

OPEN SOURCE INNOVATION, PATENT INJUNCTIONS, AND THE PUBLIC INTEREST

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ABSTRACT

This Article explores the difficulties that high technology markets pose for patent law and, in particular, for patent injunctions. It then outlines the ways in which “open source innovation” is unusually vulnerable to patent injunctions. It argues that courts can recognize this vulnerability, and respond to the particular competitive and innovative benefits of open source innovation, by flexibly applying the Supreme Court’s ruling in eBay v. MercExchange. Having dealt with the lamentable failure of the International Trade Commission to exercise a similar flexibility in its own patent jurisprudence, despite statutory and constitutional provisions that counsel otherwise, the Article concludes with some recommendations for reform.

INTRODUCTION

In *eBay, Inc. v. MercExchange, L.L.C.*,¹ the Supreme Court laid down the standards for granting permanent injunctions in patent infringement actions. Overruling years of Federal Circuit precedent, the Court decisively rejected the existing presumption that, once a court finds a patent has been infringed, an injunction should issue. Instead, the Court held that permanent injunctions in patent law are governed by the same equitable four-part test as injunctions in other areas of law.

A plaintiff must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.²

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¹ *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006).

² *Id.* at 391.

A. The Challenge of High Technology Markets

High technology markets—particularly those involving sequential innovation and the “network effects” that are typically found in products such as software or communications devices—pose a number of distinct challenges in applying this test. In these markets, business models and methods of innovation vary widely. Great sensitivity is needed to make sure the law is applied in a way that is attentive to potentially disparate effects on a particular structure of innovation or type of competition. It is exactly this kind of sensitivity to context that the *eBay* test is intended to foster.

B. Benefits of Open Source Technological Development

This Article focuses on open innovation and, in particular, on “open source”³ methods of technological development—in which a wide network of developers participate in building on a shared technological base that is freely available to all. Classic examples include the operating system Linux, the Firefox browser, the Apache web server, and the Android operating system for mobile devices. Free and open source software powers everything from phones and search engines to ATMs and TiVo digital video recorders; together the companies deploying open source products make up a large and innovative industry sector that supports millions of jobs. But this method of development is not confined to software: open source or open innovation methods are also found in areas ranging from synthetic biology to the development of artificial limbs.

As the Federal Trade Commission recently pointed out,⁴ open innovation and open source methods offer compelling advantages in fostering both competition and rapid technological development. High technology markets are frequently characterized by the existence of network effects. Markets tend to “tip” towards a single standard—whether a single operating system or a single format for high quality DVDs. If the standard is proprietary, the owner can extract supracompetitive rents, while the coordination costs of switching to a new standard or technology lock users in, even if better alternatives are subsequently developed. Consumers bear the cost in the form of higher prices and reduced innovation. But when the technology is open source, no such hold-up is possible. Multiple developers can offer competing versions, with the competition simultaneously bringing down prices and offering greater choice and customization. In markets in

³ Because the ambit of this analysis goes beyond the software context, I do not generally use the terminology “Free and Open Source,” which would be appropriate if my subject were software alone.

⁴ FTC, *THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION* (2011) [hereinafter *EVOLVING IP MARKETPLACE*].

which both proprietary and open source products compete, the existence of the open source alternative provides a valuable check on potential monopoly power, as well as a continued prod to innovation by all of the companies involved, whether open source or proprietary. Owners of iPhones *and* Android phones have benefitted both in pricing and in the rapid development of new features because of the competition involved—a competition not only between *types of phones*, but between different *models of innovation*. This spur to competitiveness, yielding lower prices and accelerated innovation, clearly benefits consumers and the public interest. Finally, by allowing a wide range of participants, small and large, to share in the process of innovation on a layer of open technology, society gets the benefit of diverse approaches to the same technological puzzles. Open source offers a type of technological “species diversity,” in contrast to the proprietary monocultures.

C. The Vulnerabilities of Open Source

If open source innovation has great social benefits in fostering competition and innovation, it also has particular vulnerabilities. First, precisely because open source development takes place in a *network* and allows both small and large players to participate by building on a common technology, it is particularly susceptible to attack and disruption. A proprietary monopolist fully internalizes both the costs and benefits of policing its technology and its intellectual property. Members of an open innovation network, however, do not. Individual members can be “picked off,” forced to abandon promising lines of technological development, or to pay ruinous “stacked” royalties because the costs of litigation are too burdensome for any one member of the network to bear. It is in this context that the threat of injunctions is particularly worrisome. In fast-moving technology markets, the dead stop forced by an injunction can be enough to doom a product. An entire network of innovation could be shut down by an injunction obtained against a single small participant who lacks the resources necessary to challenge the patent or defend against the injunction.

Second, most of these markets are characterized by strongly cumulative innovation. A finished product may “read on” literally thousands of potential patents. In these markets, as Justice Kennedy noted in *eBay*, there are considerable concerns with low patent quality and with the vagueness of the patents themselves.⁵ Even the most scrupulous respecter of intellectual property can be subject to hold-up by a company claiming its patent has been infringed. To quote the Federal Trade Commission:

⁵ *eBay*, 547 U.S. at 397 (Kennedy, J., concurring).

Under some circumstances, however, the threat of an injunction can lead an infringer to pay higher royalties than the patentee could have obtained in a competitive technology market. At the time a manufacturer faces an infringement allegation, switching to an alternative technology may be very expensive if it has sunk costs in production using the patented technology. That may be true even if choosing the alternative earlier would have entailed little additional cost. If so, the patentee can use the threat of an injunction to obtain royalties covering not only the market value of the patented invention, but also a portion of the costs that the infringer would incur if it were enjoined and had to switch. This higher royalty based on switching costs is called the “hold-up” value of the patent. Patent hold-up can overcompensate patentees, raise prices to consumers who lose the benefits of competition among technologies, and deter innovation by manufacturers facing the risk of hold-up.⁶

Large firms protect themselves from the vulnerability inherent in this situation by purchasing huge war chests of patents, not for their inherent value but to threaten “mutual assured destruction” should their (large) competitors start a patent war. But an open innovation or open source network is at best imperfectly protected by such tactics, and remains vulnerable in any event to hold-up by “non-practicing entities”—patent trolls who can use the threat of an injunction to extract large rents without being subject to attack in return because they never actually make anything.

Empirical studies and theoretical economic models confirm the dangers described here are real. For example:

- Preliminary injunction claims are disproportionately more likely to be brought by plaintiffs that are financially stronger and larger than the defendants—a troubling barrier to entry in a supposedly dynamic market.⁷ Here, the desirable heterogeneity of open innovation networks becomes a vulnerability.
- Professors Mark Lemley and Carl Shapiro have shown the threat of injunctions allows for “holdup” and

⁶ EVOLVING IP MARKETPLACE, *supra* note 4, at 5.

⁷ “The empirical results suggest that this remedy may be available only to financially stronger plaintiffs. In univariate comparisons, disputes in which preliminary injunctions are requested have plaintiffs almost twice as large, in terms of sales, employment, and cash and equivalents, as those in disputes where preliminary injunctions are not requested. The plaintiff is also significantly more likely to be bigger than the defendant.” Jean O. Lanjouw & Josh Lerner, *Tilting the Table? The Use of Preliminary Injunctions*, 44 J.L. & ECON. 573, 575 (2001).

“royalty stacking,”⁸ particularly in the type of cumulative innovation markets in which open source methods are most often found.

For these reasons among others, we have empirical, experiential, and economic reasons to believe that the *eBay* factors should be applied with particular care to high technology markets. The courts have actually begun to do so, applying several heuristics that this Article will support, with the scope to do still more. There is, however, a catch.

D. Enter the International Trade Commission

eBay v. MercExchange revolutionized patent injunctions in the federal court system, and its effects have even spread beyond patent to copyright. Ironically, there is one intellectual property context in which the *eBay* standards have *not* been applied and where the public interest is still narrowly and formalistically construed. It lies at the heart of patent law—the very field in which *eBay* was announced. The tribunal concerned is the International Trade Commission (ITC), now the favored destination of companies seeking patent injunctions.

Why the favored destination? Because, according to empirical studies, the ITC’s favorable response to requests for patent injunctions is astonishingly high, between 96% and 100%.⁹ Thus, thirty years after the CAFC was set up to *harmonize* patent law, we have effectively developed two legal systems for patent injunctions in the United States, each applying entirely different standards and only one of them truly considering competitive effects and the public interest.

This Article details the empirical, experiential, and economic reasons to believe that patent injunctions can present severe anti-competitive problems, particularly in high technology markets characterized by network effects, and that they can lead to royalty stacking, to “hold-up,” and to the chilling of competitive innovation. Unfortunately, these concerns are not confined to Article III courts. They do not vanish when one enters the doors of the ITC. Yet, inexplicably and despite the presence of a clear statutory mandate to consider competitive issues and effects on United States’ consumers,¹⁰ judicial attention to them does vanish. The CAFC may have been mistaken to hold that *eBay* did not apply to the ITC. This Article will argue that it was. But more importantly, the ITC already has a statutory

⁸ Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1993 (2007).

⁹ Robert W. Hahn & Hal J. Singer, *Assessing Bias In Patent Infringement Cases: A Review Of International Trade Commission Decisions*, 21 HARV. J.L. & TECH. 457, 484 (2008).

¹⁰ 19 U.S.C. §§ 1337(d)–(f) (2006).

mandate to consider public interest factors, including the effect on competition. So far, it has failed almost totally to do so. But as the economic and legal arguments presented here will show, that stance is a costly mistake, one that harms both the competitive American economy and the American consumer. This mistake should be rectified as soon as possible, either by the ITC's own jurisprudence, by executive action, or by legislative clarification—all aimed at ensuring patent remedies serve, rather than harm, the goal of innovation they are designed to foster.

E. Defining the Public Interest

First, this Article argues the Supreme Court's test in *eBay*, properly understood, offers some constructive ways to respond to both the benefits of open source innovation and the threats posed to it by injunctions. In particular, the third and fourth factors—the “balance of hardships” component and the “public interest” component—are ideally suited to allow recognition of the unique vulnerabilities and the unique competitive and innovative value of open source production. It is precisely this kind of equitable context-sensitivity that the Supreme Court's test in *eBay* was designed to reintroduce into decisions about patent injunctions. Attention to the economic and empirical literature on injunctions reinforces the need for such an approach, and there are hints that the federal courts have begun to adopt one. Nevertheless, much remains to be done.

Second, this Article argues the ITC's attitude towards patent injunctions needs to change and change soon, largely by incorporating the same kinds of concerns the Supreme Court, scholars, and empiricists have all stressed are vital to preserving the competitive balance at the heart of patent law. The ITC is *not* in fact required automatically to issue exclusion orders or cease-and-desist orders if it finds infringement of a patent, though that has been its practice. All of the sections authorizing permanent or temporary orders of this kind have the following vital rider: “*unless, after considering the effect of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers, it finds that such articles should not be excluded . . .*”¹¹ Public health and welfare, competitive conditions, and the effects on competing products and on the availability of products to US consumers—these are exactly the issues the *eBay* factors require courts to consider.

The remedy to these problems is relatively simple. Ideally, the ITC should put its own house in order by paying greater attention to the statute that governs its operation. If the ITC will not do so—and so far there has been no sign that it will—then executive or legislative action is urgently

¹¹ 19 U.S.C. § 1337(d)(1) (emphasis added).

needed to protect the American economy and American consumers from overreaching injunctions that end up undermining the creativity they are supposed to protect. Such a result will benefit not only open source innovation, but innovation in general.

The Article proceeds as follows. The first two sections outline the law and policy of patent injunctions in the federal courts and in the ITC, laying out the considerations applicable to *any* high tech industry. The remaining sections describe the specific benefits and vulnerabilities of open source production and suggest some ways in which injunctive practice can be made more sensitive to them.

I. EBAY'S STANDARD FOR PATENT INJUNCTIONS

In *eBay, Inc. v. MercExchange, L.L.C.*,¹² the Supreme Court laid down the standards for granting permanent injunctions in patent infringement actions. Overruling years of Federal Circuit precedent, the court decisively rejected the existing presumption that, once a court has found that a patent has been infringed, an injunction should issue unless there are “exceptional circumstances.”¹³ Instead, the court held that permanent injunctions in patent law were governed by the same equitable four-part test as injunctions in other areas of law.

A plaintiff must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in

¹² *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006).

¹³ True, the courts before *eBay* had refused to issue injunctions if it would not be in “the public interest.” Yet the reach of that exception, at least as defined by the Federal Circuit, was small. It was generally confined to cases where the injunction would limit access to some medical or public health technology, particularly if the patentee was not actively practicing the invention. “If a patentee’s failure to practice a patented invention frustrates an important public need for the invention, a court need not enjoin infringement of the patent. See 35 U.S.C. § 283 (1988) (courts may grant injunctions in accordance with the principles of equity). Accordingly, courts have in rare instances exercised their discretion to deny injunctive relief in order to protect the public interest. See, e.g., *Hybritech, Inc. v. Abbott Lab.*, 4 USPQ2d 1001, 1987 WL 123997 (C.D.Cal.1987) (public interest required that injunction not stop supply of medical test kits that the patentee itself was not marketing), *aff’d*, 849 F.2d 1446, 7 USPQ2d 1191 (Fed. Cir.1988); *Vitamin Technologists, Inc. v. Wisconsin Alumni Research Found.*, 64 USPQ 285 (9th Cir.1945) (public interest warranted refusal of injunction on irradiation of oleomargarine); *City of Milwaukee v. Activated Sludge, Inc.*, 21 USPQ 69 (7th Cir. 1934) (injunction refused against city operation of sewage disposal plant because of public health danger).” *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1538, 1547–48 (1995).

equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.¹⁴

In a strong concurrence, Justices Kennedy, Stevens, Souter, and Breyer elaborated on the need for caution in issuing injunctions in a number of particular situations: suits by “non-practicing entities;” situations in which the technology is complicated, the innovation sequential, and the patent itself represents only a small portion of the finished product; and suits in areas where patent quality is thought to be low and patent ambit vague, such as business method patents.

[A]n injunction, and the potentially serious sanctions arising from its violation, can be employed as a bargaining tool to charge exorbitant fees to companies that seek to buy licenses to practice the patent. . . . When the patented invention is but a small component of the product the companies seek to produce and the threat of an injunction is employed simply for undue leverage in negotiations, legal damages may well be sufficient to compensate for the infringement and an injunction may not serve the public interest. In addition injunctive relief may have different consequences for the burgeoning number of patents over business methods, which were not of much economic and legal significance in earlier times. The potential vagueness and suspect validity of some of these patents may affect the calculus under the four-factor test.¹⁵

This passage is particularly striking because the concerns the Court raises are all present in the open source context—and especially when dealing with open source software. There too, we have vague patents of suspect validity. There too we have innovation that potentially “reads on” multiple (vague) patents and is thus unusually vulnerable to hold-up. Of course, to some extent *all* software faces these concerns, as do all telecommunications technologies, but this Article will argue there are reasons to believe that open source methods have both particular benefits to competition and particular vulnerabilities to disruption through injunctions. It is for this reason that the flexible equitable considerations discussed in *eBay* are potentially important for the open source context.

In practice, district courts seem to have extracted a number of messages from the Supreme Court’s guidance on injunctions in *eBay*. Courts have been particularly skeptical about injunction claims brought forward in the absence of direct competition. This skepticism is by no means confined to “non-practicing entities” or to patent trolls. It extends to any case in which the litigants (or their licensees) are not direct competitors: “[T]he existence of direct competition generally results in a permanent

¹⁴ *eBay*, 547 U.S. at 391.

¹⁵ *Id.* at 396–97.

injunction. The converse is also true. Lack of direct competition generally results in the denial of a permanent injunction.”¹⁶ A number of explanations are traditionally offered for this difference in treatment.

When competition is present, monetary damages generally do not compensate a plaintiff for the value of future business goodwill . . . that it receives from increasing market share. In contrast, when there is no competition, the plaintiff does not suffer irreparable harm in the absence of an injunction because it is not losing any market share. Moreover, monetary damages are adequate because those are the only compensation that such a plaintiff can obtain; an injunction merely serves to increase the settlement value of a monetary damages amount. The balance of hardships also weighs in favor of denying injunctive relief in the absence of direct competition. The defendant will clearly be harmed by the inability to offer its product or services, but there is no corresponding hardship suffered by the patent holder. Finally, the public has at least some interest in having the patented technology available.¹⁷

These points have considerable force—particularly in concentrating on the effect of injunctions in denying technologies to the public—but, in practice, another consideration may weigh at least as heavily. In the high technology and software markets, where there are concerns about both patent quality and patent clarity, firms have traditionally protected themselves against suit by building large “war chests” of patents and either formally cross-licensing them to their competitors or relying on the informal threat of “mutual assured destruction” should a lawsuit begin.¹⁸ In other words, a large participant in such markets can defend itself from the vulnerability posed by vague and low quality patents by leveraging the symmetrical vulnerability faced by its competitors. Even in the absence of a formal patent pool, each party is likely both infringed upon and infringing, and thus neither will sue.

This method of dealing with the problems in the patent system is no panacea. For one thing, it poses troubling barriers to entry. Only large holdings of patents will allow participants to enter patent pools or to credibly threaten mutual ruin should legal actions commence. Thus, small

¹⁶ Bernard H. Chao, *After Ebay, Inc. v. MercExchange: The Changing Landscape For Patent Remedies*, 9 MINN. J.L. SCI. & TECH. 543, 553 (2008).

¹⁷ *Id.* at 553–54.

¹⁸ See, e.g., Brian Kahin, *Prospects for Knowledge Policy*, in *ADVANCING KNOWLEDGE AND THE KNOWLEDGE ECONOMY* 4 (B. Kahin & D. Foray eds., 2006) (“A profusion of property interests cannot be managed with due attention, understanding, and deliberation on a cost-effective basis, especially when the interests are of low or indeterminate value. We see a number of market-based responses to this problem, such as . . . Patent pools . . . Cross-licensing . . . Nonassertion agreements . . . [and] ‘Mutually assured destruction.’”).

startups are unable to avail themselves of this form of legal flak jacket. Nevertheless, for at least some participants in the market, formal patent pooling or informal mutual deterrence clearly function to mitigate the problems arising from patent thickets and patent hold-up. However, there is one player against which such tactics are clearly useless: the non-practicing entity. Precisely because it is not in the relevant market, it faces no such vulnerability. Thus, by focusing on the presence of competition between the parties, the courts are not only ensuring that a technology continues to be available to the public. They are also, wisely, tending to deny permanent injunctions to those whose behavior is not otherwise constrained and moderated by these important formal and informal safety valves.

A significant exception to the *de facto* requirement of competition between the parties is found in the case of *Commonwealth Scientific & Industrial Research Organisation v. Buffalo Technology Inc.*¹⁹ There, the court concentrated on the status of the plaintiff as a research organization. Because research organizations rarely commercialize innovations themselves, instead relying on licensing, the court reasoned that an injunction was more appropriate to defend the plaintiff's interests. The reasoning has some force, but, as Professor Mark Lemley points out,²⁰ the courts' focus should be on conduct, not status.

[W]e can learn something about the raging debate over who is a patent troll and what to do about trolls by looking at university patents. Universities are non-practicing entities. They share some characteristics with trolls, at least if the term is broadly defined, but they are not trolls. Asking what distinguishes universities from trolls can actually help us figure out what concerns us about trolls. What we ought to do is abandon the search for a group of individual companies to define as bad actors. In my view, troll is as troll does. Universities will sometimes be bad actors. So will non-manufacturing patent owners. So will manufacturing patent owners. Instead of singling out bad actors, we should focus on the bad acts and the laws that make them possible.²¹

While direct competition has rightfully been an important feature in courts' decisions on whether or not to grant injunctions, scholars agree that it has not been, and should not become, the be-all and end-all of the analysis.

¹⁹ 492 F. Supp. 2d 600 (E.D. Tex. 2007). *CSIRO* has since been vacated and remanded on validity grounds, but the predisposition to treat research entities as different presumably remains.

²⁰ Mark A. Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611 (2008) [hereinafter Lemley, *Universities*], available at <http://law.fordham.edu/publications/article.ihtml?pubID=200&id=273>.

²¹ *Id.* at 612.

[D]irect competition should be an important, but not dispositive consideration. The alternative would violate the Supreme Court's prohibition in *eBay* on broad categorical rules. There are still other circumstances where no injunction should issue even when the plaintiff and defendant are direct competitors—for example, when the patent covers a relatively unimportant feature of a product, but the costs of a design-around are high.²²

The latter problem—the disproportionate leverage that injunctions give to patents that cover a small proportion of a challenged invention—was, of course, one of the concerns raised in Justice Kennedy's concurrence in *eBay*.

Justice Kennedy's argument was echoed with particular force in Lemley and Shapiro's influential article *Patent Holdup and Royalty Stacking*.²³ Lemley and Shapiro use both economic modeling and empirical research to support the thesis that the threat of injunctions can be used to extract royalty payments far in excess of the worth of the patent in issue, with accompanying harm to the process of innovation.

The threat that a patent holder will obtain an injunction that will force the downstream producer to pull its product from the market can be very powerful. These threats can greatly affect licensing negotiations, especially in cases where the injunction is based on a patent covering one small component of a complex, profitable, and popular product. Injunction threats often involve a strong element of holdup in the common circumstance in which the defendant has already invested heavily to design, manufacture, market, and sell the product with the allegedly infringing feature. . . . [T]he threat of an injunction can enable a patent holder to negotiate royalties far in excess of the patent holder's true economic contribution. Such royalty overcharges act as a tax on new products incorporating the patented technology, thereby impeding rather than promoting innovation.²⁴

Lemley and Shapiro argue persuasively that an important solution to this problem is for the courts to stay injunctions in certain circumstances.

If the infringing firm claims that it can design around the patent, the court should issue a stay of its permanent injunction that is long enough to permit the infringing firm to complete the redesign, if there is one, in an efficient and timely manner. The infringing party would, of course, be required to pay reasonable royalties to the patent holder for any sales made during the period of the stay. With such stays, holdup based on the disparity between the relatively large value of the

²² Chao, *supra* note 16, at 555.

²³ Lemley & Shapiro, *supra* note 8.

²⁴ *Id.* at 1992–93.

patented product and the relatively small value associated with the patented feature is sharply reduced or eliminated.²⁵

To sum up, the courts have been relatively consistent in their focus on direct competition—a point noted both by analysts who agree with the focus and those who disagree with it. The courts, the FTC, and legal scholars have also shown concerns about issuing injunctions when the patent covers only a small portion of the challenged technology. However, the third and fourth portions of the *eBay* factors have received less judicial attention. Those factors are “(3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.”²⁶ Courts have in some cases adopted definitions of the public interest that seemed to hearken back to the CAFC’s old test, rejected by the Supreme Court in *eBay*. The old test, in practice, confined the narrow public interest exception to cases involving public health.²⁷ This uncertainty about the breadth of the public interest exception is compounded by the fact that the CAFC sometimes seems unsure about some of the most fundamental components of *eBay*.²⁸ At other points, however, both the district courts and the Federal Circuit seem to be operating with more nuanced definitions of the public interest, ones that recognize both the public’s interest in competition and in access to technology, and the need for courts to design remedies in order to guard

²⁵ *Id.* at 2038. There is reason to believe that courts are actually fashioning such remedies. *See e.g.*, *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 704 (Fed. Cir. 2008) (approving district court’s 20-month “sunset” delay on its injunctive remedy, noting that this would probably allow for redesign.)

²⁶ *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388, 391 (2006).

²⁷ *TiVo Inc. v. EchoStar Commc’ns Corp.*, 446 F. Supp. 2d 664, 670 (E.D. Tex. 2006). In granting the permanent injunction, the court claimed the public interest would not be affected because neither public health nor any other core public interest was concerned.

²⁸ For example, in the federal courts after *eBay*, do we still have the old rule that, once there is a finding of patent infringement, a presumption of irreparable harm automatically follows? To many, this rule seemed to be one of the central points of law that *eBay* rejected. But when the CAFC was given the opportunity to make that clear, it chose to sidestep it in a remarkably noncommittal fashion. “Amado argues that the district court ‘improperly concluded that *eBay* eliminated the presumption of irreparable harm that follows a judgment of validity and infringement.’ We find it unnecessary to reach this argument, however, because regardless of whether there remains a rebuttable presumption of irreparable harm following *eBay*, the district court was within its discretion to find an *absence* of irreparable harm based on the evidence presented at trial.” *Amado v. Microsoft Corp.*, 517 F.3d 1353, 1359 n.1 (Fed. Cir. 2008). Even more troublingly, as the next section will outline, the CAFC has also held that the ITC is exempt from *eBay*’s requirements altogether.

against the kind of “hold-up” that Lemley and Shapiro warn against. Consider this passage from the *Broadcom* case:

The district court found that although it is generally in the public interest to uphold patent rights, “an immediate permanent injunction would adversely affect the public” with respect to the ’010 patent, and that “an immediate permanent injunction would adversely affect network carriers and handset manufacturers that currently employ chips which infringe the ’317 Patent in their products.” However, the district court held that the aforementioned sunset provisions “balance[] the policy of protecting the patentee’s rights against the desirability of avoiding immediate market disruptions.” We agree that the sunset provisions mitigate the harm to the public and that the district court did not abuse its discretion in fashioning a remedy that protects Broadcom’s rights while allowing Qualcomm time to develop non-infringing substitutes.²⁹

This Article argues that this type of analysis is appropriate in guiding the future of patent injunctions, particularly when animated by the concerns raised by Justice Kennedy’s concurrence in *eBay* and in the writings of legal scholars such as Professors Lemley and Shapiro. This strand of interpretation of the *eBay* test focuses on the type of competition involved, the public’s interest in access to technology, and the need for flexible remedies that both protect patent holders and safeguard competition and technological access. Ironically, those concerns are specifically written into the statute that governs another injunction-granting body—the ITC. Unfortunately, they appear to have been ignored.

II. INJUNCTIONS AT THE INTERNATIONAL TRADE COMMISSION

In the 2010 case of *Spansion v. ITC*,³⁰ the CAFC held that the ITC was not bound by the *eBay* factors in granting injunctions.³¹ The court reasoned that, being authorized by a different statute, the ITC was not subject to the general equitable limitations outlined in *eBay*. That conclusion is a deeply problematic one, both on the narrowest doctrinal grounds and as a matter of policy.

As a doctrinal matter, even if Congress in the Omnibus Trade and Competitiveness Act eliminated the requirement of proving irreparable injury in the trade context, that is a logically separate question from the issue of whether the equitable *eBay* factors must still be satisfied before granting an injunction. The CAFC points to the fact that the statute is

²⁹ *Broadcom*, 543 F.3d at 704 (citations omitted).

³⁰ 629 F.3d 1331 (Fed. Cir. 2010).

³¹ Technically, the ITC’s remedy is a combination of an exclusion order and a cease and desist order. The result is functionally identical to an injunction.

different and concludes that Congress intended to displace the equitable factors outlined in *eBay*. But this conclusion is far from certain. If the attempt was to displace equitable considerations, why include most of them in the text of § 1337? And even if equitable factors appear in the patent statute, the CAFC was not actually applying them—the very point stressed in *eBay*.

Interestingly, when one looks at the copyright context, one finds the courts have concluded that the *eBay* factors do govern the granting of injunctions, even preliminary injunctions³²—a holding that has transformed copyright jurisprudence. Copyright is, like the ITC, governed by a different statutory scheme. Yet the Federal Appeals courts have made it clear that, in the future, copyright injunctions can only be granted after an *eBay*-type review including a focus on the public interest. In fact, the Second Circuit was even more expansive, saying, “*eBay* strongly indicates that the traditional principles of equity it employed are the presumptive standard for injunctions *in any context*.”³³ Thus we have the irony that in copyright and, according to the Second Circuit, far beyond copyright, *eBay* governs. Yet in ITC patent cases its test does not apply, though patent law was the very field on which *eBay* concentrated.

More importantly, if one looks at the text of the section at issue, one finds—repeated three times in the three relevant remedy provisions—a set of reasons for excluding injunctions that clearly invoke some of the concerns the equitable factors reaffirmed in *eBay* are designed to address. For example, in the exclusion section, one finds the following limitations:

(d) Exclusion of articles from entry

(1) If the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry into the United States, *unless, after considering the effect of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers, it finds that such articles should not be excluded from entry.*³⁴

³² See *Salinger v. Colting*, 607 F.3d 68, 77–78 (2d Cir. 2010) (“We hold today that *eBay* applies with equal force (a) to preliminary injunctions (b) that are issued for alleged copyright infringement. First, nothing in the text or the logic of *eBay* suggests that its rule is limited to patent cases. On the contrary, *eBay* strongly indicates that the traditional principles of equity it employed are the presumptive standard for injunctions *in any context*.”) (emphasis added).

³³ *Id.* (emphasis added).

³⁴ 19 U.S.C. § 1337 (d)–(f) (2006).

Identical exceptions are to be found in the sections giving the Commission power to offer preliminary relief³⁵ and cease-and-desist orders.³⁶ Thus, all parts of the Commission's injunctive powers are clearly subject to statutory exceptions that deal with the same cluster of public interest issues presented by *eBay*, including competitive conditions generally, specific competition in producing similar or directly competitive articles, and effect on consumers. In practice, the Commission has ignored these exceptions. Though it would have been a very small stretch for the Federal Circuit to conclude that Congress was in fact *amplifying* the traditional equitable requirements for injunctions, and thus that *eBay* did apply, it chose not to do so.

It is worth noting that, on paper, this set of rules for granting injunctions is actually *more restrictive* than the rules under which the CAFC had been granting injunctions before *eBay*. The CAFC's old test did refer to a narrow public interest concern, largely confined to the public health factors noted in the first part of § 1337. But it did not consider the remaining three limiting factors: general competitive conditions in the U.S. economy, production of similar or directly competitive articles in the U.S., and the effect of injunctions on consumers. Sadly, the ITC has never found that any of these factors precluded issuing an injunction. For all intents and purposes, its jurisprudence has read the exceptions out of the statute.

As a policy matter, the *Spansion* decision is even more unfortunate. The CAFC was created in 1982 to serve the goal of uniformity in patent law—to end the great differences between the Circuits and establish a single law of patent in the United States. Yet the *Spansion* decision completely undermines that uniformity. It effectively creates two systems of patents in the United States.³⁷ In the federal courts, the *eBay* standard rules and, as a result, at least some of the injunctive dangers mentioned earlier are mitigated. Among those dangers are “hold-up,” royalty stacking, the uncertainty caused by vague patents of uncertain validity, and the chill put on strongly sequential innovation that often reads on thousands of patents. Because the courts are required to consider such issues as the balance of hardships and the public interest, and because they focus on such issues as direct competition between the parties and willingness to license, injunctions are no longer automatic. In the ITC, by contrast, a completely different law of injunctions reigns. One would have thought the CAFC, created in order to bring order and consistency to the world of patents,

³⁵ 19 U.S.C. § 1337(e).

³⁶ 19 U.S.C. § 1337(f).

³⁷ For a description of other inconsistencies between the ITC and the federal courts, see generally Sapna Kumar, *The Other Patent Agency: Congressional Regulation of the ITC*, 61 FLA. L. REV. 529 (2009).

might have paused at the thought of ratifying the very different standard governing injunctions at the ITC, but it did not.

For cases in which infringement was found, empirical studies show the ITC issued injunctions at an astonishing rate of 96–100%.³⁸ Given that patent holders are rational, it comes as no surprise that the ITC has recently experienced a surge of activity. Patent holders forum-shop by picking a venue that, empirical studies show, is already biased towards plaintiffs, even without considering the differences in standards for an injunction.

The ITC found a violation in 23% of completed cases (109 of 467). When settlements and the finding of a violation are categorized as favorable outcomes for the complainant, the complainant received a favorable outcome in roughly 69% of patent cases brought before the ITC. . . . We compared the overall win rate of complainants at the ITC with the overall win rate of plaintiffs at district courts. While we found that the overall rate at which the ITC finds infringement is 23%, prior research shows that district courts found infringement in only about 6% of all patent cases. This simple difference in win rates supports the inference that the ITC is biased in favor of complainants relative to the district courts.³⁹

The CAFC is also bound in its interpretation of patent law by the Constitution, and in particular by the constitutional grant of power under which Congress makes laws regarding patents: Article 1, section 8, clause 8. In the Supreme Court's words,

the federal patent power stems from a specific constitutional provision which authorizes the Congress "To promote the Progress of . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries." Art. I, § 8, cl. 8. The clause is both a grant of power and a limitation. . . . The Congress in the exercise of the patent power may not overreach the restraints imposed by the stated constitutional purpose. *Nor may it enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby.* . . . Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must "promote the Progress of . . .

³⁸ Hahn and Singer found that the ITC issued injunctions in 96% of cases where infringement was found. Hahn & Singer, *supra* note 9, at 484. Colleen Chien found the ITC issued an injunction to a prevailing patentee in 100% of cases. Colleen Chien, *Patently Protectionist?: An Empirical Analysis of Patent Cases at the International Trade Commission*, 50 WM. & MARY L. REV. 63, 70 (2008).

³⁹ Hahn & Singer, *supra* note 9, at 474–76.

useful Arts.” This is the standard expressed in the Constitution, and it may not be ignored.⁴⁰

By ratifying the ITC’s separate standard for injunctions when the Supreme Court has introduced substantial limitations on those injunctions elsewhere, the CAFC has effectively “enlarged the patent monopoly,” giving more power to patent holders. The effect of this action is magnified given the ITC’s empirically demonstrated pro-plaintiff bias. Yet the CAFC has done so without any consideration of whether this particular interpretation of the law “promotes the progress,” a point that is given especial force by the resulting lack of harmony in the patent system; hardly the interpretive result one would want if one was seeking to promote innovation.

What should be done to rectify these problems? The first solution is obvious. The ITC needs to start applying its own authorizing statute. As discussed earlier in this Article, the Supreme Court, the Federal Trade Commission, and legal and empirical scholars have all warned against the distortions that the automatic granting of injunctions can impose on the innovative and competitive process. The ITC’s deliberations, however, appear untouched by these issues, which is remarkable because the very words describing those concerns appear in § 1337 and attention to them ought to be prompted by the Constitution’s intellectual property clause.

Because the ITC has no power to levy money damages, its power is said to be injunction or nothing—one reason scholars have given for the 96–100% win rate. Yet this explanation is simply inaccurate. Under current law, there are several things the ITC could clearly do. For example:

- The ITC has the power to stay exclusion and cease-and-desist orders pending a redesign. The staying of an order means that consumers are not denied access to technology and that competition in the specific market is not undermined because of a single count of infringement that represents a tiny fraction of the innovation in a particular product. The latter point is an issue of particular concern to open source innovation networks. It is also applicable more generally to all companies working in high technology areas that feature complex innovations on which thousands of patents can “read.” Were the ITC to adopt a wider practice of staying orders, it would be following exactly the logic of the CAFC’s

⁴⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 5–6 (1966).

endorsement of “sunset,” or delayed, injunctions in *Broadcom v. Qualcomm*.⁴¹

- The ITC also has the power, indeed the responsibility, to refuse to issue orders altogether if the effects on competition or the consumer would be negative. The patent holder is hardly left without remedy by such an action because, in most cases, it would have access to the federal courts.

If the ITC continues to ignore the limitations in § 1337, then administrative or legislative action will be necessary. One simply cannot have a system that automatically issues injunctions without considering the public interest in a world that contains patent trolls, vague patents of uncertain validity, and sequential innovation that potentially reads on thousands of patents.

III. THE BENEFITS AND VULNERABILITIES OF OPEN SOURCE

This Article focuses on open innovation and, in particular, on open source methods of technological development, in which a wide network of developers participate in building on a shared technological base that is freely available to all. Classic examples include the operating system Linux, the Firefox browser, the Apache web server, and the Android operating system for mobile devices. Free and open source software powers everything from phones and search engines to ATMs and TiVo digital video recorders; the companies that develop these products make up a large and innovative industry sector that supports millions of jobs. A recent study by Dr. Roya Ghafele and Benjamin Gibert estimated there were 1.2 million open source-related software development jobs in the United States alone, and that estimate ignores the millions of other jobs that depend on open source applications.⁴² But this method of development is not confined to software: open source or open innovation methods are also found in areas ranging from synthetic biology to the development of artificial limbs. As the FTC recently pointed out,⁴³ open innovation and open source methods offer compelling advantages in fostering both competition and rapid technological development.

A. Market Share

Open source applications already have a substantial market share in multiple areas. For example, the most important open source operating

⁴¹ *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 704 (2008).

⁴² See generally ROYA GHAFELE & BENJAMIN GIBERT, EFFICIENCY THROUGH OPENNESS: THE ECONOMIC VALUE PROPOSITION OF OPEN SOURCE (2011).

⁴³ EVOLVING IP MARKETPLACE, *supra* note 4.

system for phones is Android, initially produced by Google, and made available to any phone company or tablet manufacturer. Gartner, the leading analyst in the field, estimates that Android's share of the market for smartphone and mobile device operating systems was 43.4% in the second quarter of 2011, with Apple's market share at 18.2%.⁴⁴

Operating System	2Q11 Units	2Q11 Market Share (%)	2Q10 Units	2Q10 Market Share (%)
Android	46,775.9	43.4	10,652.7	17.2
Symbian	23,853.2	22.1	25,386.8	40.9
iOS	19,628.8	18.2	8,743.0	14.1
Research In Motion	12,652.3	11.7	11,628.8	18.7
Bada	2,055.8	1.9	577.0	0.9
Microsoft	1,723.8	1.6	3,058.8	4.9
Others	1,050.6	1.0	2,010.9	3.2
Total	107,740.4	100.0	62,058.1	100.0

Whereas only the iPhone and iPad run iOS, Android is used by multiple phone manufacturers, all of whom are free to customize the software to their particular requirements. This is a point to which I will return in a moment. In addition, the Symbian operating system, which was once open source, operates on a hybrid "shared source" model.⁴⁵ Symbian accounts for an additional 22.1% of the market for operating systems.

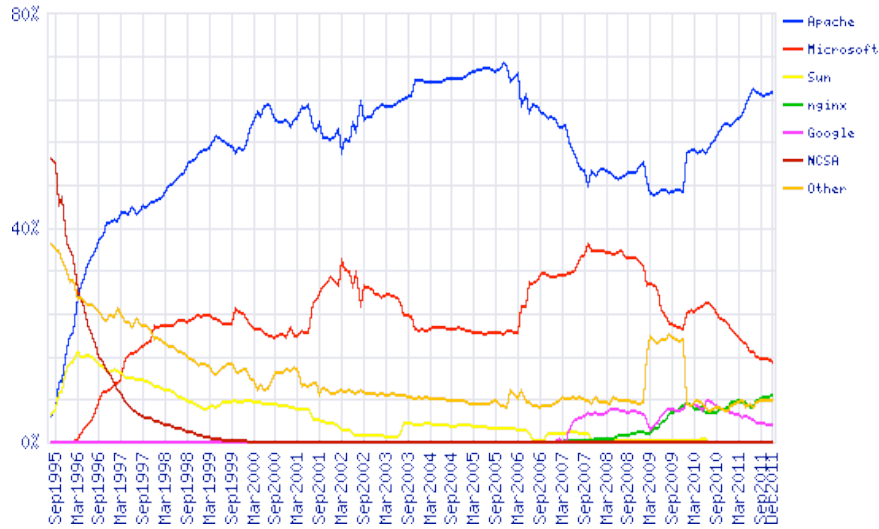
In the world of webserver software, the software that actually runs the web, the role of open source is just as pronounced. The leading study of webserver software, run by Netcraft,⁴⁶ estimated that the open source server software Apache was running on 65% of the web's leading sites. nginx, another type of open source server software, accounted for an additional 8%.

⁴⁴ *Gartner Says Sales of Mobile Devices in Second Quarter of 2011 Grew 16.5 Percent Year-on-Year*, GARTNER (Aug. 11, 2011), <http://www.gartner.com/it/page.jsp?id=1764714>.

⁴⁵ *Symbian Foundation Has Transitioned to a Licensing Body*, SYMBIAN, <http://licensing.symbian.org/> (last visited Feb. 26, 2011).

⁴⁶ *December 2011 Web Server Survey*, NETCRAFT (Dec. 9, 2011), <http://news.netcraft.com/archives/2011/12/09/december-2011-web-server-survey.html>.

Developer	# of sites 12/11	Percent of Market
Apache	362,267,922	65.22%
Microsoft	82,521,809	14.86%
nginx	49,143,289	8.85%
Google	18,464,148	3.32%



Netcraft Study: Market Share for Top Servers Across All Domains: August 1995–December 2011⁴⁷

The prevalence of open source at the server level is in dramatic contrast to the world of desktop operating systems, where estimates put Microsoft at about 92%, Mac OS at about 6%, and the free/open source operating system Linux at about 2%.⁴⁸ This pattern is changing, however, as mobile devices start to replace many desktop functions. And, as stressed

⁴⁷ *Id.*

⁴⁸ *Desktop Operating System Market Share*, NETMARKETSHARE (Jan. 2012), <http://marketshare.hitslink.com/operating-system-market-share.aspx?qprid=8&qpcustomd=0>. Even in this market, though, economists argue that the availability of an open source alternative has been important. “We argue that open source and free software licensing has been one of the most important factors of change in the microcomputer operating system markets in the recent years. We have seen new entrants in the relatively closed markets as well as renewed business models by incumbents. However, there has been no single open source strategy; all market players have adopted open source into their operating system strategy in one form or other.” Mikko Valimaki & Ville Oksanen, *The Impact of Free And Open Source Licensing On Operating System Software Markets*, 22 J. TELEMATICS & INFORMATICS 97, 97 (2005).

before, there are literally hundreds of other examples of both free and open source software, and of open source innovation more generally.

B. Policy Concerns

Clearly open source development is economically significant. But why should policy makers care about it? This Article will focus on three features of open source development that are important for innovation policy:

- The beneficial competitive effect on markets otherwise reliant on proprietary systems, particularly when network effects are involved.
- The openness, transparency, and non-exclusivity of the innovation process.
- The vulnerabilities of any open innovation system that relies on a heterogeneous network of developers.

C. Open Source and Network Effects

High technology markets are frequently characterized by the existence of network effects.⁴⁹ Markets tend to “tip” toward a single standard—whether a single operating system or a single format for high quality DVDs. The standard assumptions of economics posit declining returns to scale, but markets characterized by network effects exhibit the opposite characteristic. There are increasing returns to scale and the value of one consumer’s purchased goods can be affected positively or negatively by other consumer choices. If I am buying apples and you are buying pears, the choices have very little effect on each other. Shelf space for pears may decrease if there is more demand for apples, but the effect is weak; purchasing decisions are largely independent. However, if I am buying a HD DVD video player when you, and many others, are buying Blu-Ray DVD players, the value of my player will be affected by your choices. If enough people pick the alternative format, the number of titles offered in HD DVD will dwindle and the format will be discontinued, as in fact it was. Conversely, if I am an early adopter of Microsoft Word, as that word processing software becomes the dominant one on the market, the value of my purchase increases. I can exchange documents with more people,

⁴⁹ For some classic accounts of network effects and their relevance to competition and innovation policy, *see generally* Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985); Philip H. Dybvig & Chester S. Spatt, *Adoption Externalities as Public Goods*, 20 J. Pub. Econ. 231 (1983); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998).

peddle my skills in Word to more employers, and otherwise consume all the benefits of compatibility. It is precisely because of these benefits that markets characterized by network effects tend to “tip” sharply towards the dominant standard. As a consumer, I do not wish to be the last person trapped in Betamax, or WordPerfect, or HD DVD. Unlike markets that can easily sustain competitive equilibria with multiple competing products and firms, network effects markets tend to be winner-take-all.

It is here that the problems for competition policy emerge. The first problem is the standard price effect of monopoly. If the dominant standard is proprietary, the owner can extract supracompetitive rents while the coordination costs of switching to a new standard or technology lock users in. The second effect, however, is dynamic, not passive—it is an effect on future innovation. The “lock in” of network effects can tie consumers to an inferior old technology precisely because of those coordination costs of switching. Consider word processing. If I develop a superior product to Microsoft Word—faster, cleaner, and with more features that consumers want—I face a problem not faced by the person who develops a better mousetrap or a more fuel-efficient car. Millions of users have already learned Word. They have thousands of documents saved in Word. They have invested a considerable amount of time mastering Word’s features. Most importantly, even if one of them wishes to switch format, she faces coordination costs with all of the other Word users. No one wishes to be the sole adopter of a new technology, even if superior, if the rest of the public is still using the old technology and one is thus locked out of the network. How can users all decide to switch together?

Thus, to sum up, the combination of network effects and proprietary software means that consumers may bear the costs, in the form of higher prices and reduced innovation. But when the technology is open source, no such hold-up is possible. Multiple developers can offer competing versions, with the competition simultaneously bringing down prices and offering greater choice and customization. The monopolist cannot capture the benefits of the golden handcuffs of network effects, because there can be no monopolist; competitors have a legally guaranteed right of access to copy and modify the software that has become the market standard.

Most importantly, in markets in which both proprietary and open source products compete, the existence of the open source alternative provides a valuable check even on *potential* monopoly power, as well as a continued prod to innovation by all of the companies involved, whether open source or proprietary. Think of the vibrant and competitive smartphone and tablet market in which, as the Gartner study quoted earlier shows, there are striking increases of market share for open source operating systems and continued competition between open source and proprietary operating systems. Owners of iPhones, Blackberries, *and*

Android phones have benefitted both in pricing and in the rapid development of new features because of the competition involved—a competition not only between *types of phones*, but between different *models of innovation*. The company that installs Android on its handset is free to customize, to modify, and to experiment with new features. Consumers can choose among those phones, sending market signals back about which “flavor” of Android phone is preferable. The source code for the underlying operating system is open to all, exposing both problems and opportunities to potential developers, and dramatically easing the task of creating complementary “apps” that use the operating system’s features. Users have a rich ecosystem of devices and features, and a richer system of applications. This wealth of options in turn raises the competitive bar for the proprietary alternatives. This spur to competitiveness, yielding lower prices and accelerated innovation, clearly benefits consumers and the public interest.⁵⁰

D. The Benefits of Open Innovation

In a seminal article about free and open source software, Yochai Benkler explains the informational efficiency advantages possessed by—to use his terms—decentralized, commons-based peer production.⁵¹ The terminology is complex, but the idea at the heart of Benkler’s argument is a simple one. Open source production is transparent. Unlike the conventional proprietary software company producing code that is enigmatic to the outside world (because the source code is concealed), through processes that themselves are hidden behind the walls of the firm, the open source production process occurs in an open network. Multiple players can see the full details of the production process, can grasp the internal details of the code being produced, and can even judge who would be the best person or team suited for a job. That transparency brings twin

⁵⁰ This point has been born out in the empirical economics literature. “This paper analyzes a software market consisting of a freely available open source software (OSS), the commercial version of this OSS (OSS-SS), and the competing commercial proprietary software (PS). We find that in software markets characterized by low direct network benefits, the PS vendor is better off in the presence of competition from OSS-SS. Furthermore, the OSS-SS vendor in these markets is better off by having lower usability than PS. Therefore, the PS vendor has little incentive to improve the usability of their software in these markets. On the other hand, in software markets characterized by high network benefits, a PS vendor is threatened by the presence of OSS-SS and can survive only if the PS is more usable than the competing OSS-SS.” Ravi Sen, *A Strategic Analysis of Competition Between Open Source and Proprietary Software*, 24 J. MGMT INFO. SYS. 233, 233 (2007).

⁵¹ Yochai Benkler, *Coase’s Penguin, or, Linux and the Nature of the Firm*, 112 YALE L.J. 369 (2002).

informational advantages in its wake—advantages that in certain market contexts can actually surpass the efficiency of vertically integrated firms, or impersonal markets operating through contract-based solutions.

[T]his mode of production is better than firms and markets for two reasons. First, it is better at identifying and assigning human capital to information and cultural production processes. In this regard, peer-production has an advantage in what I call “information opportunity cost.” That is, it loses less information about who the best person for a given job might be than do either of the other two organizational modes. Second, there are substantial increasing returns to allow very large clusters of potential contributors to interact with very large clusters of information resources in search of new projects and collaboration enterprises. Removing property and contract as the organizing principles of collaboration substantially reduces transaction costs involved in allowing these large clusters of potential contributors to review and select which resources to work on, for which projects, and with which collaborators. This results in allocation gains, that increase more than proportionately with the increase in the number of individuals and resources that are part of the system.⁵²

Or, to quote Eric Raymond: “Given enough eyeballs, all bugs are shallow.”⁵³ Benkler’s point is echoed by economist James Bessen, who, in his article *Open Source Software: The Free Provision of Complex Public Goods*,⁵⁴ develops a model to show the ways in which open source software will offer greater customizing ability—one that surpasses the ability of *ex ante* contracts to provide customized software in the proprietary context.

The point is a more general one. By allowing a wide range of participants, small and large, to share in the process of innovation on a layer of open technology, society gets the benefit of diverse approaches to the same technological puzzles. Open source offers a type of technological “species diversity” in contrast to the proprietary monocultures.

E. The Vulnerabilities of Open Source

But if open source innovation has great social benefits in fostering competition and innovation, it also has particular vulnerabilities. First, precisely because open source development takes place in a *network* and

⁵² Yochai Benkler, *Coase’s Penguin, or Linux and the Nature of the Firm – Abstract*, BENKLER, <http://www.benkler.org/CoasesPenguin.html> (last visited Mar. 11, 2012).

⁵³ ERIC S. RAYMOND, *THE CATHEDRAL AND THE BAZAAR* 30 (1999).

⁵⁴ James E. Bessen, *Open Source Software: Free Provision of Complex Public Goods* (SSRN Working Paper Series, 2005), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=588763.

allows both small and large players to participate and to build on a common technology, it is particularly susceptible to attack and disruption. A proprietary monopolist fully internalizes both the costs and benefits of policing its technology and its intellectual property. Think of a proprietary software company faced by the threat of an injunction—particularly one that might be granted under the plaintiff-favorable standards of the ITC. Faced with an offer to license the disputed technology, the proprietary monopolist can judge perfectly whether it is in its interest to challenge the patent or to pay the licensing fee—even if it believes the patent to be invalid. It will capture all the gains of a patent challenge if successful. It will bear all the costs of an injunction or licensing fee if not.

Members of an open innovation network, however, are in a different situation. Individual members can be “picked off,” forced to abandon promising lines of technological development, or to pay ruinous stacked royalties because the costs of litigation are too burdensome for any one member of the network to bear. Why should this one node in the network take on the heavy financial responsibility of challenging the patent, when the gains—if it wins—will be captured by its free-riding fellow network members? In a situation like this one, patent challenges start to exhibit the economic characteristics of public goods—nonrivalrousness and nonexcludability. Even if it would be collectively in the interest of an open innovation network to litigate the patent aggressively, it may not be in the individual interest of any of its participants. In such a market, we will get an inefficiently low level of patent challenges.

It is in situations like this one that the threat of injunctions is particularly worrisome. In fast-moving technology markets, the dead stop forced by an injunction can be enough to doom a product. An entire network of innovation could be shut down by an injunction obtained against a single small participant that lacks the resources necessary to challenge the patent or defend against the injunction.

Second, most of these markets are characterized by strongly cumulative innovation. A finished product may “read on” literally thousands of potential patents. In these markets, as Justice Kennedy noted in *eBay*, there are considerable concerns with low patent quality and with the vagueness of the patents themselves.⁵⁵ Even the most scrupulous respecter of intellectual property can be subject to hold-up by a company claiming its patent has been infringed. To quote the FTC:

Under some circumstances, however, the threat of an injunction can lead an infringer to pay higher royalties than the patentee could have obtained in a competitive technology market. At the time a

⁵⁵ *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388, 397 (Kennedy, J., concurring).

manufacturer faces an infringement allegation, switching to an alternative technology may be very expensive if it has sunk costs in production using the patented technology. That may be true even if choosing the alternative earlier would have entailed little additional cost. If so, the patentee can use the threat of an injunction to obtain royalties covering not only the market value of the patented invention, but also a portion of the costs that the infringer would incur if it were enjoined and had to switch. This higher royalty based on switching costs is called the “hold-up” value of the patent. Patent hold-up can overcompensate patentees, raise prices to consumers who lose the benefits of competition among technologies, and deter innovation by manufacturers facing the risk of hold-up.⁵⁶

Large firms protect themselves from the vulnerability inherent in this situation by purchasing huge war chests of patents, not for their inherent value but to threaten “mutual assured destruction” should their large competitors start a patent war.⁵⁷ But an open innovation or open source network is at best imperfectly protected by such tactics, and remains vulnerable in any event to hold-up by “non-practicing entities”—patent trolls who can use the threat of an injunction to extract large rents without being subject to attack in return because they never actually make anything. These dangers are particularly acute when, as is often the case in the high technology area: (1) the patent in dispute represents a tiny proportion of the innovation in a finished product, (2) the patents in the area are of uncertain scope and doubtful validity, and (3) the patent claim comes to light *after* the product has been designed and the defendant faces an injunction that will deny it time to redesign unless it can—as the FTC points out—pay the “hold-up” cost. In the words of Lemley and Shapiro,

[t]he threat that a patent holder will obtain an injunction that will force the downstream producer to pull its product from the market can be very powerful. These threats can greatly affect licensing negotiations, especially in cases where the injunction is based on a patent covering one small component of a complex, profitable, and popular product.⁵⁸

The law of patents and patent injunctions did not originate in an open source world. The law’s assumptions did not contemplate decentralized networks of innovation on top of a shared technological layer, open to all. The law did not contemplate either the benefits or the vulnerabilities of such a system. Nor did the law of patents and patent injunctions originate in a world where inventions were as intangible, and

⁵⁶ EVOLVING IP MARKETPLACE, *supra* note 4, at 5.

⁵⁷ Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in INNOVATION POLICY AND THE ECONOMY 119, 119–23 (Adam B. Jaffe et al. eds., 2001).

⁵⁸ Lemley & Shapiro, *supra* note 8, at 1992–93.

their subject matter as slippery, as the world of software patents, or the confused world of method patents after *Bilski*.⁵⁹ The idea of a single device “reading on” hundreds or even thousands of patents would have been mind-boggling to Jefferson, and the vagueness of those patents would surely have been horrifying.⁶⁰

Yet it would be equally mistaken to think the law of patents lacks tools with which to react to these changed circumstances. Indeed, the whole impetus of *eBay* was to restore equitable consideration in the place of the CAFC’s mistaken hard-and-fast presumptions. The point of equitable consideration in injunction deliberations is that it allows the law to be sensitive to new contexts. Justice Kennedy’s concurrence in *eBay*, joined by three other members of the Court, clearly has in mind many of the problems that beset open source innovation.

[A]n injunction, and the potentially serious sanctions arising from its violation, can be employed as a bargaining tool to charge exorbitant fees to companies that seek to buy licenses to practice the patent. . . . When the patented invention is but a small component of the product the companies seek to produce and the threat of an injunction is employed simply for undue leverage in negotiations, legal damages may well be sufficient to compensate for the infringement and an injunction may not serve the public interest. In addition injunctive relief may have different consequences for the burgeoning number of patents over business methods, which were not of much economic and legal significance in earlier times. The potential vagueness and suspect validity of some of these patents may affect the calculus under the four-factor test.⁶¹

In the next section, this Article considers some of the potential ways in which patent law can strike the appropriate balance—protecting patent holders and yet not chilling innovation, technological access, and competition. The first two clusters of these solutions are applicable to any type of high technology industry, while the third cluster uses the flexibility in the *eBay* factors to make it specifically responsive to the concerns of open source innovation.

IV. RECOMMENDATIONS FOR INJUNCTION LAW AND POLICY

A patent is a legal right to exclude. Injunctions are an important method to protect that legal right. Plaintiffs *should* have injunctive relief

⁵⁹ *In re Bilski*, 545 F.3d 943 (2008).

⁶⁰ For an outline of Jefferson’s views, see *Thomas Jefferson Writes a Letter*, in JAMES BOYLE, *THE PUBLIC DOMAIN: ENCLOSING THE COMMONS OF THE MIND* 17–42 (2008).

⁶¹ *eBay, Inc. v. MercExchange, LLC*, 547 U.S. 388, 396–97 (2006).

available as a remedy if a clear, high-quality patent is definitely being violated, if the plaintiff truly is being irreparably harmed by it, if the balance of hardships favors the plaintiff, and if there are no public interest factors that militate against an injunction.

The reason this issue is currently so heated is that each one of those requirements is frequently missing in high technology markets. The patents frequently are of low quality and vague. (This is particularly true in the software context.) The plaintiff's case for irreparable harm is frequently weak—unless it is simply assumed, as by the ITC. Damages will often be an adequate remedy, most obviously in the case of a “non-practicing entity” that is only seeking to license, not to make, the patented innovation in any event. The balance of hardships is frequently much more complex, particularly in the case of a patent that represents a small amount of the innovation in some complicated product. The hardship imposed on defendants is magnified if the defendant could easily have designed around the patent at the beginning of the process and is now being subject to “hold-up” when that option is unavailable. Finally, the public interest is often a complex issue. If the public is being denied access to the technology altogether during the injunction, or if a type of benign competition is being removed from the market for a violation of a patent covering a small portion of a complex product, the public interest will frequently lean strongly *against* an injunction.

A. Suggested General Reforms: Federal Courts

1. Presumptively confining injunctions to cases in which there is direct competition.

As detailed earlier, district courts have applied a *de facto* presumption against injunctions in cases that do not involve direct competition. They have been particularly reluctant to grant injunctions to non-practicing entities. Both of these patterns seem appropriate and should continue. Under the logic of *eBay*, this denial of injunctions should not be a formal *rule*. Rather, when applying the *eBay* factors, courts will correctly tend to conclude in most cases that do not involve direct competition that no injunction is needed and that a damage remedy is sufficient. In the case of a non-practicing entity, because it is seeking licensing revenue rather than attempting to practice the technology itself, and because the alternative might deny the technology to the public, injunctive relief seems particularly inappropriate. A more searching analysis may be necessary in the case of patent suits brought by research organizations, but Professor Lemley's

caution that universities and other research entities can act as trolls needs to be taken into account.⁶²

2. If injunctions are granted, liberal use of “stays” and sunset provisions in order to allow for redesign, with payment of appropriate damages if necessary.

One of the biggest dangers in the contemporary world of high technology patents is that of “hold-up,” as the FTC’s recent report on the patent system points out.⁶³ Both courts and scholars have observed that this problem can be mitigated by staying injunctions, or entering “sunset provisions” pending redesign. In the words of the CAFC in *Broadcom*,

the district court held that the aforementioned sunset provisions “balance[] the policy of protecting the patentee’s rights against the desirability of avoiding immediate market disruptions.” We agree that the sunset provisions mitigate the harm to the public and that the district court did not abuse its discretion in fashioning a remedy that protects Broadcom’s rights while allowing Qualcomm time to develop non-infringing substitutes.⁶⁴

In their important article on royalty-stacking and hold-up, Lemley and Shapiro amplify this argument.

If the infringing firm claims that it can design around the patent, the court should issue a stay of its permanent injunction that is long enough to permit the infringing firm to complete the redesign, if there is one, in an efficient and timely manner. The infringing party would, of course, be required to pay reasonable royalties to the patent holder for any sales made during the period of the stay. With such stays, holdup based on the disparity between the relatively large value of the patented product and the relatively small value associated with the patented feature is sharply reduced or eliminated.⁶⁵

3. Courts should give hard look review to injunction claims when the patent covers only a small fraction of the allegedly infringing product. If an injunction is granted, they should favor stays pending redesign.

When the fraction of the allegedly infringing product affected by the patent is small, the public interest and balance of hardships factors both tilt in favor of the defendant.⁶⁶ First, the public has an interest in access to

⁶² See Lemley, *Universities*, *supra* note 20.

⁶³ EVOLVING IP MARKETPLACE, *supra* note 4, at 5.

⁶⁴ *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 704 (2008) (citation omitted).

⁶⁵ Lemley & Shapiro, *supra* note 8, at 2038.

⁶⁶ *Id.* at 2036 (“We think that one circumstance in which courts should consider denying an injunction—or at a minimum delaying it—is when the product that

technology. It will generally be hard to justify denying public access to an entire complex technology because of an infringement that affects a very small portion of it. Second, the balance of hardships factor seems to favor the defendant here, with the exception of a situation in which there is strong proof of deliberate copying. This is true both because of the imbalance between the extent of the technology enjoined and the extent of the technology infringed, and also because, with complex sequential innovation, we are more likely to find the kinds of dysfunctions in the patent system described in the *eBay* concurrence. These dysfunctions will be particularly evident in areas where patents are vague and of dubious validity; the complexity of the product acts as a multiplier effect on the difficulty potential defendants face in “clearing” their products of any possible infringement *ex ante*.

B. Suggested General Reforms: International Trade Commission

The ITC poses a genuine problem in reforming the patent injunction process in the United States. At the moment, the ITC grants injunctions in nearly all cases—the current statistic is 96%. The CAFC ruled in *Spanion v. ITC*⁶⁷ that the ITC is not subject to the equitable limitations in *eBay*, a decision criticized in Part II of this Article.⁶⁸ The result has been genuine damage to the attempt to harmonize the U.S. patent system. This result is even more unfortunate given that scholars have argued there is empirical evidence the ITC is biased in favor of plaintiffs,⁶⁹ and that it is biased in favor of domestic industries.⁷⁰ In particular, the ITC has given scant attention to the limitations in its own authorizing statute, limitations which strongly echo the themes of *eBay*. Section 1337 does *not* tell the ITC to grant an injunction in every case in which infringement is found. It tells it to do so “unless, after considering *the effect of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers*, it finds that such articles should not be excluded.”⁷¹

1. *The ITC should apply the limitations in its own statute.*

At present, judging by both its decisions and its rate of granting injunctions, the ITC’s deliberations have been almost completely unaffected

would be enjoined contains multiple components, of which only one is the subject of the patent suit.”)

⁶⁷ *Spanion v. ITC*, 629 F.3d 1331 (2010).

⁶⁸ *See infra* pp. 13–17.

⁶⁹ Hahn & Singer, *supra* note 9, at 474–76 (2008).

⁷⁰ Chien, *supra* note 38, at 67.

⁷¹ 19 U.S.C. § 1337(d)(1) (emphasis added).

by the factors listed above—in particular, by concern for general competitive conditions in the U.S. economy, the production of like or directly competitive articles in the U.S., or effects on U.S. consumers. A moment's thought allows one to recognize that these factors address both the concerns at the heart of *eBay*, and the questions raised by the FTC, scholars, and the Supreme Court about hold-up, royalty stacking, and the continuing availability of technology. The ITC could solve many of its current problems merely by taking seriously the limitations on its injunction-granting power, and it should be pressed to do so. In some cases, this will mean denying injunctions altogether and leaving the plaintiff to pursue damage remedies in the federal courts.

2. When it does issue injunctions, the ITC should consider granting stays pending redesign.

The logic of *Broadcom* or of Lemley and Shapiro's article applies equally to the ITC. Stays balance the patent holder's interest in legal protection of exclusivity and the interests of the public in having access to technology. They also mitigate against the considerable danger of "hold-up," a danger that appears to concern everyone *but* the ITC.

Unfortunately, the ITC has so far shown no interest in hewing more closely to its own statute, being attentive to the larger debate about optimal patent remedies, or heeding the concerns expressed in *eBay*, even if, as a formal doctrinal matter, it remains unconstrained by that opinion. What other options are there?

3. Give district courts exclusive control over patent law claims for which they have jurisdiction.

Hahn and Singer argue that, in order to cut down on the "Type II" errors—that is, false positives; in this case the granting of injunctions when they should not be granted—the ITC should be partially stripped of its jurisdiction. Their argument is as follows:

One way to minimize the social costs from Type II errors is to give district courts exclusive jurisdiction over any patent law claim for which they have jurisdiction over the parties. Under this approach, the ITC would only adjudicate those patent cases for which the accused infringer is not subject to the district court's jurisdiction or cannot be identified. As cases are adjudicated in district courts, there are likely to be fewer findings of infringement. Even when there is an infringement finding in a district court, injunctive relief will be granted less frequently in those cases. Thus, the frequency of Type II errors across all patent cases would decline.⁷²

⁷² Hahn & Singer, *supra* note 9, at 488.

One additional benefit of this approach is that it would return uniformity to the patent system and avoid the destructive tendency towards forum shopping, the very thing the CAFC was set up to avoid.

4. Make the ITC formally subject to the eBay factors.

Hahn and Singer, among others, suggest that the ITC be made formally subject to the *eBay* factors.⁷³ This could be done through decisions of the CAFC or the Supreme Court, using the arguments and interpretations offered in Part II of this Article. Alternatively, it could be done legislatively.

C. Specific Reforms Relating to Open Innovation

1. The Balance-of-Hardships Factor Should Focus on the Decentralized Nature of Open Innovation Networks.

The goal of the *eBay* factors is to take equitable account of context. Open innovation occurs in the context of heterogeneous networks of developers who all have access to a shared open resource. This point is relevant to the balance-of-hardships factor in a number of ways. First, members of open networks may not be able to use the patent pooling and mutual assured destruction strategies that large firms can employ to offset the dangers posed by vague and low-quality patents. Even where the network includes large players who are willing to “protect the ecosystem,” the smaller members of the network will not have the same degree of protection—particularly if they are singled out for suit. Second, members of open networks are much more vulnerable to being picked off by claims of infringement backed by injunctive threat. There are coordination costs to defending the network, and courts need to take account of those costs whenever considering an injunction. Third, it is simply harder—and in many cases impossible—for members of a decentralized network to guarantee a new product cannot be subject to hold-up by a lurking patent holder. As a result, courts should look more favorably on requests for stays pending redesign.

2. The Public Interest Factor Should Take Account of the Type of Competition Open Innovation Provides.

Both *eBay* and the courts since *eBay* have stressed that it is important to take account of the type of competition and the market position of the parties. Most obviously, this is done when district courts refuse to give injunctions in cases not involving direct competitors. The public interest in having access to the technology generally outweighs the plaintiff’s interest in an injunction if the plaintiff is not a direct competitor

⁷³ *Id.* at 489.

with the defendant. But the “type of competition” concern is broader. As this Article explains, open innovation offers some unique pro-competitive and pro-consumer advantages, particularly in industries involving network effects. Even if a dominant standard is established, so long as the standard is open, there can be no monopolist extracting rent and locking users into suboptimal designs because of the costs of switching. Low-cost or no-cost versions of the good can be made available, and multiple innovators can tinker with the innovation, offering the public choice and the virtue of incremental improvement. Further, as Benkler explains, in many situations open innovation allows a more efficient innovation process precisely because transparency allows better allocation of productive resources. Faced with all these advantages, courts should construe the public interest in technological access particularly broadly in the case of suits involving open innovation products.

CONCLUSION

In August of 2011, Google purchased Motorola Mobility for \$12.5 billion.⁷⁴ The move followed the acquisition of a collection of Nortel patents by Microsoft, Apple, and a consortium of others for \$4.5 billion in July.⁷⁵ In the coverage of these events, reporters, lawyers, and industry insiders all *took for granted* that the real point of the acquisitions was not to purchase patents over innovative new technology so that these companies could begin to create that technology for themselves—though technology creation is the classic role that we assume patents play in the innovation economy. Indeed, many insiders believed Google would end up discarding Motorola’s actual phone business, keeping only its collection of patents. The point was to acquire the means to guarantee mutual assured destruction in the event of a patent war, to “defend the ecosystem” by acquiring a large portfolio of patents. The participants actually explicitly admitted as much.⁷⁶ What was in those patent portfolios? What did the patents really cover? How many of them were actually valid? The answers to all those questions were impressionistic at best.

What was striking about these purchases is that both participants and observers seemed to share a set of premises. Of course the patents were vague and, in many cases, of low quality. Of course any competent lawyer

⁷⁴ *Google to Acquire Motorola Mobility*, GOOGLE INVESTOR RELATIONS (Aug. 15, 2011), <http://investor.google.com/releases/2011/0815.html>.

⁷⁵ Chris V. Nicholson, *Apple and Microsoft Beat Google for Nortel Patents*, N.Y. TIMES (July 1, 2011, 8:31 PM), <http://dealbook.nytimes.com/2011/07/01/apple-and-microsoft-beat-google-for-nortel-patents/>.

⁷⁶ Jay Yarow, *Google: We Bought Motorola To “Protect” The Android Ecosystem*, BUSINESS INSIDER (Aug. 15, 2011, 8:31 AM), <http://www.businessinsider.com/live-google-and-motorola-explain-the-big-acquisition-2011-8>.

could make a case that any complex handset device was potentially infringing hundreds of patents, or that it was not. Of course each device would potentially “read on” thousands of patents, to the point where even the most assiduous legal department could not guarantee there was no patent holder waiting for product release so that it could sue and gain the benefits of “hold-up.” Of course some of the patents were not over technologies *per se*, but rather over vaguely described “methods of operation” that in years past would have been rejected as unpatentable subject matter. Of course it was worth spending *billions of dollars*, not to acquire intellectual property rights that would in fact enable growth and job-generating innovation, but simply to create a form of legal insurance—a protection payment made in advance to ward off the very real danger of being mugged by the patent system. The level of acceptance of these premises was evident in the fact that the participants did not even complain about siphoning billions of dollars from productive investment into overpriced legal insurance. They were used to it. It was just a cost of doing business. That fact may actually be the most profound condemnation of the problems with our patent system,⁷⁷ problems that recent reforms have begun to address but have certainly not resolved.

A. The Role of Injunctions

The point at which the abstract problems in the patent system become concrete for high technology companies is at the moment suit is filed and an injunction demanded. A point was made in the last section that bears reiterating here. Plaintiffs *should* have injunctive relief available as a remedy if a clear, high-quality patent is definitely being violated, if the plaintiff truly is being irreparably harmed, if the balance of hardships favors the plaintiff, and if there are no public interest factors that militate against an injunction. The reason controversies over this issue are currently so heated is that each one of those requirements is frequently missing in high technology markets. There is no better indication of that fact than the Nortel and Motorola purchases.

Of course, solving the problems in the patent system will require far deeper reforms than merely tweaking the standards for patent injunctions. Yet comprehensive reforms take a long time. In the meantime, changes in the practice of granting injunctive relief—along the lines signaled by the Supreme Court in *eBay*—can actually accomplish a great deal. The factors

⁷⁷ For the two best scholarly and empirically-based accounts of the defects of our current patent system, *see generally* JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2009); and ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT (2004).

the Court laid out and the reforms suggested in Part IV of this paper—the focus on direct competition, the possibility of staying injunctive orders to allow redesign, the attention paid to the public interest in the availability of technology, and the presence of competition—are not *substitutes* for patent reform, but they do allow courts and, for that matter, the ITC to replace the sledgehammer of the injunction with a more scalpel-like remedy. That would be a good thing even in an entirely well functioning patent system. In our current patent system, it is a necessity.

B. Open Innovation and its Discontents

If all high technology business methods are harmed to some extent by the profusion of low-quality, vague patents that make it very difficult to practice strongly cumulative innovation, open source creativity is particularly vulnerable. There is no guarantee that there will be a Google standing in the wings to protect an open source network and no guarantee, even if there is, that the large company's interests will always align with the interests of the network or of the larger society.

This Article expanded on three particular aspects of open innovation relevant to patent and competition policy.

- Its beneficial competitive effect on markets otherwise reliant on proprietary systems, particularly when network effects are involved.
- The openness, transparency, and non-exclusivity of the innovation process.
- The vulnerabilities of any open innovation system that relies on a heterogeneous network of developers.

These factors are of profound importance to the decision to grant injunctions. The reforms suggested in Part IV of this Article would encourage courts and agencies to look at the *quality and type of competition* that open innovation brings to a marketplace, to focus on the *public interest in access to open technology*, and to consider *the balance of hardships that specifically affect open innovation networks*.

Patent injunctions are important. They are, and should be, a way in which patent holders can protect themselves from infringement. Yet, in a world where companies are spending billions of dollars to purchase patent portfolios, not to use the patented innovations, but solely to defend themselves against spurious suit by recourse to mutual assured destruction, we have clear evidence that the patent system is malfunctioning. In that world, patent injunctions cannot issue automatically lest the existing gridlock be made even worse, harming competition, the American consumer, and the cause of open innovation itself.