of the same technologies.¹²⁴

One could imagine some scenarios where it might be preferable for a patent troll to assert patents against the foundation rather than a commercial company. For instance, the company, armed with more resources, may be more capable than a foundation in invalidating or contesting the patent in court.¹²⁵

119. Hunter & Walli, *supra* note 108, at 32–33 (discussing the non-profit status of foundations and the manner in which they are funded as such).

120. *See supra* note 88 and accompanying text.

121. *See supra* note 92 and accompanying text.

122. *See supra* note 92 and accompanying text.

123. *See supra* note 88 and accompanying text.

124. *See supra* note 91 and accompanying text.

125. Some have suggested that this may be a benefit of large commercial enterprises becoming more deeply involved in open innovation. *See, e.g.*, Robin Bloor, *Patents and the Threat to Open Source*, THE REGISTER (July 2, 2004), http://www.theregister.co.uk/2004/07/02/patents_threaten_open_source/ (positing that the most likely targets of patent suits based on the use of open innovation are large corporations with deep

Some foundations, however, notably the Linux Foundation, have considerable resources and industry backing; and so such an advantage likely disappears against these foundations, whose strong ideological bent against patents may make them a formidable opponent in any patent dispute. And again, the possibility of losing out on more lucrative deals with downstream users of the technologies also likely makes this an unattractive option in many cases. Overall, foundations thus face few risks from patent trolls, even if technically they remain a possible target.

Foundations also face limited patent risks from commercial competitors to the projects that they host. One reason—similar to the dynamic found in the non-commercial developer scenario—is that the public backlash against a company asserting patents against a non-profit organization would likely be significant.¹²⁶ If a company were nonetheless intent on asserting patents for strategic reasons, in most cases it would be better served pursuing an action against the commercial competitor that uses the open innovation project in its products, not the foundation itself. In some cases, in fact, the competitor may possess fewer resources with which to defend itself than a foundation.¹²⁷

The same licensing considerations discussed above with respect to patent trolls also make patent assertions from commercial competitors less likely. For instance, if the foundation obtains a patent license from the commercial competitor in resolving its patent dispute, then all downstream users of the technology—including the commercial competitor's marketplace foes—may be immune from claims of patent infringement from the commercial competitor based on the terms of the license and the doctrine of patent exhaustion.

Again, available evidence appears to support this Section's claims. While it is impossible to know whether patent trolls or commercial competitors have asserted patents against foundations, to date no publicly available evidence indicates that they have.¹²⁸ As such, foundations appear to have a similar risk profile as that of non-commercial developers: very limited.

pockets that are more willing to provide contractual protection to their users and, presumably, more able to fight the patents in court).

126. See *supra* note 103 and accompanying text.

127. As mentioned, the Linux Foundation has a significant patent portfolio with which to defend itself and a broad spectrum of large, multinational companies who use Linux and therefore back the Foundation. Scott M. Fulton, III, *Linux Foundation: We Have Our Own Patent 'Arsenal'*, BETANEWS (May 25, 2007), <http://betanews.com/2007/05/25/linux-foundation-we-have-our-own-patent-arsenal/>.

128. Though not every conceivable database has been searched for such evidence, it seems likely that if such activities were anything close to routine, some evidence thereof would be available, which this author has not found.

C. *Open Innovation Companies*

Some view open innovation as a “non-commercial” mode of development.¹²⁹ The roots of open innovation certainly appear non-commercial in certain respects; after all, open innovation movements arose in part as a reaction to firms aggressively asserting intellectual property rights in their products.¹³⁰ Furthermore, the most widely used open innovation licenses make charging significant, recurring fees for use of the licensed materials practically impossible.¹³¹

But the commercialization of open innovation is *fait accompli*.¹³² Numerous firms have found ways to successfully commercialize open innovation, even making it the heart of a firm’s commercial activities in some cases. Red Hat, a billion dollar company, is the most successful example of such a firm. Many other firms use open innovation in a variety of commercial contexts, but open innovation may not be their primary commercial activity or may be only one area of commercial activity among many others. This section focuses on the patent risks of what I call “Open Innovation Companies”—that is, companies such as Red Hat whose commercial activities center on commercializing open innovation in some manner. Patent risks faced by other commercial entities that use or contribute to open innovation projects in some form or another will be addressed in Part II.D below.¹³³

1. *Patent Risks in General*

Not surprisingly, Open Innovation Companies face greater patent risks than do non-commercial developers or foundations. Open Innovation Companies have been the targets of patent trolls, for instance.¹³⁴ Unlike non-commercial developers and foundations, Open Innovation Companies have commercially available products and resources with which to pay

129. Aarthi S. Anand, “*Less Is More*”: *New Property Paradigm in the Information Age?*, 11 DUKE L. & TECH. REV. 65, 65 (2012) (lumping together the free and open source software movement with other non-commercial instances of software development).

130. Asay, *supra* note 49, at 797.

131. *Id.* at 761–62.

132. See Ronald J. Mann, *Commercializing Open Source Software: Do Property Rights Still Matter?* 20 HARV. J.L. & TECH. 1, 12–46 (2006) (discussing the increasingly successful commercialization of free and open source software).

133. This definition is certainly not iron-clad, and inevitably disagreements will arise regarding who belongs in which category. The purpose here is not to resolve those line-drawing questions, but instead to lay out a more nuanced (yet still necessarily somewhat general) framework for assessing patent risks within open innovation communities.

134. Indeed, not surprisingly, Red Hat has been forced to settle claims from patent trolls. See Burns, *supra* note 19, at 55–56. As have others. See Josh Taylor, *Rackspace Targets Patent Troll to Stop the Lawsuits*, ZDNET (Apr. 5, 2013), <http://www.zdnet.com/rackspace-targets-patent-troll-to-stop-the-lawsuits-7000013570/>.

tolls, making it easier for patent trolls to (1) assess whether their patents may cover the commercial products and (2) obtain higher returns.

Furthermore, Open Innovation Companies may be more likely to settle with a patent troll—which is often a patent troll’s goal, depending on the type of troll—than to fight to invalidate the asserted claims in court.¹³⁵ As a commercial enterprise, an Open Innovation Company is often likely to be more utilitarian in its approach to such patent claims than, for instance, some foundations motivated by strong normative concerns in defending open innovation.¹³⁶

Patent troll risks to Open Innovation Companies may be particularly acute given the technology sectors in which such companies are involved. For instance, patent troll activity has been found to be significant in the information technology and software sectors.¹³⁷ And, the most successful open innovation to date has occurred in the software world.

One potentially mitigating factor is that, again, trolls may be better served pursuing actions against downstream users of the technologies rather than the upstream provider thereof. If a patent troll sues an Open Innovation Company and the parties resolve the dispute with the Open Innovation Company taking a license that protects its downstream users, then the patent troll may have been better served suing the numerous downstream users, not the upstream Open Innovation Company. In fact, Red Hat has negotiated such licenses with at least some patent trolls.¹³⁸

135. See, e.g., Jon Brodtkin, *Red Hat CEO Hates Patent Trolls, but Says Sometimes You Just Have to Pay Up*, NETWORKWORLD (May 5, 2011), <http://www.networkworld.com/news/2011/050511-red-hat-ceo-patents.html> (summarizing settlements that Red Hat has agreed to with patent trolls, with Red Hat’s CEO indicating that settling is often more financially responsible than fighting the asserted patent in court); see also Lemley & Melamed, *supra* note 88, at 2121–29 (distinguishing between different types of patent trolls and the types of outcomes they prefer).

136. See Brodtkin, *supra* note 135. But see Mike Masnick, *Why Red Hat Is Wrong That It’s Better to Just Pay Patent Trolls Sometimes*, TECHDIRT (May 6, 2011), <http://www.techdirt.com/articles/20110505/15041914171/why-red-hat-is-wrong-that-its-better-to-just-pay-patent-trolls-sometimes.shtml> (criticizing Red Hat’s utilitarian approach to settling with patent trolls). For an example of an Open Innovation Company taking a different approach, see Taylor, *supra* note 134.

137. See, e.g., Colleen Chien, *Patent Trolls by the Numbers*, PATENTLY-O (Mar. 14, 2013), <http://www.patentlyo.com/patent/2013/03/chien-patent-trolls.html> (noting that “patented technologies like software are the building blocks of modern commerce”); see also Lemley, *supra* note 69; Colleen V. Chien & Aashish R. Karkhanis, *Functional Claiming and Software Patents* (Santa Clara Univ. Legal Studies Research Papers Series, Working Paper No. 06-13, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2215867; Adi Kamdar & Daniel Nazer, *Deep Dive: Software Patents and the Rise of Patent Trolls*, ELEC. FRONTIER FOUND. (Feb. 28, 2013), <https://www.eff.org/deeplinks/2013/02/deep-dive-software-patents-and-rise-patent-trolls> (highlighting many of the specific issues that software patents in the hands of patent trolls pose to those in the software/high tech industries).

138. Jon Brodtkin, *How Red Hat Killed Its Core Product—And Became a Billion-Dollar Business*, ARSTECHNICA (Feb. 28, 2012), <http://arstechnica.com/business/2012/02/how-red-hat-killed-its-core-productand-became-a-billion-dollar-business/> (interview with Red Hat CEO Jim White-

Open Innovation Companies also face patent risks from more traditional commercial competitors. Microsoft's patent threats against Linux and, more recently, Android, are the most heavily cited case-in-point of commercial competitors wielding patents against users of open innovation.¹³⁹ But other commercial enterprises have also brought patent suits against Open Innovation Companies on the basis of their use of openly innovated technologies.¹⁴⁰

In this context, it is noteworthy that, despite this evidence, commercial competitors have initiated very few formal lawsuits against Open Innovation Companies. Commercial competitors may frequently assert patents against Open Innovation Companies pre-litigation, resulting in settlements, licenses, or some other resolution unknown to the general public. However, if pre-litigation patent assertions and resolutions were routine, it seems that at least some of these would mature into formal litigation, even if the cases were ultimately settled. This is not to say that commercial competitors do not pose patent risks to Open Innovation Companies. But it is to say that, at this point, it is difficult to ascertain the precise nature of this risk due to the paucity of information about such assertions that is publicly available.

Some of this apparent lack of patent assertions may result from the same public relations factor discussed in the context of non-commercial developers and foundations. While Open Innovation Companies that compete with another enterprise's products and services are more likely to be sued than either non-commercial developers or foundations, they may still enjoy increased leeway due to the feel-good nature of open innovation. A commercial competitor almost certainly would not allow such a factor to prevent it from asserting its patents against a direct threat to its commercial success. But, at least on the margins, Open Innovation Companies may enjoy a free pass as a result of these public relations factors that they otherwise would not.

2. *To Patent or Not to Patent*

One way Open Innovation Companies could reduce the risks that they face from patent trolls and commercial competitors is to patent the technologies that they invent. Naturally, the technologies may still be subject to patents that cover some aspect of the overall technology or overlapping pa-

hurst indicating that the company often settles with trolls in a manner that protects the company's downstream users).

139. Steven J. Vaughan-Nichols, *Microsoft's Most Profitable Mobile Operating System: Android*, ZDNET (May 8, 2013), <http://www.zdnet.com/microsofts-most-profitable-mobile-operating-system-android-7000015094/>.

140. See, e.g., Stephen Shankland, *Sun Settles Kodak's Java Suit for \$92 Million*, CNET (Oct. 7, 2004), http://news.cnet.com/Sun-settles-Kodaks-Java-suit-for-92-million/2100-1012_3-5401804.html (summarizing the settlement of Kodak's patent claims against Sun for its use of Java software, a popular openly innovated technology).

tents—the so-called problem of “patent thickets.”¹⁴¹ But if Open Innovation Companies patented whatever technologies that they did invent, they would at least remove some possible pieces of the thicket from being asserted against them. And, in the case of commercial competitors, they may be able to use such patents to negotiate patent peace.

But historically, Open Innovation Companies have not aggressively pursued patents.¹⁴² Others have chronicled the perceived reasons for this behavior: open innovation communities often have strong ideological leanings against patents in general; open innovation communities are made up of large networks of contributors that do not have the resources or incentives to pursue patents; and because patents can eventually become a sword rather than a shield, open innovation communities do not trust patents and thus forego pursuing them.¹⁴³

While these reasons may apply in some contexts, they do not apply across the board. In the case of Open Innovation Companies, resource constraints are less of an issue. In fact, Red Hat has begun to build a significant patent portfolio, despite being ideologically opposed to patents.¹⁴⁴ Furthermore, for startup Open Innovation Companies, investors may look favorably upon patent acquisition, thus providing at least some incentive for these companies to pursue patents.¹⁴⁵

Most other Open Innovation Companies do not appear to be following Red Hat’s lead, however.¹⁴⁶ Such Open Innovation Companies may not pursue patents for many of the same reasons that some claim open innovation communities in general have historically failed to pursue patents, including a cultural disdain for patents. Indeed, if “openness” is a company’s selling point, then patents in many ways seem inimical to that approach.

3. *Inherent Patent Gaps and Risks*

But even if Open Innovation Companies chose to more diligently pursue patents, this Article argues that significant limitations exist in any aggressive patent acquisition strategy. Such limitations, in turn, may help explain the lack of patenting by many Open Innovation Companies as well as

141. See generally Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POL’Y AND THE ECON. 119, 121 (Adam B. Jaffe et al. eds., 2001), available at <http://www.nber.org/chapters/c10778.pdf> (laying out the problem of patent thickets and the threat that they pose to innovation generally).

142. Schultz & Urban, *supra* note 9.

143. *Id.*

144. See *supra* note 15.

145. 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. 1255, 1296–1309 (2009).

146. For instance, in a survey of fifty other Open Innovation Companies, only five owned any patents, according to the USPTO’s database. None of these five, furthermore, owned significant numbers of patents, with the high being seventeen (results on file with the author).

highlight certain patent risks that appear to be inherent to Open Innovation Companies and open innovation communities in general under current patent law.

First, Open Innovation Companies do not invent many parts of the openly innovated technology that they use. In many cases, in fact, the point of adopting open innovation is to avoid development work. So, even if Open Innovation Companies seek patents on the pieces that they contribute, large swaths of the technology upon which they rely may be, technically, unpatentable by them.

If others in the community choose to patent their contributions to a project upon which an Open Innovation Company relies, then the patent risks that the Open Innovation Company faces may decrease some. The licenses under which the technologies are made available generally help promote patent peace between users of the technology.¹⁴⁷ And if a contributor patents its contribution, it may be less likely that a commercial competitor or patent troll obtains a patent on the same technology. Furthermore, some open innovation communities have created patent pools upon which participants in a given community can rely to fend off would-be patent aggressors.¹⁴⁸

But even in cases where other contributors do patent their contributions, Open Innovation Companies that use such patented technologies still face patent risk. In typical commercial licensing, for instance, a technology licensor provides the licensee with protection in the form of an indemnity, a warranty, or both, against third-party intellectual property claims.¹⁴⁹ In the open innovation universe, this is generally not true.¹⁵⁰ In fact, the licenses under which openly innovated technologies are made available generally disclaim any such protection.¹⁵¹ In the world of patents, such disclaimers are even more significant since independent invention is no defense to a patent infringement claim.¹⁵² And, the possibility of overlapping patents and patent thickets makes patent risks even more acute. Thus, though the decision of an open innovation project contributor to patent its contribution may help indirectly by reducing the likelihood that someone else will patent the same technology, it is certainly no guarantee against patent risks.

147. See *infra* Part III.A.

148. See *infra* Part III.C.

149. Jon Christiansen et al., *Redefining "Free": A Look at Open Source Software Management*, 8 NW. J. TECH. & INTELL. PROP. 425 (2010) (including comments of Mr. Joseph A. Herndon); Lothar Determann & Gary Shapiro, *Handling Open Source Software Risks in Commercial and M&A Transactions*, 956 PLI/PAT 227, 231 (2009).

150. Some companies such as Red Hat do provide such protection, however. See Brodtkin, *supra* note 138.

151. See Christiansen et al., *supra* note 149.

152. Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525 (2007).

If others choose not to patent their contributions, then the patent risks for Open Innovation Companies increase. The contributor may have already explored patenting its technology and opted against doing so due to the presence of existing patents. Accordingly, the owners of such patents may eventually assert them against the Open Innovation Company. Or, even absent an already existing patent, the failure to patent may make it more likely that a commercial competitor or a patent troll obtains patents that read on the technology.

4. *Patenting the Unpatentable*

So is the answer simply for Open Innovation Companies and others in open innovation communities to overcome their bias against patents and more diligently pursue them? Recent proposals have argued along these lines.¹⁵³ As discussed, significant patent risks would remain even if this strategy were pursued. But more importantly, this Article argues that the nature of open innovation may make patenting the resulting technologies inherently more difficult than in the intra-firm context. Consequently, any strategy that relies primarily on patenting open innovation seems inherently unstable under current patent law.

For instance, one of the primary advantages of open innovation is its decentralized, incremental nature.¹⁵⁴ While open innovation communities often have hierarchies, the general development model allows diverse contributors to collectively and efficiently create technology.¹⁵⁵ As such, in many cases it may be difficult to determine who the inventor of any given inventive concept actually is. And patents require inventors to be specified.¹⁵⁶

To illustrate: if Open Innovation Companies only contribute one piece to a larger inventive concept that the community is collaboratively creating, whose invention is it? And who is in a position to patent it? The collaborative, incremental nature of open innovation may mean that only the entire community is rightly considered the inventor of many broader inventive concepts. In some cases, especially in projects where one contributor is the primary contributor to the project, this may not be an issue. But in more collaborative projects, where each contributor is adding some incremental piece to a larger inventive concept, it almost certainly is.

Could open innovation communities solve this puzzle by collectively pursuing patents on open innovation projects? “Joint inventorship” is a well-established doctrine in patent law that allows multiple inventors to file

153. Schultz & Urban, *supra* note 9.

154. Yochai Benkler, *Freedom in the Commons: Towards a Political Economy of Information*, 52 DUKE L.J. 1245, 1245–47 (2003); Mann, *supra* note 132, at 21–22.

155. Benkler, *supra* note 154.

156. 37 C.F.R. § 1.41 (2013).

for and obtain patents.¹⁵⁷ By some accounts, joint inventorship may also be the norm in patenting.¹⁵⁸

Realistically, though, joint inventorship is not a solution for open innovation communities. First, because of the collaborative, incremental nature of open innovation, in many cases it would be difficult to determine who from any given community qualifies as a joint inventor. Only those that contribute significant material to the inventive concept embodied in the patent's claims are considered joint inventors; those that merely implement the invention or that contribute only "prior art" material are not.¹⁵⁹

But perhaps more fundamentally, the type of coordination and consensus necessary for open innovation communities to jointly pursue, maintain, and enforce patents seems even less likely. For instance, enforcing jointly owned patents in a court of law requires the unanimous consent of all joint owners.¹⁶⁰ Each joint owner also has the right to assign its equal, undivided right in the patent to anyone else it wishes, regardless of any objections that other joint inventors may raise.¹⁶¹ Effectively resolving these and similar issues would require open innovation communities to increasingly take on the attributes of a traditional firm. But one of the points of open innovation is to transcend the limitations that firms impose.¹⁶² Open innovation communities may excel at collaborating to create technology, but this model of decentralized collaboration is precisely what would make collectively pursuing, maintaining, and enforcing joint patents difficult if not impossible in many cases.

Open Innovation Companies could simply ignore these possible inventorship issues and pursue patents on broader inventive concepts that the community collectively creates. And some almost certainly have. But significant informal and formal hurdles mar the way in so doing. Informally, an Open Innovation Company that began to aggressively obtain patents on inventions that the community collaboratively developed would almost certainly face some backlash.¹⁶³ Pursuit of such patents defies the very es-

157. *Id.* (allowing for multiple inventors of a shared invention to apply for a patent together).

158. See John R. Allison & Mark A. Lemley, *Who's Patenting What? An Empirical Exploration of Patent Prosecution*, 53 VAND. L. REV. 2099, 2117 (2000) (noting that most inventions are developed by more than one inventor).

159. Mark A. Lemley, *Point of Novelty*, 105 NW. U. L. REV. 1253, 1261–62 (2011).

160. Gregory N. Mandel, *Left-Brain Versus Right-Brain: Competing Conceptions of Creativity in Intellectual Property Law*, 44 U.C. DAVIS L. REV. 283, 295–97 (2010).

161. *Id.*

162. See generally Benkler, *supra* note 7.

163. For a particularly skeptical view of certain Open Innovation Companies and their relationship to patents, see Florian Mueller, *Red Hat Feeds the Patent Trolls and Fools the FOSS Community*, FOSS PATENTS BLOG (Mar. 14, 2011), <http://www.fosspatents.com/2011/03/red-hat-feeds-patent-trolls-and-fools.html>; see also Cade Metz, *Red Hat: 'Yes, We Undercut Oracle with Hidden Linux Patches'*, CHANNEL REGISTER (Mar. 4, 2011), http://www.channelregister.co.uk/2011/03/04/red_hat_twarts_oracle_and_novell_with_change_to

sence of open innovation by seeking exclusive rights in what the entire community helped create or is working to create. Such backlash may be especially true in cases where the Open Innovation Company pursuing the patents was not the primary contributor to or originator of an inventive concept.

Even in cases where Open Innovation Companies promise to only use such patents in order to protect open innovation (that is, as a shield), concerns remain. The very purpose of patents is to centralize rights, whereas open innovation's is to decentralize them. So even when such centralized power is employed on behalf of openness and decentralization, the intrinsic contradiction between the two means that openness is always in danger of collapsing on itself.¹⁶⁴ As the old adage goes, promises are made to be broken.¹⁶⁵ And even where purportedly binding mechanisms are adopted to guard against these undesirable outcomes, the effect and durability of such mechanisms is only as good as the predictability of judicial interpretations and enforcement of the same.

Formally, patent law may present additional hurdles to patenting openly innovated technologies. If an Open Innovation Company seeks patents on inventive concepts relating to an open innovation project, the contributions of others in the community could bar such patents due to issues with "obviousness" and lack of "novelty." Under patent law's novelty requirement, for instance, an invention must be new, that is, not already present in the prior art.¹⁶⁶ If an Open Innovation Company were to seek a patent on inventive concepts that the community had already implemented, and these implementations include all elements of the patent application's claims, the Open Innovation Company's patent application should fail due to lack of novelty.¹⁶⁷ And this would be true even if the company significantly im-

_source_code_packaging/ (highlighting several instances where Red Hat, the most successful Open Innovation Company to date, appears to defy the normative tenets of open innovation communities by putting its business interests above all else).

164. I make a similar argument in Asay, *supra* note 49. *But see also* Greg R. Vetter, *A Public Domain Approach to Free and Open Source Software*, 75 OHIO S. L.J. 8 (2014) (highlighting several concerns with moving away from an intellectual property law-based approach for fostering open innovation).

165. Indeed, participants in open innovation communities are often quite skeptical of patent pledges from large corporations that participate in open innovation communities. *See, e.g.*, Florian Mueller, *Google's Promise Not to Assert 10 Patents Against Open Source Software: Just a PR Stunt*, FOSS PATENTS BLOG (Mar. 28, 2013), <http://www.fosspatents.com/2013/03/google-promise-not-to-assert-10.html> (arguing that such pledges are often meaningless). This skepticism has only grown as pledgers have purportedly violated their patent pledges in some cases. *See, e.g.*, Mueller, *supra* note 94 (alleging that IBM broke one of the more significant open innovation pledges by asserting two of its pledged patents against a small free and open source software developer).

166. *See* 35 U.S.C. § 102 (2012) (requiring novelty); *see also* Lemley, *supra* note 159, at 1253–54.

167. *See supra* note 166.

proved the concepts' implementation, so long as the same general concepts were implicated. The incremental, collaborative nature of open innovation may make such results more likely since innovation within open innovation communities often consists of members incrementally and frequently iterating on the collective contributions of the community.

Perhaps even more problematic, an Open Innovation Company's patents may be more likely to fail than in other contexts due to issues with obviousness. For instance, patent law requires that, for a patent to be issued on an inventive concept, the inventive concept cannot have been obvious to someone ordinarily skilled in the relevant art and familiar with what has already been done in the community and elsewhere at the time of invention.¹⁶⁸ But the incremental, cumulative nature of open innovation means that overcoming the non-obviousness hurdle is likely more difficult for open innovation communities because participants' contributions are often only incremental changes to a larger body of collaboratively created technology that is publicly available. In short, the often incremental contributions of participants are more likely to be obvious in light of what the rest of the community has already done or is doing. And this may be so even if the collective contributions of the community do cover significant inventive concepts that otherwise would be patentable (i.e., because, collectively, those concepts are non-obvious, even if the individual, incremental contributions to the general concepts on their own are unpatentable because they are obvious).

Of course, if Open Innovation Companies did pursue patents on the community's collaborative inventions, they may actually succeed in obtaining them in many cases, even if the inventions are technically obvious or lacking in novelty. Indeed, others have chronicled the shortcomings of the United States Patent and Trademark Office ("USPTO") in assessing whether patents should be granted.¹⁶⁹

Nonetheless, the obstacles that patent law's novelty and non-obviousness requirements present to open innovators may still surface later on. For instance, others wishing to invalidate such patents—such as a commercial competitor involved in a patent dispute with the Open Innovation Company or even someone within the open innovation community itself—would have a readily available record of prior art (i.e., the contribu-

168. See 35 U.S.C. § 103 (2012) ("A patent . . . may not be obtained . . . if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.").

169. See, e.g., Jay P. Kesan & Andres A. Gallo, *Why "Bad" Patents Survive in the Market and How Should We Change?—The Private and Social Costs of Patents*, 55 EMORY L.J. 61, 63 (2006); Mark A. Lemley & Bhaven Sampat, *Is the Patent Office a Rubber Stamp?*, 58 EMORY L.J. 181, 181 (2008); John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. ILL. L. REV. 305, 316–22 (2001).

tions of others in the open innovation community) to which they could point the USPTO and courts. And that readily available record of prior art would consist in many cases of incremental, cumulative contributions of the community that make the open innovator's patent "non-novel" and/or obvious in light of what the community had already accomplished. These issues could become particularly problematic if long-standing calls for tightening the obviousness and novelty requirements are heeded.¹⁷⁰

Indeed, in the free and open source software context, others have suggested that the availability of the source code makes these communities more susceptible to patent infringement claims because the ability to inspect the source code makes it easier to prove patent infringement.¹⁷¹ By the same token, the availability of the source code and other technologies may also make patents on openly innovated technologies easier to eventually invalidate, even if such patents do initially issue.

Such issues are easily resolved in traditional firms. Firms file for and obtain patents that cover the collective contributions from all of their employees and contractors. Or, in joint inventorship scenarios, collaborating firms work out via contract who owns what. Modern patent law thus accommodates this mode of production relatively well.¹⁷²

But where inventive activity transcends firms and embraces a larger community, modern patent law fails to be as accommodating. The decentralization found in open models of innovation is both a blessing and a curse, at least insofar as modern patent law is concerned. Decentralization may provide certain advantages over a more centralized mode of production. But it simultaneously makes patenting its technologies inherently more difficult and, in some cases, impossible.

5. *Open Innovation's Counterbalancing Act*

Despite these risks, the benefits of open innovation may help counteract some of them. For instance, an Open Innovation Company may enjoy a significant head start in adopting openly innovated technologies as the basis

170. President Obama has recently weighed in on this issue by indicating that he will issue an executive order to improve the training of patent examiners so that many patents that should not issue in the first place (due to issues such as obviousness or lack of novelty) do not. See *Fighting 'Patent Trolls,'* N.Y. TIMES, (June 5, 2013), <http://www.nytimes.com/2013/06/06/opinion/obamas-promising-reforms-to-fight-patent-trolls.html>.

171. See, e.g., FOGEL, *supra* note 6; Greg R. Vetter, *The Collaborative Integrity of Open-Source Software*, 2004 UTAH L. REV. 563, 592-93; Mueller, *supra* note 6.

172. Carliss Baldwin & Eric von Hippel, *Modeling a Paradigm Shift: From Producer Innovation to User and Open Collaborative Innovation* 2-3 (Harvard Bus. Sch. Fin. Working Paper No. 10-038, 2010), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1502864 (arguing that the current patent system is based primarily on a "producer" system that assumes single producers need intellectual property rights to recoup their costs and ignores the increasingly important open model of innovation).

of its commercial activities; it can forego much initial development work that would otherwise be necessary before launching its products and services.

Furthermore, the Open Innovation Company will likely be able to obtain “free” labor from those that adopt its products and services and improve upon them. This ongoing community support may lead to more rapid innovation, which in turn may ultimately lead to greater commercial success.

Lastly, Open Innovation Companies may benefit from the general goodwill of the broader open innovation universe. The positive association that many have with open innovation may indirectly and directly benefit such firms, which in turn may make some of the costs associated with patent assertions more bearable.

6. Conclusion

In sum, Open Innovation Companies face significantly greater patent risks than do non-commercial developers and foundations. Patent trolls are more likely to target Open Innovation Companies than non-commercial developers or foundations because (1) Open Innovation Companies have money and (2) Open Innovation Companies often produce commercial products, which means that (a) patent trolls may have an easier time detecting infringement and (b) patent assertions are likelier to result in more lucrative outcomes. Open Innovation Companies also face patent risks from commercial competitors, though to date such suits seem less than routine.

Open Innovation Companies could theoretically build a large patent portfolio with which to defend themselves and better guarantee their freedom to operate. And some Open Innovation Companies such as Red Hat have begun to do precisely that. Others, however, do not appear to have taken this approach, at least not yet.

Importantly, some of this inaction and the resulting patent risks almost certainly result due to the nature of open innovation itself. First, because Open Innovation Companies do not invent much of the technology that they use, they are not in a position to patent much of it. Second, if others in the community fail to patent such technologies as well, then the patent risk increases for Open Innovation Companies using such technologies. Third, large swaths of such technology may be unpatentable by anyone for both practical and legal reasons. Within firms, collaborative development makes patenting easier; in open innovation communities, in many cases it may make patenting more difficult if not impossible. Consequently, the nature of open innovation enhances the patent risks that Open Innovation Companies face, at least based on current patent law.

Nonetheless, the benefits of open innovation may counterbalance some of these risks. This does not mean that the system should not be improved.

But it does mean that the patent problems for open innovation—even in its commercialized form—may not be as dire as some suggest.

D. Commercial Users of Open Innovation

The final category of participants in open innovation communities consists of commercial enterprises that use or contribute to open innovation in some form or another, but whose commercial activity is not primarily focused on open innovation. Such commercial users of open innovation range from the Googles and Apples of the world to any number of small software application developers that include openly innovated technologies in their applications.

1. Patent Risks in General

The patent risks that commercial users of open innovation face are similar in many respects to those of Open Innovation Companies. Patent trolls have asserted patents against commercial users of openly innovated technologies.¹⁷³ Larger firms may be more likely targets of patent trolls because of their significant resources¹⁷⁴ and because they often sell expensive, complex products that increase the likelihood of obtaining higher returns.¹⁷⁵ Nonetheless, smaller commercial enterprises are increasingly becoming patent troll targets, too.¹⁷⁶

Commercial competitors also pose significant patent risks to commercial users of open innovation. Oracle's patent assertions against Google for its use of Java in Android are one recent high-profile example in this context.¹⁷⁷ Patent assertions from commercial competitors may be more manageable for larger users of open innovation when they have significant patent portfolios themselves,¹⁷⁸ though the opportunity costs that they incur in

173. See, e.g., Florian Mueller, *Texas Jury Finds Against Google in Linux Patent Case, Determines Damage Award of \$5,000,000*, FOSS PATENTS BLOG (Apr. 21, 2011), <http://www.fosspatents.com/2011/04/texas-jury-finds-against-google-in.html> (discussing a patent suit from a patent troll against Google and Amazon, among other larger corporations, for their use of Linux).

174. See, e.g., *id.*

175. Lemley & Melamed, *supra* note 88, at 2164.

176. Chien, *supra* note 93.

177. Josh Lowensohn, *Jury Verdict: Android Doesn't Infringe Oracle's Patents*, CNET (May 23, 2012), http://news.cnet.com/8301-1023_3-57440235-93/jury-verdict-android-doesnt-infringe-oracles-patents/ (summarizing the dismissal of Oracle's patent assertions against Google for use of Java in Android).

178. For instance, many major corporations have struck licensing deals with Microsoft due to their use of Android, and presumably such corporations' own patent portfolios have made such licensing deals more feasible. See Florian Mueller, *Android Patent License Deals Continue to be Struck: Microsoft-Nikon Is (Announced) Deal No. 18*, FOSS PATENTS BLOG (Feb. 22, 2013), <http://www.fosspatents.com/2013/02/android-patent-license-deals-continue.html>. Apple has also brought a number of suits against commercial competitors that use openly innovated technologies

defending themselves may still be significant.¹⁷⁹ For smaller firms, the lack of a significant defensive patent portfolio may prove a distinct disadvantage in defending themselves in the marketplace.¹⁸⁰

Furthermore, because openly innovated technologies generally come with no patent protection from the contributors to open innovation projects, users are typically left on their own. This has increasingly become an issue for users of Android and Linux; Microsoft is purported to have reached numerous patent licensing deals with such users,¹⁸¹ and some Android users are reported to be switching platforms altogether.¹⁸² If contributors to the open innovation project have not patented the technologies, the risks that commercial users of openly innovated technologies face may increase because it may be more likely that others have patented the same technologies. And as we have seen, the likelihood of contributors to open innovation projects successfully patenting their contributions may be lower due to the decentralized, incremental nature of open innovation.

2. *Open Innovation's Counterbalancing Act*

While both large and small commercial players face patent risks as a result of their use of openly innovated technologies, certain factors may help offset some of these risks. First, while companies may end up paying licensing fees to both patent trolls and commercial competitors, the overall cost structure of using openly innovated technologies may still be worth it. Because a company saves so much initially by adopting the freely available technologies, fees that become due later may still pale in comparison to the costs of either licensing the technologies commercially or developing the technologies themselves.¹⁸³

in their products. See Florian Mueller, *Updated Lists of Android Patent Infringement Findings and Successful Countersuits*, FOSS PATENTS BLOG (Oct. 12, 2012), <http://www.fosspatents.com/2012/10/updated-lists-of-android-patent.html>.

179. See Lemley & Melamed, *supra* note 88, at 2129–39.

180. Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 10, 65 (2005).

181. *Id.* at 49; see also Geoff Duncan, *Is Microsoft Trying to Snuff Out Android With Its 'Tax,' or Just Milking It?*, DIGITAL TRENDS (Apr. 30, 2013), <http://www.digitaltrends.com/mobile/is-android-being-stifled-by-a-microsoft-tax/> (noting that Microsoft collects royalties on the majority of Android devices shipped worldwide); Mary Jo Foley, *Microsoft Inks Patent Deal With Service Provider Using Linux Servers*, ZDNET (July 24, 2012), <http://www.zdnet.com/microsoft-inks-patent-deal-with-service-provider-using-linux-servers-7000001498/> (summarizing a licensing deal that Microsoft reached with a service provider using Linux on its servers).

182. Gary Schwartz, *Samsung Abandoning Android? 'Tis Tizen?*, MOBILE MARKETER (Mar. 27, 2013), <http://www.mobilemarketer.com/cms/opinion/columns/15037.html> (noting that Samsung reportedly intends to switch from Android to a new software platform). However, this switch may have more to do with decreasing Samsung's dependence on Google than patent issues.

183. Indeed, though over half of all Android-based devices pay some sort of license fee to Microsoft, no mass exodus from the platform has occurred, at least yet. This may suggest that the advantages of open innovation still outweigh the patent risks in most cases.

Furthermore, even if the patent costs of using open innovation are equivalent to, or eventually greater than, what it would have cost to either commercially license or develop the technology, the greater flexibility that openly innovated technologies present may also offset some of these costs.¹⁸⁴ Users may also benefit from the broader community and its contributions to the technology. Conversely, a “closed” solution often comes with a restrictive license agreement, less of a community willing and able to accelerate the technology’s development, and less flexibility.

Of course, such benefits may not always outweigh the patent risks. Problems with patent thickets and royalty stacking may be particularly problematic in technology areas where open innovation is the most pervasive, such as the software world.¹⁸⁵ Indeed, these problems seem increasingly evident in the case of Android, an open source software platform used on many smartphones and tablets, and the ongoing smartphone patent wars between the likes of Apple, Samsung, Motorola Mobility, Microsoft, Nokia, numerous patent trolls, and many others.¹⁸⁶

Nonetheless, to date no mass exodus from Android has occurred, despite its perceived patent problems, though some significant users may be leaving soon.¹⁸⁷ The seeming “staying power” of Android and other openly innovated technologies may result from several factors, including the benefits of openly innovated technologies described above and the likelihood that similar patent issues would occur regardless of whether an open or closed technology were adopted.

Last, the “public relations” factor that diminishes patent risks for non-commercial developers, foundations, and Open Innovation Companies also may play a role in reducing patent risks for commercial users of open innovation. Doubtless, the public relations factor probably has the least effect for this category of open innovation users, primarily because strategic reasons for asserting patents against a commercial competitor that happens to use open innovation may be easy to come by. Nonetheless, the public relations factor still may play a role on the margins. Oracle and Microsoft, for instance, have received significant amounts of negative press for their patent activities with respect to open innovation and its use by commercial competitors.¹⁸⁸

184. In the free and open source software world, for instance, the user has access to the source code and thus can significantly modify and adapt the software to his or her own purposes.

185. See Lemley & Shapiro, *supra* note 80.

186. For some background on the smartphone patent wars as well as some useful graphical depictions of the patent litigations, see Sascha Segan, *Infographic: Smartphone Patent Wars Explained*, PCMAG.COM (Jan. 19, 2012), <http://www.pcmag.com/article2/0,2817,2399098,00.asp> (depicting the complex thicket of patent litigations as of early 2012).

187. See Schwartz, *supra* note 182.

188. See, e.g., David Kravets, *Oracle-Google Suit Attacks Open Source Software*, WIRED (Aug. 13, 2010), <http://www.wired.com/threatlevel/2010/08/oracle-attacks-opensource/> (warning

3. Conclusion

In sum, the patent risks that commercial users of open innovation face are similar to the patent risks that Open Innovation Companies face. Patent troll risk exists but is more the product of the patent system in general than open innovation in particular. Similarly, commercial users of open innovation may become targets of their commercial competitors based on their use of open innovation, but such competition is likely regardless of what solution—whether open or closed—they adopt.

However, open innovation may enhance these risks. First, because openly innovated technologies are often made available without any sort of patent protection, users of open innovation are typically left on their own. And if such users lack a robust patent portfolio, they may be at the mercy of their commercial competitors.

Furthermore, because open innovation is not heavily patented, due at least in part to the decentralized, incremental nature of open innovation itself, it may be more likely in some cases that both patent trolls and commercial competitors obtain patents reading on the technologies that they use. Consequently, patent risks may be greater for commercial users of open innovation not only because they receive no patent protection from their licensors, but also because such licensors' failure or inability to patent openly innovated technologies makes it more likely that others have or will.

But the advantages of open innovation may help offset some of the disadvantages associated with these risks. Indeed, openly innovated technologies are often free for the taking. That may mean that users do not get the advantages of patent protection, but it also means that users save significantly as they avoid having to pay heavy upfront fees to commercially license the technology from a third party or develop it themselves. Furthermore, even in cases where the deferred costs are equivalent to or greater than a commercial solution, the flexibility inherent with an open innovation solution may still make the openly innovated solution worth it.

that Oracle's suit against Google was likely the "first of many battles" involving Java under Oracle's management); Simon Phipps, *If Oracle Wins Its Android Suit, Everyone Loses*, INFOWORLD (Apr. 6, 2012), <http://www.infoworld.com/d/open-source-software/if-oracle-wins-its-android-suit-everyone-loses-190312?page=0,1> (portraying Oracle patent lawyers in a less-than-flattering light in connection with its suit against Google); Steven J. Vaughan-Nichols, *How Oracle Sees Open Source May Not Be How You See Open Source*, COMPUTERWORLD (Aug. 17, 2010), http://blogs.computerworld.com/16766/how_oracle_sees_open_source_may_not_be_how_you_see_open_source (suggesting Oracle exploits open innovation and a broken patent system for its own benefit); see also, e.g., MG Siegler, *Google on Microsoft's Android Patent Tactics: It's Extortion*, TECHCRUNCH (Sept. 28, 2011), <http://techcrunch.com/2011/09/28/microsoft-samsung-extortion-google/> (suggesting Microsoft's patent assertions against Android are at best "evil genius," but may be simply "evil"); Alan Shimel, *Barnes & Noble Blows the Lid Off Microsoft's Android Patent Squeeze*, NETWORKWORLD (Nov. 15, 2011), <http://www.networkworld.com/community/blog/barnes-noble-blows-lid-microsofts-android-pat> (labeling Microsoft's Android licensing program "[p]ositively evil").

In some cases, the patent costs that users of open innovation face may deter them from continuing to use the openly innovated solution. But even in those cases, other factors may be at play. In the Android scenario, for instance, many have complained that Android is not as “open” as claimed,¹⁸⁹ which may be the actual reason that some such as Samsung are reported to be considering switching platforms. As open innovation projects become more centralized with one organization, the advantages of the decentralized model may begin to diminish. And when that occurs, the patent costs may tip the balance away from nominally open projects.

This suggests something important about open innovation and proposed solutions to the patent risks that it may face. The more centralized that open innovation projects become, the more likely that open innovation’s advantages, which largely result from decentralization, will disappear. And the very essence of patents is centralization. While it is certainly true that private ordering solutions to open innovation’s patent risks can re-allocate the starting point of a patent by widely distributing its benefits to others, a patent remains at its heart a set of rights possessed by its owner. The only permanent way to distribute its benefits to the public, therefore, may be to eliminate the exclusive rights altogether.

III. ADDRESSING PATENT RISKS WITH PATENTS

So far this Article has explored, at both a theoretical and practical level, a central tenet of open innovation communities: patents threaten open innovation. As discussed, certain factors reduce the patent risks to many that participate in open innovation communities. For non-commercial developers and foundations, for instance, the patent risks seem negligible.

For Open Innovation Companies and commercial users of open innovation, however, the patent risks increase. Some of these risks arise due to the nature of open innovation itself. The patent system does not accommodate a decentralized mode of production well because the very premise of patent law is that centralization of rights is needed in order to promote innovation. Conversely, one of the driving forces behind open innovation is that decentralization is a virtue, not a vice.

Some proposed solutions to these patent risks focus on private ordering mechanisms meant to counteract them. Many of the proposals seek to turn the exclusivity of patents on its head in order to defend and promote

189. See, e.g., Ray Walters, *Is Android the Most Closed Open Source Project?*, EXTREMETECH (Dec. 13, 2011), <http://www.extremetech.com/mobile/108911-is-android-the-most-closed-open-source-project> (discussing a ranking methodology that lists Android as the least open free and open source software project); Joe Wilcox, *‘Slightly Closed Android Ecosystem Could Be Reality by the End of 2015,’* BETANEWS, (Apr. 5, 2013), <http://betanews.com/2013/04/05/slightly-closed-android-ecosystem-could-be-reality-by-the-end-of-2015/>.

open innovation. Such proposals, therefore, rely on the acquisition of significant numbers of patents and using them to help enforce openness.

This Article argues that such solutions are inherently unstable. Patents threaten open innovation, not because they are simply in the wrong hands, but because the patent system assumes that centralization of rights is a virtue, not a vice. Open innovation and its successes defy this basic proposition in many contexts. And in so doing, patent rights, however deployed, present a basic contradiction to the realities (and virtues) of open innovation.

The next sections examine the most standard patent-centric strategies that open innovation communities use to counteract perceived patent threats. Part III concludes that, while many of these strategies have something to offer, they cannot avoid the fundamental conflict between the centralizing approach of patents and the decentralizing nature of open innovation. Consequently, the most effective means by which to promote both models of innovation is to reform patent law itself to better accommodate open innovation. Part IV takes up the task of initially exploring how this might be done.

A. *Patent Peace Provisions*

One way open innovation communities seek to limit patent risk is through “patent peace” provisions commonly found in open innovation licenses. Such provisions stipulate that users of the openly innovated technologies may not assert their patents against any of the upstream licensors and, often, any other users of the same technology; if they do, their license to use the technology ceases.¹⁹⁰ Such licenses also often require that anyone contributing to, and/or distributing the openly innovated technology, explicitly grant all other users thereof a license to exercise any of their patents that read on the technology.¹⁹¹

Some of the limitations to this approach are quickly apparent. First, only those using the technology are subject to the patent peace terms. Patent trolls and many commercial competitors will, therefore, avoid the effects of such terms and remain free to pursue patent suits against users of openly innovated technologies. Consequently, users of the technology, while safe from other users of the technology, have no such guarantee from non-users of the technology or even former users who find it in their interest to give up their licenses in favor of asserting patents against a competitor.

190. For a more detailed explanation of how such provisions work, as well as an example of such a license, see Asay, *supra* note 12.

191. *Id.*

Indeed, commercial competitors are often quite fastidious in their use of openly innovated technologies in order to ensure that such patent provisions do not jeopardize their patent portfolios.¹⁹² It is thus unclear that patent peace provisions have much of an effect other than ensuring that large corporations spend significant amounts of time avoiding the reach of such terms.¹⁹³ Those that could benefit from them the most—Open Innovation Companies and commercial users of open innovation—in fact likely receive little in the way of patent risk mitigation through these types of terms.

The patent peace provisions may be even less effective than imagined since open innovation communities do not generally patent their inventions, and in fact, as argued, in some cases simply cannot. The patent peace provisions may thus often be effectively empty promises, since those making the promises neither possess any rights to license nor the ability or inclination in many cases to obtain such rights. This in turn may mean it is more likely that a commercial competitor or patent troll has or will. Overall, then, while patent peace provisions may provide some comfort, the extent to which they actually guard against patent risks appears limited.

B. Patent Pledges

Open innovation communities have also been the beneficiaries of “patent pledges” from supporters of open innovation. For instance, Red Hat has made an extensive pledge that it will only enforce its patents, if at all, defensively.¹⁹⁴ IBM has also pledged that it would not assert over 500 of its patents against open innovation communities.¹⁹⁵ Others have made similar pledges.¹⁹⁶

The most immediate drawback with this approach is that it relies on unlikely goodwill. Despite such pledges, for instance, significant numbers of patents remain a risk to open innovation communities, especially to Open Innovation Companies and commercial users of open innovation. Even from those electing to make such pledges, the pledges may only include

192. Asay, *supra* note 49, at 768–82.

193. *Id.* Indeed, some companies have even gone so far as to restructure themselves so as to better protect their patent portfolios. See, e.g., Chloe Albanesius, *Qualcomm Restructures to Protect Patents*, PCMAG.COM (June 28, 2012), <http://www.pcmag.com/article2/0,2817,2406466,00.asp>.

194. See *supra* note 62.

195. See *supra* note 14.

196. See *Open Patent Non-Assertion Pledge*, GOOGLE, INC., <http://www.google.com/patents/opnpledge/pledge/> (last visited May 20, 2013); *Patent Pledge for Open Source Developers*, MICROSOFT CORP., <http://www.microsoft.com/openspecifications/en/us/programs/interop/interoperability-principles-patent-pledges/default.aspx> (last visited May 20, 2013).

“junk” patents,¹⁹⁷ an accusation commonly leveled against IBM¹⁹⁸ and, more recently, Google.¹⁹⁹

It is also unclear to what extent such pledges are enforceable. IBM, for instance, has allegedly broken its pledge in some cases.²⁰⁰ But it is far from certain what legal theory would require IBM or any other pledger to remain strictly true to their pledges.²⁰¹

Furthermore, while pledges may be perceived as gestures of goodwill towards smaller, purportedly more vulnerable participants in open innovation communities, as we have seen, these participants face little patent risk in any event. One might argue that pledges are one of the significant causes of this limited risk. But it seems more likely that such pledges are made precisely because the pledgers never intended to assert patents against non-commercial developers, foundations, and the like.²⁰²

For Open Innovation Companies and commercial users of open innovation, patent pledges may, on the margins, address some patent risk. But patent pledges have almost uniformly come from other significant participants in the open innovation world. Thus, the likelihood of patent suits from these pledgers on the basis of open innovation use was already low due to the informal strategic bond between the pledgers, Open Innovation Companies, and other commercial users of open innovation.

In some cases such strategic alignment may not exist. For instance, IBM, with its diverse set of business interests, almost certainly does not align with Google, a significant participant in open innovation, in all of its strategic interests. But that simply points to another of a patent pledge’s weaknesses—IBM and others carefully select which patents to pledge so as not to compromise parts of their patent portfolios which they may wish to eventually wield against Google or some other competitor.

197. Julie Bort, *The Defensive Patent License Makes Patents Less Evil for Open Source*, NETWORKWORLD (May 7, 2010), <http://www.networkworld.com/community/node/60939> (quoting an attorney: “The perception is that bigger companies only commit their least-effective, least-important patents to a patent pool”).

198. David McAmis, *The Patent Trap*, ZDNET (Jan. 18, 2005), <http://www.zdnet.com/the-patent-trap-2039213656/>.

199. See, e.g., Mueller, *supra* note 165 (arguing that Google’s pledge withheld the most valuable patents and only pledged ten out of its thousands of patents).

200. See Mueller, *supra* note 94.

201. See Schultz & Urban, *supra* note 9, at 31–32. But see also generally Jorge L. Contreras, *A Market Reliance Theory for FRAND Commitments and Other Patent Pledges*, UTAH L. REV. (forthcoming 2015) (proposing a market reliance basis for holding such pledges enforceable), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2309023.

202. Indeed, Microsoft’s pledge only covers non-commercial developers and specifically excludes any entity that commercially distributes free and open source software. See *Patent Pledge*, *supra* note 196.

Patent pledges also do little in the way of patent troll risk. That risk is nearly unavoidable, regardless of the patent strategy, so long as the patent system retains its bias in favor of the centralization of rights.

Lastly, patent pledges also do nothing in terms of addressing the inherent difficulties and resulting risks that exist in patenting openly innovated technologies. Those, too, result from the theoretical underpinnings of the current patent system—namely, its bias in favor of granting exclusive rights to a centralized point and, generally, a strict liability standard for infringement of those rights.

C. Patent Pools

Another strategy used to protect against patent risk is to create what are commonly referred to as “patent pools.” The most prominent example of a pooling effort is the Open Invention Network.²⁰³ In such an arrangement, an entity is formed whose purpose is to acquire patents and use them to defend open innovation, typically a specific open innovation project. Any third party can obtain a royalty-free patent license from the pooling entity so long as the third party is willing to enter an agreement with the pooling entity not to assert its patents against the open innovation project and any of its uses.²⁰⁴

In the case of Linux, the Open Invention Network appears to have enjoyed some success. Prominent technology companies such as Red Hat, Google, and IBM have joined the Open Invention Network as both members and licensees. In some cases, the Open Invention Network has assigned some of its patents to particular licensees and members in order to help them defend their use of Linux against patent aggressors.²⁰⁵ Furthermore, such patent pools almost certainly affect the calculus of commercial competitors and whether they are willing to assert their patents against users of Linux and thereby face possible counterclaims.

But patent pooling efforts can only do so much about patent troll risk. They may play a role in reducing the risk that patent trolls obtain patents on the same or similar inventions, but the pooled patents cannot be used in any sort of defensive way against patent trolls. Furthermore, some have worried that patent pools could themselves create patent risks if the pool’s patents were to eventually fall into the wrong hands.²⁰⁶ Indeed, the centralizing ef-

203. See *supra* note 13.

204. *Id.* This is, generally, how the Open Invention Network works. Pooling efforts can obviously also include other variations.

205. See Roger Parloff, *Amid the Patent Wars, a Powerful Pact of Non-Aggression*, FORTUNE (Feb. 13, 2013), <http://fortune.com/2013/02/13/amid-the-patent-wars-a-powerful-pact-of-non-aggression/>.

206. Schultz & Urban, *supra* note 9, at 36.

fects of patent law ensure that patent trolls and other risks remain no matter what private ordering mechanisms are adopted.

Furthermore, patent pooling efforts seem unnecessary to protect the development efforts of non-commercial developers and foundations, since these parties face little in the way of actual patent risk. Instead, it seems that open innovation patent pools are largely a mechanism by which commercial enterprises agree to both avoid patent aggression among themselves and obtain patent support in the event that someone outside the network brings patent suits against one of them.

However, those companies whose membership in such patent pools would most benefit the pools are the ones most likely to forego joining. Generally patent pools are a collection of players whose strategic interests align in such a way that asserting patents against each other on the basis of open innovation use was already unlikely. Consequently, while pooling efforts can lend patent support to companies within the network against those without, they are less likely to be the catalyst for achieving patent peace among participants, since those alliances already existed informally and were likely to continue.

Lastly, patent pooling efforts cannot solve the inherent difficulties in patenting openly innovated technologies. Even in cases where patent pools do acquire patents reading on openly innovated technologies, the decentralized, incremental, freely accessible nature of open innovation may mean that others wishing to invalidate such patents will have an easier time doing so, as discussed above.

In sum, though patent pools have proved to be a useful mechanism by which to address some of the effects that a centralizing patent system has on open innovation and its decentralized mode of production, they seem less capable of solving the inherent conflict. That conflict and the risks that flow from it will continue so long as the patent system remains based primarily on the assumption that centralized rights, whatever their costs, are an overall boon to innovation.

D. The Defensive Patent License

More recently, Jason Schultz and Jennifer Urban have proposed the “Defensive Patent License” (“DPL”) as a more comprehensive means by which to address the patent risks that open innovation communities face.²⁰⁷ As an initial matter, Schultz and Urban argue that open innovation communities must abandon their traditional aversion to patents and arm themselves; otherwise the escalating patent wars may very well engulf open innovation in their wake.²⁰⁸ They then review the perceived reasons for why

207. *Id.* at 37.

208. *Id.* at 5.

open innovation communities do not patent their technologies and the various patent strategies that have been employed to counteract patent threats, noting along the way the shortcomings of each.²⁰⁹

Schultz and Urban then lay out the basics of the DPL: each party that joins the DPL commits to irrevocably license its entire patent portfolio royalty-free to anyone else that joins the DPL community.²¹⁰ In return, such party similarly receives an irrevocable, royalty-free license to each DPL member's patent portfolio.²¹¹ Each party also commits to ensure that assignees of its patents abide by the DPL's terms.²¹² If a party wishes at any time to leave the DPL community, it may. But it must give six months' notice, at which point it can exit the DPL community.²¹³ However, the licenses that it granted prior to its exit remain irrevocable and royalty-free, and other members of the DPL community are free to revoke their patent licenses to the exiting party going forward.²¹⁴

Schultz and Urban argue that the DPL addresses many of the reasons why open innovation communities have traditionally failed to patent their technologies. The DPL helps distribute the costs and benefits of patents evenly among a variety of actors, thus accommodating the decentralized nature of open innovation;²¹⁵ it addresses cultural and political concerns about patents in general by ensuring that patents are only used for defensive purposes;²¹⁶ and it employs a well-known tool to open innovation communities—a license—to ensure a reliable commitment to openness.²¹⁷

The most immediate weakness of the proposed solution is similar to one from which patent pools suffer: the solution is primarily a solution if those least likely to join nevertheless do. And those most likely to join are those least likely to sue each other in any event. While the DPL may add cement to strategic reasons for non-aggression, it seems unlikely to do much beyond that, at least in this regard.

Indeed, non-commercial developers, foundations, and Open Innovation Companies are more likely to join because they have little to lose and much to gain, since open innovation is their way of life. But larger companies with significant portfolios seem less likely to join because the diversity and ever-changing nature of their business make it nearly impossible to enter such a commitment; their rising competitors could join at any time, obtain a license to the larger firm's patent portfolio, and lose little in return.

209. *See id.* at 6–15, 26–37.

210. *Id.* at 38–44.

211. *Id.*

212. *Id.*

213. *Id.*

214. *Id.*

215. *Id.* at 45–48.

216. *Id.* at 52–55.

217. *Id.* at 56–59.

And in many cases, the success of the DPL effort would seem to depend on these larger firms joining.

Furthermore, while the DPL would distribute some benefits of patents among those acceding to the DPL—namely, a guarantee that the licensors will not sue other members of the DPL community—arguably some of the most important benefits of patents remain undistributed. For instance, the DPL does not make patents available to fend off would-be patent aggressors. Patent pools may thus have an advantage over the DPL approach in this respect.

Another potential issue with the proposal is that it neglects to systematically analyze the risks that open innovation communities face. Instead, it appears to take the risk as a given and treats open innovation communities monolithically in terms of patent risks. But as this Article has argued, patent risks differ significantly depending on the type of participant in the open innovation community. Defining the risk is the first step in developing the right solution, and arguably the DPL proposal glosses over this issue.

Schultz and Urban are also hopeful that the DPL will help address risks associated with patent trolls. While they acknowledge that patent trolls are a systemic issue that even their private ordering solution cannot completely solve, they suggest that the irrevocability of the patent licenses granted under the DPL may reduce the attractiveness of such patents to patent trolls in future patent sales.²¹⁸

This certainly may be the case if large numbers of patents became, eventually, part of the DPL network. But as argued above, the chances of this happening seem slim, especially if joining may reduce the value of the firms' patent portfolios and therefore make them more difficult to sell. Furthermore, such patents could still be used against anyone that had not joined the DPL community, as well as against those that joined the community after the patent troll acquired the patent and withdrew it from the DPL community. Such temporal complexities suggest that the DPL may be less effective than hoped in addressing patent troll risks. Indeed, though a systemic solution may be unlikely, it still remains the one best capable of addressing the risk.

Lastly, while Schultz and Urban are hopeful that a growing DPL community would encourage participants in open innovation communities to more aggressively patent their technologies, this hope may falter because of the inherent difficulty with patenting open innovation, as discussed above. In the end, open innovation may simply be unpatentable in some cases or certainly more difficult in others, precisely because of the decentralized, incremental nature of inventive activity in open innovation com-

218. *Id.* at 54–55.

munities. Open innovation's natural strength thereby becomes a weakness, but not an inborn one. Reforming patent law could address the issue.

IV. REASSESSING PATENT LAW THEORY AND SOLUTIONS

In Part I, this Article explored the predominant theories of patent law; how open innovation may challenge those theories; and how those theories, to the extent that they undergird current patent law, may undermine open innovation. Having subsequently explored the actual patent risks that different participants in open innovation communities face, as well various patent-centric strategies to address them, this Article now briefly returns to patent law theory. In so doing, it also takes up the task of exploring possible solutions to reconciling open innovation with the patent system based on what this Article suggests about patent law theory.

A. *Patent Law Theory Redux*

It seems clear that patent law, even in its current form, does not threaten to extinguish open innovation. But the lack of portending doom is less the result of protections in patent law itself and more the result of informal, exogenous factors.

For instance, as discussed, non-commercial developers and foundations face little if any actual patent risks. Those that wish to invent and contribute technology without significant commercial motives are generally free to do so. But, their free pass results, not because patent holders have no recourse against them under current patent law, but because, generally, such patent holders lack strategic reasons to come after them.

Patent risk, unsurprisingly, rises with commercial activity. But even Open Innovation Companies and commercial users of open innovation are managing to survive, and in some cases even thrive, in spite of patents and their purported negative effects on open innovation. Some of this uneasy coexistence is also almost certainly the result of informal, exogenous factors; because of likely public backlash, patent holders may forebear asserting patents against other commercial enterprises in the absence of significant strategic reasons to do so. Some of this result also likely stems from the fact that, in many cases, the overall benefits to users of open innovation still outweigh the negative effects associated with patents.

While the survival of open innovation thus seems likely, what does its story say about patent law theory and patent law itself? One thing seems clear: many engage in inventive activity in spite of patents, not because of them. The open innovation story is one of diverse actors collaborating together to create significant amounts of freely available technology, all without the ability to exclude others via patent rights as a necessary precondition to such activity. The myth of the sole inventor—and its starring role in

helping shape modern patent law—remains a myth in the context of open innovation. And the idea that such collaborators need strong patent rights before engaging in such activity is also a myth that has been disproved time and again by open innovation's many instances of patentless innovation.

Those that are forced to live by these myths are also often forced to waste resources seeking to protect their mode of innovation. The significant defensive patent efforts reviewed above—from patent pools to new approaches such as the DPL—are just a few examples of resource-intensive efforts aimed at combating perceived patent risks. Others may include developers and companies spending significant amounts of time and resources designing around the reach of patents in technically unfavorable but patentably required ways. In an ideal world, such resources would instead be devoted to innovating for the public good.

But none of this is to say that patents do not have merit in many contexts. Many do rely on the reward of a patent in order to engage in inventive activity.²¹⁹ While open innovators may pursue patents when available primarily in order to protect against patent aggressors, i.e., as a stick, the patent aggressor may not have engaged in inventive activity without the prospect of a patent carrot. If patents did not exist, would the inventive activity that the carrot seeker undertook have been made up for by open innovation communities? Answering that counterfactual is impossible. And that is not the job of patent law in any event, which is to encourage inventive and innovative activity, not dictate the direction or source of it.

Furthermore, patent-motivated inventive activity may often play a role in spurring inventive activity within open innovation communities themselves, and vice-versa. The two systems need not be mutually exclusive and in fact may complement each other in many cases.²²⁰

Fixing the patent system, then, seems more a task of better enabling both models of innovation rather than choosing one over the other. Some view the two models of innovation as mutually exclusive systems. Many proposed solutions, consequently, have been rather simple: abolish patents

219. The pharmaceutical, chemical, and biotechnology industries, for instance, are fields where patents seem especially important to encouraging innovation. *See, e.g.*, Allison & Lemley, *supra* note 158, at 2125 (suggesting that patents may be considered more important in the chemical, pharmaceutical, and biotechnological fields than in others); *see also* Wesley M. Cohen & Stephen A. Merrill, *Introduction*, in *PATENTS IN THE KNOWLEDGE-BASED ECONOMY* 12 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) (“Economic research has made a convincing case that in at least one area—pharmaceuticals—patents have played a critical role in stimulating technical advance.”); BESSEN & MEURER, *supra* note 2, at 14–17 (suggesting that patents may only be justified in the pharmaceutical and chemical industries).

220. *See, e.g.*, James Bessen, *Open Source Software: Free Provision of Complex Public Goods*, 1–4 (Bos. Univ. Sch. of Law Research on Innovation, Working Paper, 2005), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=588763 (arguing that openly innovated technologies are often a complement to proprietary development efforts).

altogether.²²¹ But that does not seem to be the lesson of open innovation. Companies engage in both open and closed innovation simultaneously all the time, in some cases with patent rights as the catalyst and in others not. In short, both models of innovation seem to have merit in encouraging innovation. The next sections explore possible ways to improve the coexistence of open innovation and the patent system and thereby “promote the Progress of Science and [the] useful Arts.”²²²

B. Prior User Rights

One potential way to better accommodate both types of innovation is in the form of prior user rights. Prior user rights are a defense to patent infringement that allow a third party the limited right to continue to practice an invention for which it did not obtain a patent, despite another party obtaining a patent whose claims read on the invention.²²³

Before the America Invents Act of 2011, prior user rights were limited to business method patents.²²⁴ Following the America Invents Act, prior user rights are now available for any category of invention, so long as the user “commercially used” the invention at least one year before the earlier of the other party’s patent application filing date and the first public disclosure of the invention.²²⁵

Several factors, however, make prior user rights—at least in their current form—a weak solution to the open innovation conundrum. Practically, prior user rights may be mostly available to inventions that qualify as trade secrets, since other public uses would typically qualify as prior art that would simply bar a patent application for lack of novelty. But even in cases of eligibility, prior user rights cannot be licensed or otherwise transferred except in limited cases.²²⁶ The intellectual property licenses upon which open innovation communities rely would thus be ineffective in publicly sharing openly innovated technologies.

Furthermore, it is difficult to envision how this defense might be expanded to accommodate open innovation without changing it entirely. Some of the necessary accommodations—for instance, alienability—would

221. See, e.g., Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1135–40 (1990) (proposing sole reliance on copyrights, not patents, to protect software); Wadhwa, *supra* note 81.

222. U.S. CONST. art. I, § 8, cl. 8.

223. Jay M. Mattappally, *Goliath Beats David: Undoing the Leahy-Smith America Invents Act’s Harmful Effects on Small Businesses*, 58 LOY. L. REV. 981, 1005–06 (2012).

224. Brian J. Love & Christopher B. Seaman, *Best Mode Trade Secrets*, 15 YALE J.L. & TECH. 1, 12–14 (2012).

225. *Id.*; see 35 U.S.C. § 273(a) (2012).

226. 35 U.S.C. § 273(a) (2012).

begin to morph this defense into some of the other possible solutions discussed below.

C. *Defensive Publications*

Another approach is for open innovation communities to more proactively and effectively publicly disclose their technologies. Open innovation communities may often come up with patentable solutions before others patent them. In such cases, the solutions should be unpatentable for lack of novelty if the published technologies include all claim elements of the patent application in a single prior art reference.²²⁷ Or, patents should not be available even in cases where not all patent claim elements are found in a single prior art reference if the innovations are nonetheless obvious in light of what the open innovation community has already made available to the public.²²⁸

But open innovation communities often do a poor job of making their ideas available in a manner that patent examiners are likely to come across them or, even if they do, understand what they are looking at.²²⁹ For instance, many open innovation communities publish their projects as raw technology without much in the way of explanation.²³⁰ In the free and open source software world, open innovation communities release the raw source code for their projects, but significant work is often still needed to implement that source code as part of a product. Furthermore, without additional guidance, the source code may offer few clues in terms of what inventive concepts it covers. While such materials could still be used to invalidate patents after they issue, significantly higher hurdles exist in invalidating patents once they have issued.²³¹

Because of these issues, several groups have formed that seek to help open innovation communities create more effective prior art by publishing defensive patent publications.²³² The idea behind such efforts is to publicize the projects of open innovation communities in a manner that is more accessible and informative to patent examiners, judges, and the like. Other

227. 35 U.S.C. § 102 (2012).

228. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 415–22 (2007).

229. *See* Schultz & Urban, *supra* note 9, at 27–29 (discussing such deficiencies).

230. *Id.*

231. *See* *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1555 n.1 (Fed. Cir. 1985) (stating that an issued patent is presumed valid); Lucy Grace Dearce, *Deconstructing and Recalibrating the Valley Drug Analysis of Reverse Payments*, 47 *IDEA* 587, 596 (2007) (discussing several of the procedural hurdles imposed on defendants that result from the presumption that a patent is “born valid” (quoting *id.*) (internal quotation marks omitted)).

232. *See, e.g.*, LINUX DEFENDERS, *What Is a Defensive Publication?*, DEFENSIVE PUBL'N, <http://www.defensivepublications.org/> (last visited May 21, 2013); *Solutions Overview*, ARTICLE ONE PARTNERS, <https://www.articleonepartners.com/products-and-solutions> (last visited May 21, 2013).

related efforts have focused on helping the USPTO find these and other sources of prior art prior to patents issuing.²³³

Schultz and Urban point to certain problems with these approaches. For instance, open innovation communities are not accustomed to organizing themselves and their technical information in such a manner, so the likelihood of widespread, effective defensive publications becoming the norm may be low.²³⁴ If this is a valid criticism, however, then it also applies to advocating that open innovation communities seek patents on open innovation, something else to which open innovation communities are often unaccustomed (and in some cases deliberately opposed to). Indeed, it seems that collaborative communities that are ideologically opposed to patents may be more willing to pursue defensive publications than seeking costly patents.

Schultz and Urban also point out that patenting open innovation is preferable both in terms of the potentially defensive effect of the patents and as prior art—an issued patent is the “gold standard” of prior art.²³⁵ While it is true that patents constitute one form of effective prior art, even the best form, the inherent difficulties in patenting open innovation may make this approach somewhat unrealistic. Furthermore, simply because patents are generally considered the gold standard does not preclude the possibility that defensive publications can become effective themselves, even potentially matching that gold standard. Indeed, if the collaborative successes of open innovation communities are any indication, there may be significant reasons for optimism in this regard.²³⁶

Nonetheless, though a defensive publications strategy has some merit, it still primarily relies on taking advantage of cracks in a patent system designed around the economic incentives story of patents. Arguably, a better solution would acknowledge the merits of open innovation by more explicitly accommodating it under patent law.

D. Patent Fair Use

Some have argued that patent law should borrow from copyright law by adopting a “fair use” defense to patent infringement.²³⁷ Under copyright

233. See, e.g., *Peer to Patent*, DO TANK: DEMOCRACY DESIGN WORKSHOP, <http://dotank.nyls.edu/2011/02/08/peer-to-patent/>; LINUX DEFENDERS, *supra* note 232.

234. Schultz & Urban, *supra* note 9, at 28.

235. *Id.* at 48.

236. This may be particularly the case in light of recent patent law reforms under the America Invents Act, which introduced bolstered mechanisms for invalidating patents after they have issued. See *Inter Partes Review*, FISH & RICHARDSON, <http://fishpostgrant.com/inter-partes-review/> (last visited Jan. 12, 2015).

237. See Maureen A. O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 COLUM. L. REV. 1177 (2000); Katherine J. Strandburg, *Patent Fair Use 2.0*, 1 U.C. IRVINE L. REV. 265, 293–300 (2011).

law, the fair use defense grants someone who is otherwise infringing another's copyright in a work a limited right to continue to use the work. As with copyright law's fair use defense, proponents of this solution suggest that a fair use defense in patent law could provide a malleable instrument with which to protect against some of the excesses of patent rights.²³⁸ A fair use defense in patent law could thus also potentially help protect open innovation communities from the patent risks that they face.

One clear drawback with such a solution, however, is that it may offer little help to Open Innovation Companies and commercial users of openly innovated technologies. Under copyright law, for instance, commercial use of a copyrighted work that has the effect of substituting for the copyrighted work in the marketplace weighs against a finding of fair use,²³⁹ and presumably a patent fair use doctrine, if adopted, would work similarly. Open Innovation Companies and commercial users of open innovation—i.e., those facing the most significant patent risks under the current system—would thus be left vulnerable to patent infringement claims to the extent that they commercially exploited openly innovated technologies in ways that technically infringed the patent claims of others.

Those in favor of patent fair use suggest a list of factors that, if taken into account consistently in favor of open innovation communities, may help avoid this result.²⁴⁰ But that discussion points to another likely weakness of patent fair use in reconciling open innovation with the patent system: the unpredictability of how courts may apply the doctrine, even if adopted. Such unpredictability has been one of the most frequent criticisms of copyright's fair use defense, for instance.²⁴¹

Thus, though a patent fair use doctrine may make some intuitive sense, it seems less capable of solving the conflict between the phenomenon of open innovation and the patent system and addressing some of the more significant risks that Open Innovation Companies and commercial users of open innovation face.

238. See *supra* note 237.

239. See 17 U.S.C. § 107 (2012) (laying out the factors for determining whether a use of a copyrighted work is "fair use," and specifically listing as two of the relevant factors whether the use is commercial or not and what effect the use has on the market for the copyrighted work).

240. See Strandburg, *supra* note 237, at 300–02 (discussing patent fair use as applied to open source software communities in particular).

241. See, e.g., Edward Lee, *Warming up to User-Generated Content*, 2008 U. ILL. L. REV. 1459, 1468 (2008) (indicating that expert predictions of fair use are no better than those of the person on the street and possibly even worse); James Gibson, *Once and Future Copyright*, 81 NOTRE DAME L. REV. 167, 192 (2005) (suggesting that fair use is too indeterminate to provide a reliable metric for future conduct); Michael J. Madison, *A Pattern-Oriented Approach to Fair Use*, 45 WM. & MARY L. REV. 1525, 1666 (2004) ("Fair use is an *ex post* determination, a lottery argument offered by accused infringers forced to gamble, after the fact, that they did not need permission before.").

E. Independent Invention Defense

Unlike copyright law, where independent creation of a work is a defense to copyright infringement, patent law provides no such defense—it is generally a strict liability regime.²⁴² Patent rights typically may be exercised against anyone practicing the patented invention, regardless of whether they copied the invention from the patentee.²⁴³

Some studies suggest that the majority of inventions are simultaneously developed independently by any number of inventors.²⁴⁴ This phenomenon may suggest that awarding absolute patent rights to any of those inventors is unnecessary to incent the inventive activity; presumably at least one of those inventors would have undertaken the inventive activity without the lure of a patent, and perhaps, in fact, did. Consequently, some scholars argue that an “independent invention” defense to patent infringement could be an equitable means by which to address issues relating to patent trolls as well as curbing unnecessary costs imposed on society via granting absolute patent rights.²⁴⁵

Such a defense, furthermore, could be a means by which to reconcile open models of innovation with the current patent system. Indeed, if open innovators could rely on such a defense both to develop their technologies and license them to others, then an independent invention defense may be a promising solution to the open innovation/patent conundrum.

But an independent invention defense may make patents much less valuable and thereby undermine incentives to invent for those that do invent in pursuit of patent carrots.²⁴⁶ If potential participants in a patent race knew that winning the race only provided the winner with rights against those knowingly in the race, incentives to engage in the race may be significantly reduced. Such weakened patent rights may also reduce the value of the patents as licensable assets.²⁴⁷ And if all possible participants in the race withdrew because of such factors, then society may lose out on significant amounts of inventive activity. In short, while the phenomenon of simulta-

242. Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1421–22 (2009).

243. *Id.*

244. See D. LAMB & S.M. EASTON, *MULTIPLE DISCOVERY: THE PATTERN OF SCIENTIFIC PROGRESS* (1984); WILLIAM FIELDING OGBURN, *SOCIAL CHANGE: WITH RESPECT TO CULTURE AND ORIGINAL NATURE* 90–122 (1964); Eugene Garfield, *Multiple Independent Discovery & Creativity in Science*, 44 CURRENT COMMENTS, reprinted in 4 ESSAYS OF AN INFO. SCIENTIST 660 (1980); Jerry Gaston, *Secretiveness and Competition for Priority of Discovery in Physics*, 9 MINERVA 472 (1971); Lemley, *supra* note 23; Robert K. Merton, *Singletons and Multiples in Scientific Discovery: A Chapter in the Sociology of Science*, 105 PROC. AM. PHIL. SOC'Y 470 (1961); William F. Ogburn & Dorothy Thomas, *Are Inventions Inevitable? A Note on Social Evolution*, 37 POL. SCI. Q. 83 (1922).

245. See generally Vermont, *supra* note 8; Lemley, *supra* note 152.

246. See Lemley, *supra* note 152, at 1528–32.

247. *Id.*

neous, independent invention may suggest an independent invention defense is a good idea, it may also suggest it is a bad one under a different set of assumptions.

An independent invention defense may also lead to less inventive activity because it might encourage parties to syphon themselves off from others. That is, parties may be so fearful of being contaminated with knowledge of others' technology that they may go to extreme lengths to avoid such contamination. But there are good reasons to believe that information sharing leads to enhanced inventive activity, even outside an open model of innovation.²⁴⁸

An independent invention defense could be especially devastating to the patent system when applied to open innovation. For instance, for an independent invention defense to be effective for open innovation communities, it would have to allow independent inventors to freely license their inventions to others, and those others must also have immunity from patent assertions. In other words, the independent invention defense would need to be capable of running with the independently invented technology. Otherwise, an independent invention defense would serve open innovation communities only poorly. But if such were the case, in many cases the actual patent holder would quickly have no rights against the world because the open innovation community's independently invented technology would be freely available under the generally permissive open license terms.

In sum, while the independent invention defense has much to offer, it may go too far. In the first instance, there are significant, unanswered questions regarding what effect such a defense would have on incentives to engage in inventive activity. Furthermore, for it to help reconcile open innovation with the patent system, an independent invention defense would have to run with the technology and be freely alienable, including by way of the pervasive permissive licensing typical to open innovation communities. But if that were true, the defense may swallow the general patent rule insofar as open innovation is concerned. These realities may suggest additional reasons to fear that an independent invention defense would go too far in eroding inventive incentives.

F. A Two-Track System

1. The Mechanics

Another possibility to addressing the incompatibilities between open innovation and the current patent system is an independent invention de-

248. Fromer, *supra* note 34, at 541–44. Some of this issue may be addressable, however, through defining what constitutes independent invention. For instance, allowing constructive notice of an invention to eliminate the independent invention defense may help reduce incentives to pursue rational ignorance. Vermont, *supra* note 8, at 485–87.

fense with a significant twist: making the defense conditional. For instance, a reformed patent system could allow anyone to forego the right to offensively assert patents against third parties. In exchange, the party would receive patent infringement immunity for its use of otherwise infringing technologies so long as the technologies were independently invented. In other words, the patent system could explicitly protect open innovators and others so long as (1) the allegedly infringing technology was independently invented, and (2) the party gives up any right to assert patents against others except defensively.

Before assessing the possible advantages and disadvantages of such a system, a few clarifying comments about its mechanics are in order. First, if a party claiming the defense had actual notice of the patented technology before it conceived the same invention, then clearly its claim of “independent invention” would fail.²⁴⁹ In such cases, the party would thus not be eligible for the defense. Actual notice of the invention before the claiming party conceived the same invention would thus be a relatively straightforward rebuttal to a claim of independent invention.

But constructive notice should also bar an independent invention claim.²⁵⁰ Otherwise, the previously mentioned problems with willful ignorance may arise, which could lead to less inventive activity as parties syphon themselves off from each other. But as Samson Vermont argues, constructive notice should be more than the standard for determining prior art under current patent law, where a single publication in some remote location may constitute prior art that forecloses the possibility of a patent (and in this case, the independent invention defense).²⁵¹ A stronger possibility of actually having obtained notice would be preferable.

One possibility is to borrow from copyright law. For instance, when determining whether a third party has violated a copyright holder’s exclusive right to copy a work in cases where no direct proof of copying exists, courts analyze whether (1) the accused infringer had sufficient access to the copyrighted work, and (2) substantial similarity exists between the two works.²⁵² A similar construct might be used in assessing whether something was independently invented in the patent space.

As envisioned, then, determining whether technologies were independently invented would be the prerogative of courts. Independent inven-

249. Vermont, *supra* note 8, at 485–87 (explaining that something is not independently invented if the other party had notice of the patented technology).

250. *Id.*

251. *Id.*

252. See 2 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 13.01[B], 13-12 (rev. ed. 2014).

tion would thus be an affirmative defense to patent infringement rather than something determined by the USPTO or any other agency *ex ante*.²⁵³

If the relevant technology was independently invented, then a party may use it without being liable for patent infringement if the party also agrees to forego its right to assert patents against others, except in defensive scenarios where third parties have already asserted patents against them. Such an agreement could be accomplished through a simple registration system, publicly available for others to review.²⁵⁴ Registration would also mean that any patents that the registering party acquires after registering would be designated “defensive-only” patents for the life of such patents. This would help address concerns about patents being transferred to unregistered parties, such as patent trolls, who then might be used as the registering party’s enforcer. De-registering should also be possible, though the registration system and rules surrounding it would need to be carefully crafted in order to address significant gamesmanship issues.²⁵⁵

Parties would also be able to share independently invented technologies with others. That is, the defense would run with the technology for third parties that opted into the system and otherwise legitimately received the materials.²⁵⁶ On the other hand, parties that independently invented the technologies would be unable to claim the defense if they failed to register in the system, even if others opting into the system could.

2. *The Advantages*

Such a system presents several advantages over other proposals. First, unlike the DPL, patent pools, and patent pledges, the system would not depend on parties joining or pledging patents that are unlikely to do so. If a party opted into the system, it would receive patent infringement immunity

253. It would also be worthwhile to explore whether the USPTO or courts could play a role in making this determination *ex ante*, which would provide the advantage of upfront clarity and possibly avoiding litigation altogether. Such a discussion is outside of the scope of the current Article, however.

254. Such a registration system could also track what technologies have been deemed as having been independently invented.

255. For instance, if a party were able to register and thereby obtain the benefit of the independent invention defense but then transfer its patents to another entity and have it act as its enforcement arm, then the system obviously would not fulfill its purpose. Such issues would have to be carefully considered in constructing such a system and, in fact, are already under consideration in relation to patent trolls. See, e.g., Adi Kamdar, *Whose Patent Is It Anyway? A New Bill to End Patent Anonymity*, ELEC. FRONTIER FOUND. (May 20, 2013), <https://www.eff.org/deeplinks/2013/05/whose-patent-it-anyway-new-bill-end-patent-anonymity> (discussing a proposed bill aimed at ensuring that the actual owners of patents are better known).

256. That is, the third party obtains any necessary copyright, trademark, and trade secret rights that may be associated with the independently invented technologies.

for its use of independently invented technologies from the parties most likely to assert patents against it.²⁵⁷

For instance, such a system would help curtail the patent troll problem. Patent trolls and others could still assert and win suits against unregistered parties, even in cases of independently invented technologies. And patent trolls and others could assert and win suits against registered parties for their use of technologies that were not independently invented.²⁵⁸ But the system would help address what may be one of the more sinister activities of patent trolls: patent suits for use of technologies developed independently and in good faith.

Of course, patent troll problems would certainly not disappear. Because courts would have to determine whether something was independently invented, trolls may still convince many parties to settle rather than undergo the costly litigation that may or may not lead to a finding of independent invention. But the prospect of a liberal independent invention defense may both embolden many defendants to contest the claims of trolls and others as well as deter initiation of some suits in the first place.

Arguably such a system would also still provide significant incentives to invent and innovate, to both those opting into the system and those remaining outside of it. For those opting in, the system would provide them with incentives to develop their technologies as quickly as possible in order to take advantage of the patent infringement immunity. It may also encourage greater collaboration between registering parties in order to ensure that independently invented technologies are developed more quickly.

Furthermore, the system would also encourage such parties to publicly disclose their inventions as quickly as possible, and in a publicly useful manner. For instance, it would be far easier to demonstrate independent invention of a technology by pointing to the release dates of a product or

257. It is true that the two-track system may be viewed as even more successful if the parties most unlikely to join were to do so (for example, if Microsoft joined and thus was barred from asserting patents against others or, bizarrely, patent trolls). So it might be contended that the proposal suffers from the same weakness as the others. But such an argument rests on a problematic assumption of what success in this context means. The system is not meant to dictate what mode of innovation is best. Instead, it is intended to provide an escape valve for those that have little interest in patents but do in innovation, e.g., Open Innovation Companies. And that escape valve depends on independent invention and registration, not whether an unlikely party nonetheless decides to join.

258. The system may still need some bolstering in the sense that patent trolls would still have incentives to assert patents against others in the hopes that they may quickly settle rather than the parties choosing to litigate the matter in order to demonstrate that the technology was independently invented. Some of this may be addressed through defining what constitutes constructive notice, e.g., constructive notice should not entail the requirement to read and understand every possible patent claim's scope. Instead, a better standard might be that constructive notice entails something similar to what is required in proving unlawful copying under copyright law: proof of access plus substantial similarity between the allegedly infringing product and the original copyrighted work.

well-known publication than relying on internal notes or email exchanges between engineers. Thus, the two-track system would incorporate the advantages of defensive publications discussed above as well as benefiting society generally through such early disclosures.

Parties opting into the system may also still have some incentives to obtain patents. Consequently, if patents in today's system provide such parties with incentives to invent (e.g., because they need patents for defensive purposes), patents would play a similar role in the reformed system. For instance, such parties may still face patent suits for their use of technology that was not independently invented, and so may still obtain patents for defensive purposes. And even in cases where they believe the technology was independently invented, they may want patents to help ward off patent suits from those outside of the system who believe otherwise.

For those remaining outside of the system, incentives to invent (and as quickly as possible) also remain, but for the opposite reason. For instance, if exclusive patent rights are a make-or-break event for such inventors, then they have all the more reason to invent as quickly as possible and put others on notice of the invention, because doing so will decrease the likelihood of others successfully claiming independent invention. In short, such a system may provide greater incentives to innovate quickly, whether one finds patents desirable or anathema.

3. The Potential Drawbacks

Some may find the risk of weakened patent rights in an independent defense regime significant enough that they forego innovative activity. Indeed, if the potential of weaker patents caused all or significant numbers of would-be inventors to sit on the sidelines in any given patent race, the proposed system may be less defensible. Put simply: it may do more harm than good.

The conditional nature of the defense, however, makes such an outcome unlikely because, arguably, patents would remain strongest where they matter most. For instance, the likelihood of pharmaceutical companies opting into the system seems doubtful; their significant upfront costs associated with research and development and FDA testing and approval may make the ability to exclude others through patents of paramount importance. The proposed system would thus help identify where patents are needed—the relevant industries would likely self-select: actors in those industries where patents matter would almost certainly stay outside of the system because of the required sacrifice (i.e., giving up the right to exclude others from practicing their patented inventions).

In industries where parties value the defense of independent invention more than the exclusive rights of patents, such as the software industry,²⁵⁹ self-selection would likely occur in the opposite direction. That is, it is more likely that many parties in such industries would opt into the system. The conditional nature of the system and the resulting self-selection by industry would thus help guard against weakening patent rights in ways that harm society, regardless of whether any given industry embraces or rejects patents.

Aside from industries self-selecting and thereby mitigating the potentially perverse effects of the system, there are other reasons to doubt that such a system would harm innovation. For instance, in less crowded technology fields, the risk of independent invention is less of a concern, and thus the risk of weakened patent rights is, too. Put another way: to the extent that parties opted into the system and successfully independently invented technologies, such a system may weaken patent rights for others. But arguably it would only weaken them in cases where the invention is likely from multiple parties anyway. In cases of true “lone genius” inventive activity, the risk of weakened patent rights is less because independent inventors are, by definition, less likely. Consequently, the incentive to invent such technologies would remain strong. And such areas are precisely where we should want patent rights to be the strongest in order to encourage inventive activity that otherwise may not occur.

But this analysis may appear to rest on faulty assumptions relating to what information inventors actually have about each other. For instance, even in areas of “lone genius” inventive activity, the lone genius may forego the socially beneficial inventive activity for fear that others are independently developing the same thing, even if, objectively, independent invention by others is unlikely. Or, some parties that consider themselves “lone geniuses” may devote significant resources to expensive inventive activities and largely justify these activities on the belief that exclusive patent rights will help them recoup their costs. But it may often be the case that such self-perceptions are inaccurate and that, in reality, these self-ascribed lone geniuses are only one of many parties simultaneously inventing the same thing.

Indeed, in perhaps the worst-case scenario, such lack of perfect information regarding independent invention may cause all parties that rely on patent rights as an incentive to invent to forego the efforts necessary to do so. In cases where open innovation communities do not fill the resulting gap, society may lose. Thus, where previously multiple possible inventors raced to invent in order to obtain the prized patent, the two-track system

259. Indeed, many companies in the software industry already de facto operate in this manner and only acquire patents in order to defend themselves.

may in some cases weaken patent rights sufficiently enough to cause all to exit.

But even if perfect information is impossible, some information is available, and this available information likely mitigates many of these risks. Indeed, though a party can never know with absolute certainty whether another party is working on the same idea, it can often know with some amount of precision. Parties routinely engage in market research in order to mitigate the risks associated with spending significant amounts of time and energy on ideas that others are already pursuing or are likely to pursue. In short, this risk already exists under the current patent system. Although a two-tiered system may enhance it, there are measures that companies can and already do take in order to mitigate it. The likelihood of some areas of technological development being completely abandoned due to weakened patent rights thus seems unlikely.

Furthermore, this possibility seems even more remote in technology areas where patents are more important to inventive activity. This is so because, as discussed above, if patents are significant in such development areas, the likelihood of companies and others opting into the system is less because presumably one needs patents in order to survive in these spaces. And parties would have an easy way to identify which other parties are even eligible for the defense through the publicly available registration system, as described above.

It still might be argued that someone who exited a patent race because of the two-tier system may have been a better innovator than the independent inventor. And so if the party does not pursue a patent or the inventive activity due to the possibility of weakened patent rights, society may still lose because it then does not receive the superior innovations (even if it does receive the invention, albeit from a party with a poorer implementation record). But if the prospective patent holder is actually a better innovator, then in most cases it should still pursue the innovative activity, even with weakened patent rights, because society will prefer its innovations over those of others. In other words, incentives other than patents should help keep them in the game.

Indeed, overall a two-track system may provide a good indicator of how valuable patents actually are in encouraging innovative activity. If large numbers of companies and individuals opt into the system, such a trend may suggest that patents do not typically act as carrots, at least in some technology spaces. Instead, parties may seek patents simply because they perceive that they must in order to survive. As discussed throughout, for open innovation communities such a necessity is both undesirable and in some respects infeasible. And even for others outside of the open innovation world, such expenditures are often simply waste.

If significant numbers of parties stay outside the system due to concerns with the system's impact on patent assets, this result might be viewed as an indictment of the system. But it shouldn't. Normatively, the proposed system is not for or against patents; it is simply meant to suggest a promising way to provide those willing to contribute technology to society without the need of a patent, such as many within open innovation communities, improved opportunities to do so.

V. CONCLUSION

Many in open innovation communities have long believed that patents unduly threaten their mode of innovation. This Article's exploration of the patent risks that different participants in open innovation communities face suggests this concern is exaggerated in some cases. For non-commercial developers and foundations, the direct patent risks are often negligible.

Open Innovation Companies and commercial users of open innovation, on the other hand, face significant patent risks. Indeed, some of those risks appear to be unavoidable, since the decentralized, incremental nature of open innovation may make patenting the resulting technologies inherently more difficult than in other contexts.

But even these risks are unlikely to doom open innovation. Open innovation presents significant advantages that many will likely continue to harness, even in the face of the waste that the current patent system causes.

But this latter point makes one thing clear: the current patent system does cause waste. Is that waste simply unavoidable, a necessary tradeoff for a net positive amount of innovative activity that the patent system yields? Open innovation's successes suggest no; many are willing to invent and innovate without the lure of a patent. And many outside of open innovation communities seem to find the current patent system and its effects on innovative activity increasingly troubling.

Attempts by those within open innovation communities to solve the riddle have produced a mixed bag. Efforts to use patents against the patent system are a well-known strategy in open innovation communities; it is the basis, for instance, of "copyleft" and "share-alike" in the copyright sphere. Some have called for an enhanced version of this approach in the patent sphere.

But, as this Article has argued, open innovation and the current patent system have certain incompatibilities that stem largely from a patent system built on outdated patent law theory. These incompatibilities, furthermore, may make using patents to combat patent risks an unviable long-term solution for open innovation communities. While using the patent system to defend open innovation against the patent system has yielded some help, arguably the ultimate solution does not lie in patents. Instead, it lies in

reforming the patent system to expressly acknowledge and facilitate a mode of innovation that avoids the societal costs that patents are meant to impose.

This Article has suggested as one possibility for improving open innovation and the patent system's coexistence a two-track system that would better protect open innovation while still allowing industries that rely on patents the ability to do so.

Would such a system work? More study is needed to explore how such a system may affect patents and incentives to invent as well as possible litigation issues relating to proving independent invention. And the actual mechanics of the system need additional assessment in order to address significant issues of possible gamesmanship. Undoubtedly, though, patents would enjoy less predominance in such a system. This Article offers an initial argument that this decreased predominance would enhance innovative activity rather than dampen it. And by so doing, the patent system would undergo a much-needed facelift that better reflects the many ways in which innovation actually happens today.

