The Evolving IP Marketplace

Aligning Patent Notice and Remedies with Competition

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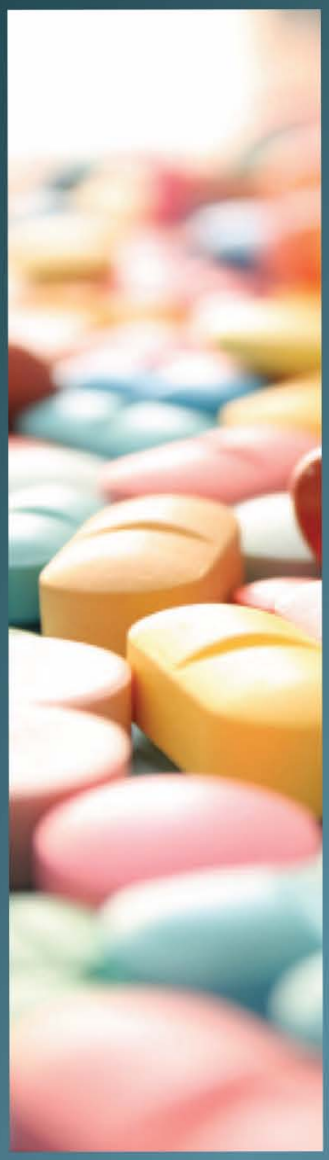

Federal Trade Commission

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THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION

A REPORT OF THE
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INTRODUCTION

Innovation benefits consumers through the development of new products, processes and services that improve lives and address unmet needs. It is key to meeting society's greatest challenges in areas as diverse as energy production, communications and health care, and it is essential to sustained economic growth and global competitiveness. But innovation is a complex process. It involves a series of steps from idea to invention through development to commercialization, each of which can be expensive, risky and unpredictable.

The goal of the patent system is to promote innovation in the face of that expense and risk. It does so by giving patent owners the right to exclude others from making, using or selling a patented invention for 20 years. By preventing copying that might otherwise drive down prices, the patent system allows innovators to recoup their investment in research and development (R&D). The patent system plays a critical role in promoting innovation across industries from biotechnology to nanotechnology, and by entities from large corporations to independent inventors.

The patent system's exclusive right promotes innovation, but so too does competition, which drives firms to produce new products and services in the hope of obtaining an advantage in the market. The patent system and the antitrust laws share the fundamental goals of enhancing consumer welfare and promoting innovation. The legal doctrines that most successfully accomplish those goals align the patent system and competition policy so that one does not undermine the effectiveness of the other. One important aspect of that alignment is antitrust enforcement that recognizes the incentives to innovate created by the patent system. Condemning efficient, legitimate uses of patent rights can undermine those incentives and harm consumers. For that reason, the guidance of the 2007 FTC/DOJ Report on IP and Antitrust focused on incorporating careful consideration of the benefits of patent rights into antitrust analysis.[1] Another aspect of that alignment is a proper balance between exclusivity and competition. Invalid or overbroad patents disrupt that balance by discouraging follow-on innovation, preventing competition, and raising prices through unnecessary licensing and litigation. For that reason, many of the recommendations in the 2003 FTC IP Report focused on improving patent quality as a means of balancing exclusivity and competition.[2]

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[1] FED. TRADE COMM'N & DEPT. OF JUSTICE ANTITRUST DIV., ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (April 2007), *available at* http://www.ftc.gov/reports/innovation/P040101PromotingInnovationandCompetitionrpt0704.pdf

[2] FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, Exec. Summ., at 1 (Oct. 2003), ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

Two areas of patent law beyond patent quality impact how well the patent system and competition policy work together to further their common goal of enhancing consumer welfare. The first is notice – how well a patent informs the public of what technology is protected. The second is remedies – judicially awarded damages and injunctions following a court finding of patent infringement. The impact of notice and remedies on the alignment of the patent system with competition policy results from the operation of relevant legal rules and practices on competition among patented technologies.

A patent does not necessarily confer market power because patented inventions often compete with alternative technologies. Patentees can earn rewards in the market by selling a patented product themselves or by licensing the patent for others to practice. In either case, the market reward earned by the patentee, and the economic value of the invention, will depend upon the extent to which consumers prefer the patented technology over alternatives. A patent covering a highly valued, disruptive technology can confer market power and generate significant market rewards. More often, competition from acceptable alternatives will limit the market reward that a patent owner receives.

Competition among patented technologies at every stage of the innovation process helps generate lower prices, more choices and higher quality products for consumers. Products compete to be purchased by consumers. Developed technologies compete in technology markets to be chosen for incorporation into products. Early-stage technologies compete for development funding. By aligning the patentee's market reward with consumer preferences, competition in product and technology markets encourages investment in those inventions that are more likely to be valued by consumers. When patent law facilitates and does not distort this competition, it aligns with competition policy to the benefit of consumers.

FTC Hearings on the Evolving IP Marketplace

To explore the interplay of notice, remedies, innovation and competition, the FTC held eight days of hearings beginning December 2008. In addition, the FTC cosponsored a workshop with the Patent and Trademark Office (PTO) and the Department of Justice in May 2010, on the intersection of patent policy and competition policy. The hearings and workshop involved more than 140 participants, including business representatives from large and small firms, start-ups and the independent inventor community, leading patent practitioners, economists, and patent law scholars. The FTC also received over 50 written submissions.[3] This report is based on testimony, written submissions and independent research.

The report begins by examining the role of technology markets and patent markets in innovation today. Those roles have evolved in recent years in ways that heighten the importance of patent notice and remedies to competition among technologies. As Chapter 1 discusses, collaboration and technology transfer have become increasingly important pathways to

[3]Appendices C-E list participants, comments received and topics examined at the hearings and workshop. Transcripts and written submissions are available at http://www.ftc.gov/bc/workshops/ipmarketplace/.

innovation with significant benefits for consumers. Patents play an important role in supporting these technology markets, and undermining that role would harm innovation. At the same time, as described in Chapter 2, we see increasing activity and complexity of business models in markets for patents that do not involve technology transfer. In these markets, patents are bought, sold and licensed as assets whose value is based on their ability to extract rents from manufacturers already using the patented technology. This activity risks distorting competition among technologies and deterring innovation, especially when driven by poor patent notice and remedies that do not align with the economic value of the patented invention. Chapters 3 through 8 make recommendations for adjustments to the legal rules and practices governing notice and remedies to better align them with competition policy without undermining patent law's support for innovation.

How Patent Notice Affects Innovation and Competition

Clear notice of what a patent covers can increase innovation by encouraging collaboration, technology transfer and design-around. Clearly defined patent rights can help companies identify and license technology they wish to develop or adopt. Poor patent notice can undermine the patent system's ability to fulfill this role, however. Potential collaborators or licensees may not find relevant patents, or they may hesitate to invest in technology when the scope of patent protection is unclear.

Notice affects competition among technologies at every stage of the R&D process. The ability to identify and assess the scope of relevant patents at an early stage can be critical for firms considering making investments in developing and commercializing an innovative product. They may unnecessarily elect not to pursue a R&D effort when the scope of coverage is unclear if they fear that another firm has blocking patents. Such decisions deter and lessen innovation and competition among technologies that might otherwise have been created. Poor patent notice also hinders competition by forcing firms to design products with incomplete knowledge of the cost and availability of different technologies. Technologies compete to be incorporated into products. But that competition is distorted if designers cannot discern in advance which technologies carry the cost of patent royalties and negotiate those royalties before they incur sunk costs based on the patented technology.

When firms choose technologies and market products despite an uncertain patent landscape, they risk post-launch patent assertions and litigation. As described in Chapters 2 and 3, resolving these claims often involves expensive litigation, which diverts resources and disrupts business operations. If the firm pays royalties, costs may increase and consumers may be deprived of the full benefit of competition among technologies.

Firms can invest in patent clearance activities – attempts to identify patents that might read on their planned activities – to reduce uncertainty and avoid later infringement allegations. Such efforts are often expensive. In the information technology (IT) industries, where products consist of many components covered by numerous patents, firms may not reliably identify all relevant patents. When they do identify patent risks, firms may unnecessarily design around

those risks or take a license due to unclear patent scope. To the extent that patent clearance and product design are made more expensive by poor notice, they impose unnecessary costs.

As discussed in Chapter 3, a firm attempting patent clearance must undertake three activities. One is claim interpretation. To fulfill their notice function, patent claims must clearly delineate the scope of patent rights. A second is predicting what claims might emerge from pending patent applications. A third is identifying potentially relevant patents or applications. Effective patent notice supporting each one of these activities implicates multiple legal rules and practices, including claim interpretation, specification requirements and application examination. Chapter 3 examines those rules and practices and makes recommendations for improving patent notice. Doing so would better align patent law and competition policy by allowing competition among technologies to function more effectively.

How Patent Remedies Affect Innovation and Competition

Effective patent remedies are critical to the patent system's incentives to innovate. Patent infringement interferes with a patentee's ability to realize its patent's value in the marketplace. Remedies protect the ability of patentees to earn returns in the market by stopping and deterring infringement in the case of injunctions, and by making patentees whole through damage awards when infringement has occurred. As explained in Chapter 4, to perform that role, patent remedies should seek to replicate the market reward that the patent holder would have earned absent infringement.

Compensatory damage awards that either under or overcompensate patentees for infringement compared to the market can have detrimental effects on innovation and competition. Undercompensation can undermine the patent system's incentives to innovate. This could impair investment in R&D and result in fewer new, innovative products and services. Damage awards that exceed what the invention could have earned absent infringement when competing with alternatives can lead to higher prices. Consumers are effectively deprived of the benefit of competition among technologies. Overcompensation can also encourage speculation in patent rights and litigation. As discussed in Chapter 2, this can deter innovation by raising the costs and increasing the risks of investment. Moreover, damages law that systematically overcompensates certain types of inventions can over-incentivize invention and patenting in that field. This outcome can disrupt the market's ability to allocate R&D resources to those areas most likely to generate the products most valued by consumers.

Calculating patent damages that replicate the market reward for the invention by constructing the world but for infringement can be a very difficult task for litigants and factfinders. Over the years, courts have developed an extensive jurisprudence surrounding the calculation of patent damages. While the fundamental principles of damages law are sound, some legal rules and practices are not well-grounded in economic analysis. For instance, some rules do not reflect a full appreciation of the appropriate role of competition from non-infringing alternatives in determining patent damages. Trial practice has allowed ill-supported damages testimony into evidence. Chapters 4 through 7 develop an economically grounded approach to

calculating patent damages and recommend changes to better align patent law and competition policy by producing damage awards that more closely replicate the market value of the invention.

Permanent injunctions prohibiting future infringement play a critical role in protecting the exclusivity that allows a patentee to reap the market reward for its invention. Following a finding of infringement, an injunction preserves the patentee's exclusivity going forward. Just as importantly, the threat of an injunction creates a significant deterrent to infringement, which allows patentees to obtain the full market reward for the invention, supported by an exclusive market position, without costly litigation.

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.

One challenge for injunction analysis is to protect the critical importance of patent exclusivity for innovation while recognizing that, in some instances, patent hold-up can undermine innovation and harm consumers. Chapter 8 proposes an approach that balances these concerns within the equitable analysis required by *eBay v. MercExchange*.[4] The proposed approach aligns patent law and competition policy by preventing hold-up based on sunk costs when innovation would not be harmed.

[4]eBay, Inc. v. MercExchange, LLC, 547 U.S. 388 (2006).

EXECUTIVE SUMMARY

CHAPTER 1
EVOLVING PATHWAYS OF INNOVATION: OPEN INNOVATION, TECHNOLOGY TRANSFER AND EX ANTE PATENT TRANSACTIONS

Understanding what changes to the law of patent notice and remedies would increase innovation and better align the patent system and competition policy requires that we first examine how the pathways to innovation and the role of patents in promoting innovation have evolved. In one significant change, many firms have increasingly embraced "open innovation." In a traditional or closed model of innovation, a firm relies on its own research and development (R&D) to create the products it markets. But a firm that pursues an open innovation strategy recognizes that valuable ideas can originate with others and seeks to acquire those inventions that fit its business model. Many of the inventions acquired and commercialized by large firms originated with start-ups and small companies, which have accounted for a steadily increasing percentage of R&D spending over the past 30 years.

Consumers benefit from open innovation strategies. The growth of technology transfer has permitted a division of labor to emerge between those who invent and those who manufacture most efficiently. This division of labor speeds up the rate of innovation and results in broader, faster distribution of new products to consumers. By providing a pathway for invention without commercialization, technology transfer also lowers barriers to entry for inventors who do not have access to the capital required to build manufacturing facilities and establish distribution channels. Easier entry supports additional sources of invention, which increases competition among technologies to be further developed and incorporated into products. That competition benefits consumers by generating better, cheaper products. Moreover, competition among early-stage technologies for development funding is an important mechanism for allocating scarce resources to those inventions having the greatest chance of generating the products most valued by consumers.

The patent system facilitates open innovation and technology transfer in ways that implicate patent quality, patent remedies and the notice function. The exclusive patent right creates incentives for sellers of technology to invent, and for buyers of technology to purchase and invest in further development. But the nature and effectiveness of the exclusive patent right depend in part on the remedies available for its infringement. Damages must make a patent owner whole or infringement will undermine the patent system's incentives to innovate. Permanent injunctions must deter infringement and protect the exclusivity. Good notice of patent rights encourages investment in new technologies. But poor quality patents can discourage innovation by creating uncertainty and raising costs.

Patents also facilitate open innovation and technology transfer by creating rights based on intangible concepts, which makes contracting easier and helps create a market for ideas. In a technology transfer agreement, patents often define the rights to be transferred. Thus, patent transactions (licensing or sales) form the basis of many technology transfer agreements. Patent transactions that occur as part of a technology transfer agreement can be considered ex ante

because they occur *before* the purchaser has obtained the technology through other means. Such ex ante patent transactions accompanied by technology transfer are an important means for advancing innovation, creating wealth, and increasing competition among technologies.

CHAPTER 2
THE EVOLVING PATENT MARKETPLACE: EX POST PATENT TRANSACTIONS

While the open innovation model and technology transfer are important pathways to innovation, not all patent licensing and sales occur ex ante as part of a technology transfer agreement. In many cases, the licensee or purchaser already uses the patented technology when approached by the patent owner, but it lacks a license to use the technology. These patent transactions occur ex post, *after* the firm accused of infringement has invested in creating, developing or commercializing the technology. The firm needs the ex post license to avoid liability, even if it invented or obtained the technology independent of the patentee, because patent infringement is a strict liability offense.

The ability of patentees to assert their patents against infringers is important to the patent system's role in promoting innovation and facilitating technology transfer. The threat of a patent infringement suit deters infringement and safeguards the exclusivity that is the heart of the patent system. A business model based on invention followed by technology transfer will only succeed if a firm can prevent copying and recoup its investment in R&D.

But ex post licensing to manufacturers that sell products developed or obtained independently of the patentee can distort competition in technology markets and deter innovation. The failure of the patentee and manufacturer to license ex ante with technology transfer results in duplicated R&D effort. When a manufacturer chooses technology for a product design without knowledge of a later-asserted patent, it makes that choice without important cost information, which deprives consumers of the benefits of competition in the technology market. If the manufacturer has sunk costs into using the technology, the patentee can use that investment as negotiating leverage for a higher royalty than the patented technology could have commanded ex ante, when competing with alternatives. The increased uncertainty and higher costs associated with ex post licensing can deter innovation by manufacturers.

Increasing activity by patent assertion entities (PAEs)[5] in the information technology (IT) industry has amplified concerns about the effects of ex post patent transactions on innovation and competition. The business model of PAEs focuses on purchasing and asserting patents against manufacturers already using the technology, rather than developing and transferring technology.

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[5]This report uses the term "patent assertion entity" rather than the more common "non-practicing entity" (NPE) to refer to firms whose business model primarily focuses on purchasing and asserting patents. Taken literally, the term NPE encompasses patent owners that primarily seek to develop and transfer technology, such as universities and semiconductor design houses. Patent assertion entities do not include this latter group.

Some argue that PAEs encourage innovation by compensating inventors, but this argument ignores the fact that invention is only the first step in a long process of innovation. Even if PAEs arguably encourage invention, they can deter innovation by raising costs and risks without making a technological contribution.

The clear benefits for innovation and competition stemming from ex ante patent transactions contrast with the detrimental and ambiguous effects of ex post transactions. An important goal in aligning the patent system and competition policy is to facilitate ex ante transactions while making ex post transactions less necessary or frequent.

Improving the notice function of patents would help with both. Manufacturers often license ex post because they were not aware of the patent ex ante. Multiple factors can contribute to notice failure, including overbroad, vague claims, the large number of patents potentially relevant to IT products, and the pendency of patent applications in the Patent and Trademark Office (PTO). More clearly defined patent rights could help companies better find and license technology they wish to develop ex ante, which would support technology transfer. Better notice could also help companies obtain licenses or design around patents in advance of marketing a product, thereby decreasing the amount of ex post licensing.

Remedies law requires a careful balance to accomplish the goal of facilitating ex ante transactions while reducing the frequency of ex post transactions. On the one hand, any adjustments to remedies law must be careful not to undermine the patent system's incentives to innovate. On the other hand, if remedies overcompensate patent owners compared to the market reward absent infringement, they can distort competition and encourage patent speculation. Improvements in both notice and remedies law, as discussed in the following sections, can better align the patent system with competition policy and balance these concerns.

CHAPTER 3
PATENT NOTICE: A COMPETITION PERSPECTIVE

The Nature and Sources of Notice Problems

The hearings examined three principal notice challenges, listed below. Numerous IT panelists indicated that notice problems were substantial, often leading firms to abandon patent "clearance" efforts. In contrast, panelists from the pharmaceutical and biotech sectors generally found patent notice sufficient for effective, albeit sometimes costly, clearance searches.

Difficulty interpreting the boundaries of issued claims. To fulfill their notice function, patent claims must delineate the scope of patent rights with sufficient clarity that a person skilled in the relevant art can reliably determine whether planned activities would infringe. The hearings explored several interrelated sources of ambiguity or uncertainty:

- Language is inherently imprecise.
- Some art areas, such as software, lack clear nomenclature and common vocabularies for claiming.
- Claiming using functional language, which describes what the invention does rather than what it is, can produce abstract, ambiguous claims.
- Some applicants may have incentives to draft ambiguous claims that might be viewed narrowly by the PTO and then construed broadly in litigation.
- PTO examination often focuses on issues of novelty and nonobviousness and may result in deferring clarification of claim boundaries until litigation.

Claims that may issue from pending applications. Because products can infringe subsequently issued patents, an effective clearance search should include pending applications. A requirement that most applications be published 18 months after filing provides a partial solution. However, applications can be amended during examination, provided that there is sufficient support in the specification. Adequacy of notice depends on whether the application is published and the extent to which the specification enables third parties to foresee the claims that may emerge.

Difficulty of identifying and reviewing published patents. IT panelists described the difficulty in performing patent clearance that results from the sheer number of relevant patents, potentially numbering in the thousands. They explained that IT products typically contain many different components, each of which may be covered by numerous patents. They also reported that reliably identifying all patents that might be asserted was undermined by the lack of predictable vocabulary and frustrated by short product cycles. Panelists from other industries generally found clearance searches manageable.

Guideposts and Trade-offs

We examine possible notice enhancements with several guideposts in mind. Cost is obviously important. Often, patent applicants are best positioned to supply low-cost, but very valuable, information. Timing is another key consideration. Notice is more beneficial to third parties when they are still planning their R&D strategies and before they make sunk investments that may expose them to hold-up. Accordingly, many of the suggested improvements look to the examination process, rather than to litigation.

Trade-offs between notice and scope pose particularly thorny issues, and it is vital that they be approached with a full understanding of the notice implications. Divergence in the extent and nature of notice problems among industries also poses challenges. We look for ways to improve notice in problem areas without impairing the patent system elsewhere and without sacrificing the benefits of a unitary patent system, with doctrines applicable across technologies.

Improving the Ability to Understand Existing Claims: Indefiniteness

Under Section 112, second paragraph of the Patent Act, 35 U.S.C. § 112, claims must "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as

his invention." Otherwise, the claims are invalid on grounds of "indefiniteness." An indefiniteness standard that weeds out claims reasonably susceptible to multiple interpretations could reduce ambiguity and improve notice in a broad range of settings.

PTO review. The Federal Circuit requires that claims be "insolubly ambiguous" to be invalid as indefinite.[6] The PTO Board of Patent Appeals and Interferences has adopted a lower threshold of ambiguity, however, by ruling that a claim may be indefinite if it is "amenable to two or more plausible claim constructions."[7] *Miyazaki* approaches indefiniteness with a focus on notice. In contrast, the "insolubly ambiguous" standard accepts substantial ambiguity. It preserves claims that require a court to make hard choices among varying interpretations, thereby overstating what marketplace participants are likely to understand. The *Miyazaki* approach is preferable when implemented during PTO review. In the PTO, indefiniteness rulings promptly add clarity and require only a claim amendment from the applicant.

> ***Recommendation.*** In assessing indefiniteness, the PTO should adhere to the principle articulated in *Miyazaki*.

Functional claims. The Federal Circuit has also recognized notice concerns in recent rulings finding computer-implemented means-plus-function claims indefinite.[8] In each case, the invalidated claims covered a function implemented by means of a computer or microprocessor, but the specification provided no details regarding the relevant program. The court ruled that without disclosing in the specification some form of algorithm for performing the claimed function – not necessarily anything highly detailed – the applicant had not satisfied definiteness requirements. This presents a helpful opportunity to enhance notice regarding software patents, but the reach of the "algorithm" requirement is still uncertain. The rulings also point the way toward steps that would add clarity to functional claims that fall outside the means-plus-function format.

> ***Recommendation.*** The Commission recommends that courts give weight to notice objectives as they further explicate the circumstances in which a patent's specification sufficiently supports a means-plus-function claim. Those objectives require sufficiently detailed structure to inform the public of the means that fall within and outside of the claim's scope. Similar concerns apply more broadly, and the Commission urges that courts extend their recent focus on indefiniteness to address functional claiming in general.

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[6]Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed. Cir. 2001).

[7]Ex Parte Miyazaki, 89 U.S.P.Q. 2d 1207, 2008 WL 5105055, at *5-6 (Bd. Pat. App. & Interf. Nov. 19, 2008).

[8]Finisar Corp. v. DirecTV Group, Inc., 523 F.3d 1323, 1340 (Fed. Cir. 2008); Aristocrat Techs. Australia Pty, Ltd., v. Int'l Game Tech., 521 F.3d 1328, 1338 (Fed. Cir. 2008).

Improving the Ability to Understand Existing Claims: Enhancing the Value of the Specification for Claim Construction

Claim construction raises a set of issues with profound notice implications. Claims are interpreted "in light of the patent specification," but this principle often leaves significant ambiguity regarding claim coverage. Hearing testimony focused on enhancing the value of the specification for claim construction through more stringent enforcement of Section 112, at least in the IT industry, and by defining claim terms.

Enforcement of 35 U.S.C. § 112, ¶ 1. Panelists stressed the importance of calibrating claim scope to the specification for predictable claim construction and effective public notice. As claims extend farther beyond the invention expressly described in the specification, their boundaries become more ambiguous. Patent law achieves that calibration through two requirements recited in 35 U.S.C. § 112, the written description requirement and the enablement requirement.[9] There was considerable testimony, however, that the written description and enablement requirements have been much less stringently enforced in IT industries than elsewhere, leading to concerns over ambiguous scope. The hearings suggested several ways to address this issue.

Whether a specification sufficiently supports a patent's claims under Section 112 is assessed through the eyes of the hypothetical "person having ordinary skill in the art," or PHOSITA. What the PHOSITA is likely to understand or find demonstrated is a reasonable proxy for what third parties are likely to perceive. Some analysts have argued that, at least for Section 112 purposes, the level of skill attributable to the PHOSITA has been set too high in IT contexts and too low in biotech settings. Attributing too high a skill level to the IT PHOSITA could unduly reduce disclosure requirements for the specification, allow broad, ambiguous claims, and raise serious notice concerns. To ensure adequate notice, the level of skill ascribed to the PHOSITA must reflect facts and avoid inappropriate rules of thumb.

> ***Recommendation***. The Commission urges courts to direct heightened attention and provide additional guidance regarding assessment of PHOSITA skill levels relative to the problems posed by the art. To serve notice goals, application of the PHOSITA standard should be fact-based, up-to-date, and appropriately tailored to the specific technology at hand.

A second problem derives from the requirement that the specification enable third parties to make or use the invention without "undue" experimentation. From the perspective of competitive impact, time-consuming experimentation is more likely to be undue in settings where product life-cycles are measured in months than where they are measured by decades.

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[9]The specification must (1) describe the invention sufficiently to convey to a person having skill in the art that the patentee/applicant was in possession of the claimed invention at the time the application was filed, and (2) enable third parties to make or use the invention without undue experimentation.

However, the factors traditionally considered in evaluating "undue experimentation" omit this commercial perspective.

> ***Recommendation.*** Determinations regarding whether a disclosure requires undue experimentation should give recognition to the competitive significance of the time required for experimentation; when product life-cycles are short, greater disclosures may be needed in order to be competitively meaningful.

Defining claim terms. One concern raised repeatedly during the hearings was that claims frequently use terms with no apparent definition in the specification. Litigants disputing claim interpretation may turn to different dictionaries to find a favorable definition. The problem is exacerbated for fast-moving technologies lacking widely-accepted terminology. Notice would be improved through undisputed claim term definitions.

> ***Recommendation.*** The Commission recommends that patent applicants be required either (i) to designate a dictionary for use in assigning meaning to terms not defined in the application or (ii) to acknowledge acceptance of a PTO-designated default dictionary for that purpose. The PTO-designated default dictionary could vary by art unit.

> ***Recommendation.*** The Commission urges the PTO to continue to look for ways to press patent applicants to include definitions or contextual explanations of key terms. Mechanisms that could accomplish this include (i) requiring applicants to provide a glossary defining any key terms that are not covered by a designated or default dictionary or that the applicant chooses to define differently than in such a dictionary or (ii) requiring that applicants include key claim terms in the specification and provide a ready means for identifying where they appear.

> ***Recommendation.*** The Commission urges that the PTO convene a government/industry task force or hold a workshop to explore ways of fostering greater uniformity in the methodology or language used for describing and claiming software inventions.

Improving the Ability to Understand Existing Claims: Enhancing the Value of the Prosecution History for Claim Construction

In addition to the language of the patent itself, important evidence relevant to a claim's meaning may appear in the prosecution history. Panelists registered considerable support for increasing and recording exchanges between examiners and applicants pertinent to patent scope. They explained that engaging the applicant in ways that build a prosecution history record

enables all participants in the patent system to better understand claim boundaries. The PTO very recently has exhorted its examiners to take steps in these directions.[10]

> ***Recommendation.*** The Commission urges that examiners be further encouraged to build a record that improves claim scope clarity. In part, this may be achieved through greater focus on Section 112 standards. Additional notice may be derived via indefiniteness rejections or interviews tailored to elicit information from applicants regarding the meaning of their claims. Beyond this, the Commission reiterates the recommendation in its 2003 IP Report[11] for "a concentrated effort to use examiner inquiries [under PTO Rule 105] more often and more extensively," as a means, for present purposes, of increasing and recording examiner/applicant exchanges pertinent to patent scope.

> ***Recommendation.*** The Commission recommends that the PTO continue to encourage examiners to make greater and more informative use of statements of reasons for allowance and for withdrawing indefiniteness rejections and that courts accord such statements due weight as prosecution history relevant to claim interpretation.

Improving the Ability to Foresee Evolving Claims

Adequate notice requires both knowledge of those patent applications pending in the PTO that might issue with relevant claims and an ability to foresee the evolving claims that could issue as a result of prosecution. Knowledge of the applications comes through their publication. The ability to foresee claims depends on enforcement of the Section 112 requirements. The amount of time an application remains pending in the PTO also affects notice.

Publication of applications. Until a patent application is available to public view, third parties have no opportunity to determine whether they have freedom to operate. Under current law, most U.S. patent applications are published 18 months after filing. For applications filed only domestically, however, the applicant may keep the application secret until the patent issues. Hearing testimony described unpublished applications as a threat to expensive R&D, although independent inventors feared publication would allow large companies to appropriate their inventions.

> ***Recommendation.*** The Commission recommends legislation requiring publication of patent applications 18 months after filing, whether or not the applicant also has sought patent protection abroad (subject to possible adjustments to provide any necessary protection to independent inventors). This

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[10] *See* USPTO, *Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112*, 76 Fed. Reg. 7,162 (Feb. 9, 2011).

[11] 2003 FTC IP Report, ch. 5, at 13-14.

recommendation is consistent with that made in the 2003 FTC IP Report, which noted the "benefits of publication to business certainty and the potential competitive harms and hold-up opportunities that flow from unanticipated 'submarine' patents."[12]

Section 112 requirements. Once an application is published, third parties have notice of the specification and pending claims. However, a patent applicant can amend and add new claims during prosecution. The ability of third parties to foresee evolving claims depends on the extent to which the specification provides effective notice of the range of claims that ultimately might issue. The disclosure requirements of Section 112 (written description and enablement) provide protection against undue broadening of claims through additions and amendments.

Panelists from the IT industry expressed concern about how well these protections allow them to foresee claims that might issue. One reason is the perceived lax enforcement of the Section 112 requirements for IT patents. Another reason is the nature of the written description requirement, which, traditionally, has not focused on precisely the right question for notice purposes. Thus, it uses an already written claim to evaluate the sufficiency of the specification. But it does not ask whether the specification allows the PHOSITA to predict what might be claimed as within the scope of the invention. Enablement analysis presents a similar problem. Unless a manufacturer can predict when making R&D investments that patent claims covering its product could emerge, the broadened claims reach beyond the application's effective notice.

A breakdown of notice regarding evolving claims can have important competitive consequences. In its 1988 *Kingsdown* decision, the Federal Circuit declared that it is not "in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application," provided the claims are adequately supported by the original disclosure.[13] If the competitor could not have predicted those claims, application of the *Kingsdown* doctrine subjects its innovation to unexpected infringement liability. That result impairs the competitive efforts of rivals and undermines the patent system's goal of fostering innovation.

Recommendation. The Commission recommends that consideration of the PHOSITA's ability to foresee future evolution of the claims be more fully incorporated into application of the written description requirement; the applicant should not be understood to have been in possession of the subject matter of a new or amended claim of scope broader than what the PHOSITA, on the filing date, could reasonably be expected to foresee from the specification.

Continuation practices. Another way of addressing some of these issues would be to limit infringement exposure when claims have been broadened using continuations.

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[12] *Id*. at 15.

[13] Kingsdown Med. Consultants, Ltd. v. Hollister, Inc., 863 F.2d 867, 874 (Fed. Cir. 1988).

Continuation applications enable an applicant to extend the prosecution period, potentially for many years, while maintaining the benefit of the initial filing date. So long as the original application's specification contains adequate support for any claim additions or amendments, continuation practice provides a means to broaden coverage of the application's claims.

Continuations are not the source of the notice problem regarding evolving claims, and they often serve important, entirely legitimate needs. They do, however, extend the period of new-claim gestation and thereby raise third-party exposure to opportunistic conduct that takes advantage of intervening market commitments, such as the conduct sanctioned in *Kingsdown*. A targeted limitation on enforcement of broadened continuation claims could limit the potential competitive harm.

> ***Recommendation.*** The Commission recommends enactment of legislation to protect from infringement actions third parties who (i) infringe properly described claims only because of claim amendments (or new claims) following a continuation and (ii) developed, used, or made substantial preparation for using, the relevant product or process before the amended (or newly added) claims were published.[14]

PTO funding. Finally, a crucial predicate for this discussion is an ongoing examination process. Unfortunately, the PTO currently suffers under a huge application backlog. Delay in commencing the examination procedures that begin to add clarity and in issuing patents only adds to the period of uncertainty.

> ***Recommendation.*** The Commission recommends that the PTO receive the funding and information systems needed to promptly and properly examine the many applications that it faces.

Improving the Ability to Sift Through a Multitude of Patents

Identifying and reviewing the patents and applications that might conceivably apply to a new product often present daunting challenges in IT industries. In addition to the sheer number of patents, testimony emphasized that unclear claim language and the diverse ways in which claims might be expressed make search less effective. The hearings considered three ways to address these issues.

Improving clearance search. The PTO provides public access to paper and electronic files of patents, but organizes them under a system that differs from industry-based classifications. Moreover, particularly in software contexts, researchers and applicants may describe the same invention using different words, undermining reliable search.

[14]The Commission first made this recommendation at 2003 FTC IP Report, ch. 4, at 31.

Recommendation. The Commission recommends that the PTO instruct examiners to classify patents using an industry-based classification system, as well as the PTO classification system, in art units where the additional classifications would significantly improve public notice. The Commission further recommends that the PTO explore mechanisms for encouraging examiners to compile search-friendly lists of descriptive terms for applications under review and patents ready for issuance.

Recommendation. The Commission urges that the PTO explore with the software industry whether ways might be devised to foster greater uniformity in the methodology or language used for describing and claiming inventions, as a means of enhancing search capabilities.

Identifying patent assignees. Potential users of a technology need a ready means of identifying the current owner of a patent. One strategy for navigating an environment with many potentially relevant patents is to concentrate clearance efforts on patents held by competitors or others who are likely to sue. This strategy falters if the public cannot identify current owners. Panelists reported that under current law parties often fail to record assignments or list "shell companies" as assignees. A patent confers a right to exclude, and it is important to clearance efforts that the public faced with that right have a ready means of identifying the owner.

Recommendation. The Commission recommends the enactment of legislation requiring the public recordation of assignments of patents and published patent applications. To ensure that such listings provide maximum benefit to public notice, they should identify both the formal assignee and the real party in interest.

Modifying liability for inadvertent infringement. The consequences of notice failures are particularly harsh because infringers are held liable even if they have no knowledge of the patent. Recent studies show that patent infringement litigation often seeks recovery from such "inadvertent infringers." If efforts to improve notice do not succeed, consideration of modifications to strict liability – such as prior user rights or an "independent invention" defense – may be appropriate. But a substantial change along these lines could result in a dramatically different patent system, and knowledge in this area is limited. Under these circumstances, research designed to better understand how modifications to strict liability for patent infringement would affect incentives to invent and innovate would be desirable.

CHAPTER 4
THE ECONOMIC AND LEGAL FOUNDATIONS OF PATENT REMEDIES

The Patent Act incorporates the fundamental goal of fully compensating patentees for infringement by requiring that a court award a successful patentee damages "adequate to compensate for the infringement." Courts have defined damages "adequate to compensate" as those that make the patent owner whole by placing it in the position it would have been but for the infringement. This standard aligns patent law and competition policy by replicating the

market reward for the invention, meaning the amount the patentee would have earned in the absence of infringement by either selling a patented product or by licensing the patented technology.

Courts have developed an extensive jurisprudence on how to calculate compensatory damages. Current law identifies two categories of patent damages – lost profits and reasonable royalties – and provides legal rules for determining which category applies and how damages should be calculated. Calculating accurate damages is a difficult task, however. The calculation is based on a hypothetical world of no infringement but continued competition from non-infringing alternatives. Undercompensation can harm consumers by decreasing incentives to innovate. Overcompensation can also hinder innovation and deprive consumers of the benefits of competition in multiple ways. To address these concerns, this report seeks to derive an economically grounded approach to calculating patent damages and to test the current legal rules for calculating damages against that approach.

CHAPTER 5
LOST PROFITS DAMAGES

When a patentee commercializes the invention itself, its market reward is measured by the profits it earns. In this context, infringement generally entails making and selling a competing product containing the patented technology. Infringing competition can reduce a patentee's profits in a number of ways, including by diverting sales from the patentee's product, eroding the patentee's sales price, and causing the patentee to lose collateral sales of nonpatented products.

> ***Recommendation***. In assessing how the market would have rewarded the invention absent infringement, courts should allow a patentee flexibility in creating the "but for" world to address different losses and avoid undercompensation. Patentees should not be denied an opportunity to establish lost profits through application of rigid rules that do not reflect sound economic principles or imposition of evidentiary requirements beyond what is required for the court to make a reasonable approximation of the patentee's loss.

Non-infringing Alternatives in a Lost Profits Calculation

It is also important that the legal rules recognize how alternatives to the patented invention would have affected the patentee's profits. In the world absent infringement, the infringer might have sold an alternative to the patented technology. Accurately calculating damages in the face of that competition requires an examination of consumer preferences for the patented invention over alternatives. The more consumers prefer the patented invention, the greater the number of sales that infringement causes the patentee to lose. When consumers freely substitute alternatives for the patented product, infringement causes fewer lost sales. Economic tools, including those frequently used in antitrust analysis, can help determine the number of lost sales.

Two current legal rules fail to give proper consideration to the role of alternatives in determining lost profits damages: the entire market value rule and the practice of making dual awards of lost profits and reasonable royalty damages.

The entire market value rule. When a patented invention is only one component of a larger product, the "entire market value rule" awards lost profits damages based on the entire value of the patented product if (1) the patented feature is "the basis for customer demand" of the infringing product and (2) the patented and unpatented components together "constitute a functional unit."[15] The entire market value rule distracts litigants and factfinders from a careful reconstruction of a market lacking infringement. Proper consideration of the "degrees of substitutability" among products is eliminated under the all or nothing "basis for customer demand" test. The "functional unit" prong introduces an irrelevant consideration into the analysis. A more nuanced economic analysis would seek to determine the number of consumers that would choose an alternative if the infringing product were not available. Under this economic analysis, the infringer's sales are effectively "apportioned" according to the value that the invention imparts to the entire product.

> ***Recommendation.*** Courts should reject the entire market value rule as a basis for awarding a patentee lost profits damages based on all infringing sales and instead require proof of the degree of consumer preference for the patented invention over alternatives.

Dual awards. Courts have awarded lost profits damages on a portion of the infringing sales while also awarding reasonable royalty damages on the remaining infringing sales. Such dual awards can give more than required to put the patentee in the position it would have been but for the infringement. When an analysis of consumer preferences shows that, absent infringement, some consumers would have purchased an alternative to the patented product, giving the patentee reasonable royalty damages on those sales overcompensates it.

> ***Recommendation.*** Courts should reject dual awards of lost profits and reasonable royalty damages when competition from alternatives would have prevented the patentee from making all the infringer's sales in a world of no infringement.

CHAPTER 6
THE HYPOTHETICAL NEGOTIATION IN REASONABLE ROYALTY DAMAGES

When a patentee does not market its invention, it can instead earn the market reward for the patent through licensing. For this reason, when a patentee cannot or chooses not to prove lost profits from infringement, the measure of damages is the amount that the patentee would have received in the market for licensing the patented technology. Patent law appropriately implements this concept by awarding reasonable royalty damages based on what a willing

[15]Rite-Hite Corp. v. Kelly Co., 56 F.3d 1538, 1550 (Fed. Cir. 1995) (en banc).

licensor and willing licensee would have agreed to in a hypothetical negotiation, assuming the patent is valid and infringed. In an actual negotiation and, therefore, a hypothetical negotiation, the maximum amount a licensee would pay depends upon the economic value of the patented invention, meaning the incremental value of the invention compared to alternatives.

Concerns with the Hypothetical Negotiation Framework

Its counterfactual nature. Courts have, in some instances, allowed reasonable royalty damage awards that appear to be more than a hypothetical negotiation would have produced. In doing so, they have implicitly or explicitly rejected the central premise that the award must be consistent with what a willing licensee would pay for the patented technology. Many cases suggest unease with the hypothetical negotiation due to its counterfactual assumption that the infringer never infringed and the parties reached agreement. Underlying this unease is often a concern that the maximum royalty the infringer would have been willing to pay could not adequately compensate the patentee and would have been unacceptable to it. Some cases also contain overtones of punishing infringers.

Both concerns are inappropriate. First, compensatory damages for the strict liability offense of infringement are not meant to be punitive. Second, arguments that the patentee would have rejected the maximum amount the infringer would have paid are based on assumptions that the patentee could have made more by *not* licensing. The patentee may have been better off selling the invention or a competing product exclusively. In that case, however, the patentee should be entitled to damages based on lost profits. The law must be flexible in allowing the patentee to prove its lost profits in order to provide adequate compensation. But a patentee who has failed or chosen not to do so should not be allowed to use unproven arguments of direct losses to inflate a reasonable royalty award beyond what a willing licensee would pay.

Deterring infringement. Some cases that seem to reject the willing licensor/willing licensee model have expressed concern that the prospect of paying reasonable royalty damages supplies an insufficient deterrent to infringement and leads firms to choose to infringe by charging only the "normal" royalty. This concern ignores several other deterrents to infringement incorporated within the patent system. First, the argument incorrectly assumes that damages following trial will be the "normal" royalty. The law, however, requires that the hypothetical negotiation amount incorporate the assumption that the patent is valid and infringed, which will raise the royalty rate. In addition, enchanced damages penalize those who willfully infringe and deter copying. Finally, and perhaps most importantly, the threat of injunctive relief provides critical deterrence to infringement, as discussed more fully below.

> ***Recommendation.*** The Commission recommends that courts award reasonable royalty damages consistent with the hypothetical negotiation analysis and willing licensor/willing licensee model. Concerns about punishing infringement, deterring infringement, the counterfactual nature of the analysis, or unproven lost profits that the patentee may have suffered, should not inflate the reasonable royalty damage award beyond what a willing licensee would have paid for a patent known to be valid and infringed. Doing so risks awarding patentees more

than the economic value of their inventions compared to alternatives and creating problems of overcompensation and market distortion.

CHAPTER 7
CALCULATING REASONABLE ROYALTY DAMAGES

Accurately calculating reasonable royalty damages based on a hypothetical negotiation and the willing licensor/willing licensee model presents numerous challenges for litigants and courts. An economically grounded approach to damages calculation that appreciates the role of competition in establishing the economic value of an invention would increase the accuracy of that determination. Chapter 7 suggests several steps courts can take to increase the accuracy of reasonable royalty damage awards.

The *Georgia-Pacific* Factors and Their Implementation

Courts and juries often make reasonable royalty damage awards by considering some or all of the *Georgia-Pacific* factors, a list identified by a district court in 1970 as relevant to the issue.[16] This list has served as a touchstone for expert testimony, jury instructions, and judicial review of damage awards. Clarifying the appropriate role of the *Georgia-Pacific* factors would help increase the accuracy of reasonable royalty damage awards. The factors do not provide a conceptual framework for calculating damages. Rather, they are properly understood as a non-exhaustive list of evidence categories that may be, but are not necessarily, relevant to a specific calculation.

> ***Recommendation.*** Courts should consistently adopt and apply the hypothetical negotiation and willing licensor/willing licensee model as the conceptual framework against which conduct of the damages trial is tested. In particular, courts should recognize that the *Georgia-Pacific* factors provide only a list of evidence categories. Implementing this recommendation will have practical consequences regarding jury instructions, admissibility of evidence and decision-making, discussed below.

The Role of Alternative Technologies

Manufacturers often choose among competing alternative technologies to incorporate into new products. A manufacturer will not pay more to use patented technology than the increased profits it anticipates from using the patented invention compared to the next best alternative. If royalties exceed this economic value of the invention, manufacturers can bargain for a lower rate or choose an alternative. Because alternative technologies play a crucial role in actual licensing negotiations, they must play a commensurate role in the hypothetical negotiation that determines

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[16]Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd*, 446 F.2d 295 (2d Cir. 1971).

reasonable royalty damages. Recent case law has suggested, however, that the availability of non-infringing alternatives does not necessarily cap reasonable royalty damage awards.

> ***Recommendation.*** Courts should recognize that when it can be determined, the incremental value of the patented invention over the next-best alternative establishes the maximum amount that a willing licensee would pay in a hypothetical negotiation. Courts should not award reasonable royalty damages higher than this amount.

Timing of the hypothetical negotiation. A manufacturer's costs in choosing an alternative to the patented technology and the ability of alternatives to cap a reasonable royalty can depend on the timing of the hypothetical negotiation. As it chooses technologies to incorporate into a new product, a manufacturer will often make investments (e.g., building manufacturing facilities) based on that choice that make it more costly to switch to an alternative. If the hypothetical negotiation is deemed to take place after investments have increased switching costs, the reasonable royalty may be higher than it would have been at the time of the design choice. This result overcompensates patentees compared to the economic value of the invention because of investments by the infringer. The ability of patentees to demand and obtain royalty payments based on the infringer's switching costs is commonly called "hold-up." The case law places the hypothetical negotiation at the time infringement began, but it does not precisely define that point in time.

> ***Recommendation.*** To prevent damage awards based on switching costs, courts should set the hypothetical negotiation at an early stage of product development, when the infringer is making design decisions and before it has sunk costs into using the patented technology.

Reasonable royalties applied to standards. Hold-up may have especially severe consequences for innovation and competition in the context of standardized technology. IT firms often achieve interoperability among products by working together in standard setting organizations (SSOs) to jointly adopt industry-wide technical standards. Alternative technologies compete for inclusion in the standard. Once a technology is incorporated into a standard, a firm with a patent reading on the technology can demand a royalty that reflects not only the value of the technology compared to alternatives, but also the value associated with investments made to implement the standard. Switching costs may be prohibitively high when an industry becomes locked into using standardized technology. Were patentees able to obtain the hold-up value, this overcompensation could raise prices for consumers while undermining efficient choices made among technologies competing for inclusion in a standard.

One way that many SSOs attempt to address this problem is through licensing rules that require participants to agree to license patents on RAND (Reasonable and Non-Discriminatory) terms. But panelists complained that RAND was not defined and provided little guidance in licensing negotiations. More clarity in the damages case law on the role of alternatives and timing in the hypothetical negotiation would support a definition of RAND that limits hold-up. A definition of RAND based on the ex ante value of the patented technology at the time the

standard is chosen is necessary for consumers to benefit from competition among technologies to be incorporated into the standard.

> ***Recommendation.*** Courts should apply the hypothetical negotiation framework to determine reasonable royalty damages for a patent subject to a RAND commitment. Courts should cap the royalty at the incremental value of the patented technology over alternatives available at the time the standard was chosen.

Courts' Gatekeeping Role in Reasonable Royalty Damages Cases

Litigants frequently present damages evidence in patent cases to the jury through an expert witness who offers opinion on the appropriate damage award. The judge acts as a gatekeeper in determining whether that opinion testimony is sufficiently reliable to be admissible under Federal Rule of Evidence (FRE) 702. To be reliable, expert testimony must be: (1) based on sufficient facts or data; (2) the product of reliable principles and methods; and (3) result from reliable application of those principles and methods to the facts of the case.

Calls for more vigorous judicial gatekeeping excluding unreliable testimony on damages have received heightened attention in the patent community and generated broad agreement at the hearings. Such gatekeeping is especially important for achieving accurate awards in the context of the hypothetical negotiation, which can be difficult for jurors to apply. Panelists maintained, however, that courts rarely exercise their gatekeeping authority in patent damages matters. Decisions under *Daubert*[17] that examine only the reliability of an expert's methodology, without fully considering whether he reliably applied that methodology to the facts of the case, can result in admission of improper testimony. The recent Federal Circuit opinion, *Uniloc v. Microsoft*,[18] emphasizes the need for damages experts to tie accepted methodologies to the facts of the particular case.

> ***Recommendation.*** In their gatekeeper role of enforcing FRE 702, courts should test the admissibility of expert testimony on damages by assessing whether it will reliably assist the trier of fact in determining the amount a willing licensor and willing licensee would have agreed to as compensation for use of the patented invention in the infringing product. Courts should not deem evidence as relevant, reliable and admissible solely because it falls within one of the *Georgia-Pacific* factors.

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[17]Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579 (1993).

[18]Uniloc USA, Inc. v. Microsoft Corp., Nos. 2010-1035, 2010-1055, 2011 WL 9738 (Fed. Cir. Jan. 4, 2011).

Recommendation. Consistent with FRE 702, courts should require a showing that a damages expert's methodology is reliable, that he reliably applies the methodology to the facts of the case, and that the testimony is based on sufficient data. Demonstration of a reliable methodology without satisfaction of the other two prongs should not establish admissibility.

Comparable licenses and averages. The issues surrounding the admissibility of royalty rates on licenses claimed to be comparable to the hypothetically negotiated license illustrate the importance of active gatekeeping. Basing reasonable royalty awards on royalty rates in patent licenses that are "comparable" to the license that would result from the hypothetical negotiation (or averages of such royalty rates) is a common methodology for setting reasonable royalty damages. Such evidence can reliably assist the trier of fact in setting the hypothetical negotiation license only if the patented invention and its infringing use are sufficiently similar to those of the comparable license. Key attributes in assessing comparability include the technology that is licensed, the rights licensed (e.g., whether a license covers one patent or several), and the type and terms of the license (e.g., running royalty or lump sum). In *Lucent v. Gateway*[19] and other cases, the Federal Circuit has recently applied a more rigorous review of damage awards that considers whether licenses offered as "comparable" are sufficiently similar to support a jury verdict.

Recommendation. Courts should admit expert testimony based on comparable licenses as reliable only upon a satisfactory showing of similarity between the licensed patent and the infringed patent, and between the non-price terms of the comparable license and hypothetical license. That showing should be sufficient to support an inference that the royalty rate for the comparable license provides a reliable indicator of the royalty that would be reached in the hypothetical negotiation.

Choosing the Royalty Base: The Entire Market Value Rule

The entire market value rule arose in the context of calculating lost profits damages for a patent covering a component of a product. The law allows the patentee to recover lost profits damages based on the entire market value of the product when the patented component is the "basis for customer demand." Otherwise lost profits damages will be based only on the value of the patented component or "apportioned."

The entire market value rule as developed for lost profits has no corollary in the context of calculating a royalty by multiplying a royalty base times a royalty rate. There is no amount of potential damage funds, such as the profits lost on a product, to be entirely awarded or apportioned. Moreover, the base and rate are closely interrelated. Altering the base in response to a legal test should result in recalibrating the rate. Nonetheless, courts have imported this rule into reasonable royalty determinations as a technique for identifying the royalty base.

[19]Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301 (Fed. Cir. 2009).

Recommendation. Courts should eliminate the entire market value rule and the question of whether the patented feature was the "basis for customer demand" from the determination of the appropriate base in a reasonable royalty damages calculation. It is irrelevant and it risks injecting significant confusion that threatens to produce inaccurate awards.

Identifying the base. Multiple considerations apart from the entire market value rule influence parties' choice of a royalty base in actual licensing negotiations, including convenience of the parties and the practice in the industry. Where the patented invention is only one component of a larger product, the product may be the only item that is priced and can be monitored. However, the practical difficulty of identifying a royalty rate that accurately reflects the invention's contribution to a much larger, complex product counsels toward choosing the smallest priceable component that incorporates the invention. Because the choice of a base in an actual licensing negotiation is not driven by whether the patented feature is the "basis for customer demand," that question should not drive the choice of base in a hypothetical negotiation. (The rule's concern with the extent to which a patented invention drives customer demand is relevant for identifying an appropriate royalty *rate*.)

Recommendation. Courts should identify as the appropriate base that which the parties would have chosen in the hypothetical negotiation as best suited for accurately valuing the invention. This may often be the smallest priceable component containing the invention.

CHAPTER 8
PERMANENT INJUNCTIONS IN PATENT CASES

In addition to awarding damages for past patent infringement, courts may also grant permanent injunctions prohibiting future infringement. In 2006, in *eBay v. MercExchange*, a unanimous Supreme Court held that the grant of permanent injunctive relief in a patent case is governed by "traditional equitable principles." The Court listed four factors that a patentee must satisfy to obtain an injunction:

> (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.[20]

[20]eBay, Inc. v. MercExchange, LLC, 547 U.S. 388, 391 (2006).

How Permanent Injunctions Affect Innovation and Competition

Although the injunction analysis is equitable, to most benefit consumers, it should be conducted in a manner that furthers the patent system's goal of promoting innovation and recognizes consumer interest in aligning the patent system and competition policy. Three characteristics of injunctions that affect innovation support generally granting an injunction. The first and most fundamental is an injunction's ability to preserve the exclusivity that provides the foundation of the patent system's incentives to innovate. Second, the credible threat of an injunction deters infringement in the first place. This results from the serious consequences of an injunction for an infringer, including the loss of sunk investment. Third, a predictable injunction threat will promote licensing by the parties. Private contracting is generally preferable to a compulsory licensing regime because the parties will have better information about the appropriate terms of a license than would a court, and more flexibility in fashioning efficient agreements.

A fourth characteristic of injunctions affects the alignment of the patent system and competition policy. An injunction's ability to cause patent hold-up can support withholding injunctive relief in some situations. A manufacturer's high switching costs combined with the threat of an injunction can allow a patent owner to obtain payments unrelated to the economic value of its invention. Hold-up and the threat of hold-up can deter innovation by increasing costs and uncertainty for manufacturers. It can also raise prices to consumers by depriving them of the benefit of competition among technologies. In such circumstances, injunction law threatens to disrupt the alignment of the patent system and competition policy.

A challenge for injunction analysis is to integrate and balance awareness of these issues. Hold-up can harm innovation and competition. But denying an injunction every time an infringer's switching costs exceed the economic value of the invention would dramatically undermine the ability of a patent to deter infringement and encourage innovation. For this reason, courts should grant injunctions in the majority of cases, but criteria are needed to help identify those instances in which the harm to the patentee from ongoing infringement is small compared to the costs from hold-up. These criteria include: (1) whether the patented technology is a minor component of a complex product that would have been easy to design around ex ante; (2) whether the infringement affects the patentee's ability to compete in a product or technology market; and (3) whether the infringer copied the patented technology.

Analyzing *eBay's* Four Factors

To be implemented by courts, these concerns about innovation and aligning the patent system and competition policy must be translated into the *eBay* framework. In fact, these concerns fit well within the equitable nature of the injunction remedy and *eBay*'s four factor analysis.

Irreparable harm/inadequacy of money damages.[21] Much discussion concerning injunction law post-*eBay* has focused on whether the patentee and infringer compete in a product market. Conventional wisdom assumes that patentees that do not compete in a product market cannot obtain injunctions because money damages will adequately compensate any harm they may suffer from infringement. Conventional wisdom also assumes that a patent owner practicing the patent can and should be granted an injunction.

The class of non-practicing patent owners is too diverse to be subject to a simple rule. Patentees that license as part of a technology transfer program can suffer harm from infringement akin to that suffered by manufacturing patentees. These patentees compete in a technology market to have their technology purchased for incorporation into new products. The availability of an injunction is important to such patentees, who rely on the threat to deter infringement and encourage ex ante licensing. The harm suffered by these patentees as a result of infringement can be analogous to that suffered by manufacturing patentees, including loss of a customer base and harm to reputation as an innovator. However, denial of an injunction may not prevent a patent assertion entity (PAE) from receiving the full value of the invention. That patentee will not have the same concerns about deterring future infringement and protecting its reputation as an innovator that other patentees may have.

This is not to say, however, that courts should assume all manufacturing patentees will suffer irreparable harm from infringement. While that might often be the case, the analysis must consider other facts. The patent may cover a minor component of the infringing product. Competing products may include non-infringing alternatives that are acceptable to customers, making it less likely that the infringement (as opposed to competition generally) is harming the patentee. The variety and complexity of different factual scenarios caution against creating any assumptions of irreparable harm based on a finding of infringement, a patentee's use of the patent, or its willingness to license.

> ***Recommendation.*** Courts should not presume irreparable harm based on a finding of infringement or the patentee's use of the patent. Conversely, courts should recognize that infringement can irreparably harm the ability of patentees that primarily engage in technology transfer through licensing to compete in a technology market.

Balance of the equities and hardships between the parties. Under this factor, courts must consider the effect of an injunction on an infringer and balance it against the harm that infringement imposes on the patentee. This factor allows courts to weigh the expense and harm to an infringer facing hold-up against the harm to the patentee by considering whether the invention is a minor component for which acceptable alternatives are available, and how infringement affects the patentee's ability to compete in a goods or technology market. Courts can also consider whether the infringer copied the technology.

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[21]Courts and commentators often analyze these two factors as one. Appendix B, Section III.A.

Recommendation. Courts should consider the hardship of an infringer facing hold-up under this prong. Courts should reject the statement that an infringer "cannot be heard to complain if an injunction against continuing infringement destroys the business"[22] except in those instances where an infringer "elects" to infringe by copying a patented invention with knowledge of the patent.

Public interest. Under the public interest factor, courts must examine the effect an injunction would have on third parties, including the public at large. Courts often cite the public's interest in the patent system's ability to promote innovation as supporting an injunction. While this is important, in some circumstances, such as those involving hold-up based on a patent for a minor component, an injunction could unduly raise prices to consumers and deter rather than promote innovation.

Recommendation. When warranted by the facts, courts should consider the public's interest in avoiding patent hold-up, which can increase costs and deter innovation.

Injunction Analysis in the Standard Setting Context

Hold-up in the standard setting context can be particularly acute. Standards are often adopted to make products compatible and interoperable with other products in the industry. "Lock-in" can make an entire industry susceptible to hold-up. In addition to higher prices and other economic harms, hold-up in standards-based industries may discourage standard setting activities and collaboration, which can harm innovation.

eBay provides a framework for evaluating whether to issue an injunction in the standard setting context. A prior RAND commitment by the patentee or its successor-in-interest can provide evidence that denial of an injunction in favor of ongoing royalties will not irreparably harm the patentee. The infringer's inability to participate effectively in the market without complying with the standard is relevant to the balance of hardships. The public interest factor may consider whether grant of an injunction would deprive consumers of interoperable products; raise costs above the incremental value of the invention compared to alternatives at the time the standard was set; or threaten to undermine the collaborative innovation that can result from the standard setting process.

Recommendation. Courts should give careful consideration under each of *eBay's* four factors to the consequences of issuing an injunction prohibiting use of a patented invention incorporated into an industry standard. Whether the patent owner made a RAND commitment will also be relevant to the injunction analysis.

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[22] *E.g.,* 3M Innovative Properties Co. v. Avery Dennison Corp., No. 01-1781, 2006 WL 2735499, at *2 (D. Minn. Sept. 25, 2006).

Remedies Following Denial of an Injunction

When the analysis leads a court to deny an injunction, the question naturally arises of what remedy to apply. The court opinions that address the question most commonly require ongoing royalties that allow the manufacturer to continue making the infringing product. The Federal Circuit has held that this remedy can be appropriate in lieu of an injunction. No consensus on how to set the royalty rate has emerged from the case law, however. The Federal Circuit has stated only that district courts must articulate a reasonable basis for determining the amount, and that the award should account for the changed relationship of the parties resulting from an adjudicated finding of infringement of a valid patent.

Ongoing royalties. To form a coherent remedies system, the legal rules for ongoing royalties following denial of an injunction must be consistent with the rationale for denying the injunction in the first place. When a court denies an injunction to prevent hold-up, the alternative remedy should not perpetuate the hold-up. The ongoing royalty should be based on a willing licensor/willing licensee model with the assumption that the patent is valid and infringed in order to account for the changed relationship of the parties following litigation. Concerns about preserving the deterrent value of injunctions and patentees' incentives to innovate are best addressed by carefully defining and limiting the circumstances under which injunctions are denied.

> ***Recommendation.*** The Commission recommends that to fully compensate patentees but avoid creating hold-up, courts base awards of ongoing royalties following denial of an injunction on the willing licensor/willing licensee model, assuming the patent is valid and infringed.

Delaying the injunction. In several instances, courts have granted a permanent injunction but delayed the time for it to commence in order to give the infringer time to design around the patent or the parties time to reach a licensing agreement. Where a design around option is feasible and the infringer is afforded sufficient time to implement it, a delayed injunction can be a useful tool to prevent hold-up while avoiding the concerns associated with denying an injunction for the life of the patent. In addition, allowing the parties time to negotiate a license can conserve judicial resources.

Remedies in the International Trade Commission

Patent holders who believe that imported products infringe their patents may file a complaint with the International Trade Commission (ITC) under Section 337 of the Tariff Act of 1930. Panelists expressed concern that patentees that are unlikely to obtain an injunction in district court under *eBay* may instead pursue a case in the ITC. Such patentees might include patent assertion entities (PAEs) and those whose patent is subject to a RAND commitment for use in a standard. The Federal Circuit has held that *eBay's* equitable test does not apply to ITC decisions to grant an exclusion order barring importation of infringing products. Thus, unlike the situation in district court, a finding of infringement in the ITC has led to a nearly automatic

exclusion order, which is sometimes tantamount to an injunction. In some circumstances, this outcome could generate hold-up and harm innovation and competition.

Section 337 provides two mechanisms through which the ITC can limit the potential harm from hold-up. The first is through the domestic industry requirement. To file suit in the ITC, a patent owner must meet the domestic industry requirement, which can be satisfied by showing "substantial investment in [the patent's] exploitation, including engineering, research and development or licensing."[23] The ITC should interpret the domestic industry requirement as not satisfied by ex post licensing activity solely focused on extracting rents from manufacturers based on marketed products. Consistent with the legislative history's concern with innovation and the language of the statute, relevant licensing activity can be that which "exploits" the patent through technology transfer that can result in the commercialization of new products and services. This interpretation would limit access to the ITC for PAEs, who are least likely to obtain an injunction under *eBay*, but not other non-practicing patent owners who compete in technology markets.

Second, Section 337 requires the ITC to consider "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" in deciding whether to grant an exclusion order.[24] The ITC has rarely used this public interest provision to deny a remedy. But its language should allow consideration of whether an exclusion order based on a minor patented component of a complex product can unduly harm consumers by causing hold-up, distorting competition, raising prices and deterring innovation. These concerns can be especially powerful when a patentee asserts a patent in the ITC that is subject to a RAND commitment against standardized technology.

> ***Recommendation*** The FTC recommends that the ITC consider whether only those licensing activities that promote technology transfer "exploit" patented technology within the meaning of Section 337, and therefore satisfy the domestic industry requirement. The FTC also recommends that the ITC incorporate concerns about patent hold-up, especially of standards, into the decision of whether to grant an exclusion order in accordance with the public interest elements of Section 337.

[23] 19 U.S.C. § 1337(a)(3).

[24] 19 U.S.C. § 1337(d)(1).

CHAPTER 1
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CHAPTER 1
EVOLVING PATHWAYS OF INNOVATION: OPEN INNOVATION, TECHNOLOGY TRANSFER AND EX ANTE PATENT TRANSACTIONS

I. INTRODUCTION

Innovation benefits consumers through the development of new products, processes and services that can improve lives and address unmet needs. It is key to meeting society's greatest challenges in areas as diverse as energy production, communications and health care, and it is essential to sustained economic growth and global competitiveness.[1] But innovation is a complex process. It involves a series of steps from idea to invention through development to commercialization. Both the invention process and the development process can be expensive, risky and unpredictable.[2]

The goal of the patent system is to promote innovation in the face of that expense and risk. By preventing copying that might otherwise drive down prices, the patent system allows innovators to recoup their investment in research and development (R&D). The patent system's exclusive right promotes innovation, but so too does competition, which drives firms to produce new products and services in the hope of obtaining an advantage in the market. As discussed in the FTC's 2003 Report on the patent system, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, the policies that most successfully promote innovation and enhance consumer welfare are those that align the patent system and competition policy by balancing exclusivity and competition.[3] Many of the recommendations in the 2003 FTC IP Report focus on improving patent quality a means of achieving that balance.[4]

Areas of patent law beyond those affecting patent quality can have a significant impact on how the patent system aligns with competition policy. Hearings held by the FTC during 2008

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[1] OFFICE OF SCI. AND TECH. POLICY, NAT'L ECON. COUNCIL, EXECUTIVE OFFICE OF THE PRESIDENT, A STRATEGY FOR AMERICAN INNOVATION: DRIVING TOWARDS SUSTAINABLE GROWTH AND QUALITY JOBS 4 (2009).

[2] LEWIS M. BRANSCOMB & PHILLIP E. AUERSWALD, DEPT. OF COMMERCE, BETWEEN INVENTION AND INNOVATION: AN ANALYSIS OF FUNDING FOR EARLY-STAGE TECHNOLOGY DEVELOPMENT 32-41 (2002).

[3] FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, Exec. Summ., at 1 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

[4] A second report, issued jointly by the Federal Trade Commission and the Department of Justice Antitrust Division in 2007, considers how antitrust law and competition policy can maintain an alignment with the patent system that best promotes innovation. FED. TRADE COMM'N & DEPT. OF JUSTICE ANTITRUST DIV., ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (April 2007).

and 2009[5] explored two: (1) notice, meaning how well a patent informs the public of what technology is protected; and (2) remedies, meaning damages and injunctions following a finding of patent infringement. Understanding how patent notice and remedies affect innovation and competition requires that we first examine how the pathways of innovation and the role of patents have evolved. That is the goal of this chapter.

In one important aspect of that evolution, many firms are increasingly embracing "open innovation." In a traditional or closed model of innovation, a firm relies on its own R&D to create the products it markets. But a firm that pursues an open innovation strategy recognizes that valuable ideas can originate with others and seeks to acquire those inventions that fit its business model. Many of the inventions acquired and commercialized by large firms originate with start-ups and small companies, which account for a steadily increasing percentage of R&D spending.

Consumers benefit from open innovation strategies. Technology transfer permits a division of labor between those who invent and those who manufacture most efficiently. This can speed up the rate of innovation and result in broader, faster distribution of new products to consumers. By providing a pathway for invention without commercialization, technology transfer also lowers barriers to entry for inventors who do not have access to the capital required to build manufacturing facilities and establish distribution channels.[6] Easier entry supports additional sources of invention, which increases competition among technologies to be further developed or incorporated into products. That competition benefits consumers by resulting in better, cheaper products. Moreover, competition among technologies for development funding is an important mechanism for allocating scarce resources to those inventions having the greatest chance of generating the products most valued by consumers.

The patent system facilitates open innovation and technology transfer in ways that implicate patent remedies and the notice function. The exclusive patent right creates incentives for sellers of technology to invent and buyers of technology to make the purchase and invest in further development. But the nature of the exclusive right depends in part on the remedies available for its infringement. Patents also define rights based on intangible ideas, which helps create a market for technology and makes contracting easier. But a patent's success in doing so depends upon how well it provides notice of what technology it protects. Chapters 3-8 of this report draw on the insights and information of this chapter in analyzing the law of patent notice and remedies and making recommendations to improve them.

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[5]Transcripts and agendas for the hearings and written submissions are available at http://www.ftc.gov/bc/workshops/ipmarketplace/. Appendices C, D and E provide lists of hearings participants, agendas and written submissions.

[6]ASHISH ARORA, ANDREA FOSFURI & ALFONSO GAMBARDELLA, MARKETS FOR TECHNOLOGY: THE ECONOMICS OF INNOVATION AND CORPORATE STRATEGY 12-13 (2001).

II. THE INCREASING IMPORTANCE OF OPEN INNOVATION

In a traditional or "closed" model of innovation, a company's R&D activities lead to internally developed products that the company then markets. The company transfers little technology either into or out of the firm as part of the R&D process, and it forms few collaborations. This was the predominant model of innovation for many companies in the past, especially those having large research arms, like AT&T's Bell Labs.[7] Certainly, large companies continue to invent and develop new technologies that they then market,[8] but many are increasingly receptive to a model of "open innovation."[9]

A. Open Innovation Embraces Technology Transfer

An open innovation strategy allows invention to flow both into and out of the firm. It recognizes that valuable inventions can come from outside the firm and seeks those that fit well with a firm's business model. Open innovation can involve collaboration or technology transfer from a company that has invented an idea to another that further develops, uses or markets it. Such technology transfer allows the acquiring firm to leverage external sources of knowledge to support its own innovation.[10]

For example, a panelist from Procter & Gamble (P&G) described how that company is pursuing an open innovation approach. Traditionally, P&G's new products came from internal R&D efforts. But in 2000, the company adopted a goal of acquiring 50% of its innovation from R&D conducted outside of the company. It exceeded that goal in 2008. As a result, the company reports that its R&D productivity has increased by 60%, the rate of its innovation has doubled,

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[7]Chesbrough at 214-15 (5/4/09); OPEN INNOVATION: RESEARCHING A NEW PARADIGM 2-3 (Henry Chesbrough, Wim Vanhaverbeke & Joel West eds., 2006) (contrasting closed innovation models like AT&T's Bell Laboratories with open innovation models). Even in a closed innovation model, knowledge transfer from one firm to another that stimulates further innovation can occur through reverse engineering and review of patent documents.

[8]*See, e.g.*, Yen at 47 (12/5/08) ("Cisco invests more than $5 billion annually in R&D."); Krall at 73 (3/18/09) ("Sun reinvests between 15 and 20 percent of its annual revenues back into R&D annually."); Miller at 148 (3/18/09) ("[Procter and Gamble] invests over $2.2 billion per year in research and development and we employ over 8,900 scientist[s] in 29 research centers in 13 countries."); Watt at 12 (5/4/09) (Amgen spent $3 billion on R&D in 2008); Myers at 220-21 (3/18/09) (Pfizer spends 20% of its revenue on R&D).

[9]OPEN INNOVATION: RESEARCHING A NEW PARADIGM, *supra* note 7, at 2-3. The model of "open innovation" discussed here involves technology transfer in and out of firms. It is not limited to innovation strategies based on open source software, as the term "open innovation" is sometimes used. *See id.* at 82-84 (discussing open innovation based on open source software).

[10]*Id.*

and costs have fallen. As a representative of the company explained, by combining P&G's internal innovation with outside sources, "one plus one makes three or five instead of two."[11]

Similarly, to create new products, large pharmaceutical and biotechnology companies often depend upon external sources of technology, including universities, start-ups and collaborations with other companies.[12] Start-ups typically develop early-stage technology, perhaps obtained from a university, and move it closer to a viable product. If successful, they may partner with or become acquired by a pharmaceutical company, which tests and commercializes the product. For many large pharmaceutical and biotech companies, a majority of their approved drug products begin with externally developed technology.[13]

Companies in the information technology (IT) sector also acquire new, externally developed technology.[14] As one commentator explained, technologies have become so complex that it is not feasible for any one company to be the source of all the innovative aspects of a product. Companies must look outside.[15] One panelist reports that open technology development has "thrived" in the software and internet industries.[16] IT companies use a variety of mechanisms to bring in new technology, including acquisition of start-ups, collaborative arrangements, and IP licenses.[17] For instance, a manufacturing company may take a license

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[11]Miller at 148-50, 154 (3/18/09).

[12]Myers at 220-21 (3/18/09).

[13]Graham at 137 (4/17/09); *see, e.g.*, Shafmaster at 214 (3/18/09) (of seven therapies produced by Genzyme in the last six years, five are protected, in part, by intellectual property in-licensed from universities, and two are based on intellectual property acquired by Genzyme).

[14]Cockburn at 188-89 (4/17/09); Rogers at 103 (3/18/09) (in the past four years, Qualcomm has acquired over a dozen companies); Yen at 47 (12/5/08) (Cisco has acquired 130 companies, mostly start-ups, to bring in new technology); Valz at 236 (12/5/09) ("small entities that are actually producing great technology along side IP will get noticed and will do really well" in acquisition in the IT sector); Thomas at 73 (4/17/09) (reporting that "some [of] our most valuable intellectual property has come from smaller companies").

[15]Phelps at 244 (5/4/09); Bergelt at 81-82 (4/17/09) (In IT industries, "we're not doing siloed parlayed invention of fundamental technologies the way we did 10 or 15 years ago. We're now inventing higher up in the stack collaboratively."); *see also* BRANSCOMB & AUERSWALD, *supra* note 2, at 43 ("By the 1990s, firms began to out-source more of their needs for component innovation to small and medium sized enterprises.").

[16]Valz at 235-36 (12/5/09).

[17]Crean at 103 (5/4/09) (listing legal tools for importing technology into a large company).

from a design house that develops technology solely in the hopes of licensing it.[18] This model has become increasingly prevalent in the semiconductor industry since the late 1980s with the emergence of companies that patent their designs and then license them to chip manufacturers.[19]

In addition to acquiring technology from external sources, a manufacturing company that pursues an open innovation strategy may also supply its internally developed technology to other firms. If a company makes a promising invention that does not fit well with its business plan, it may seek to sell or license that technology to another firm rather than leave it on the shelf.[20] That might occur when a company pursues multiple solutions through R&D but chooses only one to implement. The other solutions may still show promise for different applications.[21] Looking outside the company for partners to develop and commercialize the otherwise unused technology provides a return on R&D investment, but it also establishes collaborative relationships that can lead to more technology development.[22]

B. The Role of Small Companies and Start-ups in Open Innovation

Small companies play an important role in an open innovation paradigm.[23] Data collected by the National Science Foundation indicates that from 1981 to 2005, most of the growth in U.S. industrial R&D spending came from small companies rather than large. In 1981, 70% of R&D spending in the United States was undertaken by companies with more than 25,000 employees.

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[18]Comment of Innovation Alliance at 2 (2/5/09); Millien at 22 (12/5/08) (noting companies, including AmberWave and Rambus, that have similar business models).

[19]Ziedonis at 260 (5/4/09); Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 RAND J. ECON. 101-28 (2001); Arora at 31-32 (3/19/09).

[20]OPEN INNOVATION: RESEARCHING A NEW PARADIGM, *supra* note 7, at 1-3; BRANSCOMB & AUERSWALD, *supra* note 2, at 44; Chesbrough at 215-16 (5/4/09); Phelps at 247-48 (5/4/09) (describing the IP Ventures unit of Microsoft that licenses-out technology for development); *id.* at 245 (IBM license to Motorola and Intel of technology it did not use).

[21]Horton at 168-69 (3/18/09) (GE experience); Miller at 165 (3/18/09) (explaining that P&G invented enzymes useful for detergent that another company licenses for contact lenses).

[22]Griswold at 163 (3/18/09) (3M obtains revenue and develops relationships through out-licensing); Miller at 150 (3/18/09) (P&G); Stec at 166 (3/18/09) (Ford); Philips at 167 (3/18/09) (Exxon-Mobil).

[23]National Science Foundation, Science and Engineering Indicators 2006, *available at* http://www.nsf.gov/statistics/seind06/c4/c4s1.htm; Samuel Kortum & Josh Lerner, *Assessing the Contribution of Venture Capital to Innovation*, 31 RAND J. ECON. 674 (2000) (estimating that by 1998, venture funding accounted for about 14% of U.S. innovative activity). *See also* Miller at 150 (3/18/09) (acknowledging that "innovation was increasingly done at small and mid-sized entrepreneurial companies, universities, government labs and by individuals"); Bright at 21 (5/4/09) (companies look to start-ups and universities to create new ideas and new solutions that the company can develop).

Only 4.4% was undertaken by companies with fewer than 1,000 employees. By 2005 those numbers had changed dramatically. Companies with more than 25,000 employees accounted for only 37.6% of R&D spending while the R&D share of companies with fewer than 1,000 employees had grown to 24.1%.[24] Since 1980, small and younger firms have accounted for most of the rise in research spending.[25]

With the growing amount of research and invention located in small companies, technology transfer from small, specialized firms to larger manufacturing firms has become an increasingly important pathway of open innovation.[26] Technology can be transferred, or "spun-out" in the other direction too, from a large company to a start-up.[27] Universities provide another important source of early-stage technology that can be transferred to start-ups or large companies.[28] In 2007, over 500 new companies formed based on technology invented in

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[24]Chesbrough at 212-17 (5/4/09). For a more complete breakdown of R&D spending by company size and year, see Henry Chesbrough, *Specialization and Markets for IP*, presented at FTC Hearing: The Evolving IP Marketplace (May 4, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/may4/docs/bchesbrough.pdf.

[25]In the early 1970s, only 70 large, industrial R&D firms accounted for the majority of private R&D being performed. By 2000, those firms accounted for less than one third of R&D. Hunt at 54-56 (3/19/09); *see* Robert M. Hunt, *The Federal Trade Commission's Hearing on "The Evolving IP Marketplace"*, presented at FTC Hearing: The Evolving IP Marketplace (March 19, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/mar18/docs/rhunt.pdf.

[26]Ashish Arora, Marc Ceccagnoli & Wesley M. Cohen, *Trading Knowledge: An Exploration of Patent Protection and Other Determinants of Market Transactions in Technology and R&D*, *in* FINANCING INNOVATION IN THE UNITED STATES, 1870 TO THE PRESENT 366, 367 (Naomi R. Lamoreaux & Kenneth L. Sokoloff eds., 2007) ("the available evidence points to a renewal of market exchange of technology"); Hunt at 57 (3/19/09) ("efficient markets for technology are more important than ever"); Meyer at 68-69 (2/12/09) (observing that "oftentimes [commercialization] doesn't happen within the context of one entity").

[27]Phelps at 247-48 (5/4/09) (describing how Microsoft creates spin-out companies).

[28]Universities are able to license technology developed with government funding through the Bayh-Dole Act. University and Small Business Patent Procedures Act, 35 U.S.C. §§ 200-212 (2006). *See* Soderstrom at 7-9 (3/18/09) (discussing Bayh-Dole Act). Universities may also receive direct funding from corporate sponsors and enter licensing agreements based on that funding. Mimura at 19-20, 50-55 (5/4/09) (describing $500 million award by British Petroleum to the University of California's Lawrence Berkeley Laboratory and the University of Illinois at Urbana-Champaign made in exchange for licensing options).

universities, leading to over 700 new products.[29] In that same year, colleges and universities were awarded over 3,000 U.S. patents.[30]

Open innovation based on technology transfer provides significant benefits to consumers. It allows a division of labor between the creation of new technology and the manufacture and marketing of new products, with the efficiencies of specialization.[31] Commentators report that small companies are often more creative and agile than large companies when inventing new technology.[32] But a large company may be better able to develop the technology into a marketable product and deliver it to consumers. This is especially true when the small company lacks the resources needed for commercialization.[33] Thus, the goal of many start-ups is to attract the investment needed for initial development,[34] demonstrate the soundness of its technology, and become an attractive target for acquisition or collaboration with a larger company.[35]

Open innovation based on technology transfer also benefits consumers by increasing sources of new technology and competition among technologies. By removing the need for an inventor to commercialize his invention himself, technology transfer lowers barriers to entry. For instance, the ability of semiconductor design houses to license their technology has allowed them to specialize in one aspect of the semiconductor industry without the need to own

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[29]Soderstrom at 8-9 (3/18/09); *see also* WARF Comment at 1-2 (5/19/09); NATIONAL ACADEMY OF SCIENCES, COMPUTER SCIENCE AND TELECOMMUNICATIONS BOARD, INNOVATION IN INFORMATION TECHNOLOGY 5-8 (2003), *available at* http://www.nap.edu/html/innovation_in_IT/reportbrief.pdf (university research in information technology led to new product categories with billion-dollar markets).

[30]U.S. PATENT AND TRADEMARK OFFICE, U.S. COLLEGES AND UNIVERSITIES: UTILITY PATENT GRANTS 1969-2008, *available at* http://www.uspto.gov/web/offices/ac/ido/oeip/taf/univ/asgn/table_1_2008.htm.

[31]ADAM SMITH, THE WEALTH OF NATIONS (5th ed. 1905) (providing the fountainhead of economic thought about the substantial benefits flowing from division of labor and specialization).

[32]ANTHONY BREITZMAN & DIANA HICKS, OFFICE OF ADVOCACY, SMALL BUS. ADMIN., AN ANALYSIS OF SMALL BUSINESS PATENTS BY INDUSTRY AND FIRM SIZE, at v (Nov. 2008) (asserting that small companies are more likely to develop an emerging technology and attempt to build a business around it than are large companies).

[33]Edmund W. Kitch, *Elementary and Persistent Errors in the Economic Analysis of Intellectual Property*, 53 VAND. L. REV. 1727, 1740 (2000); Arora et al., *supra* note 26, at 366-67; Arora at 33-34 (3/19/09); Stern at 39 (3/19/09); Bessen at 45 (3/19/09); Bright at 21-22 (5/4/09); Miller at 155 (3/18/09).

[34]This funding can come from venture capitalists, angel investors and family and friends. Stuart J.H. Graham, Robert P. Merges, Pam Samuelson & Ted M. Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1306-07 (2010).

[35]James Young Comment (2/5/09); Arora *et al.*, *supra* note 26, at 367; BRANSCOMB & AUERSWALD, *supra* note 2, at 44 (small companies use joint ventures with large companies for access to manufacturing and marketing resources).

expensive manufacturing facilities. Lower barriers to entry into the creation of technology can increase sources of R&D.[36] This in turn can increase competition among technologies for funding to be developed and commercialized. That competitive process allocates resources to the most promising ideas having the greatest chance of generating products most valued by consumers.[37]

III. PATENTS FACILITATE OPEN INNOVATION AND TECHNOLOGY TRANSFER

Patent rights facilitate an open innovation strategy, including collaboration and technology transfer, in multiple ways.[38] This can be especially true when start-ups and small companies are involved. This section examines how patents facilitate open innovation in order to identify areas of patent law that impact this dynamic and the alignment of patent law and competition policy.

Patents facilitate open innovation and technology transfer by creating rights based on intangible concepts, which makes contracting easier and helps create a market for ideas.[39] As one panelist explained, "the IP serves a very valuable function in being a facilitating force in collaboration with third parties, joint ventures, joint developments. It's a tool that enables us to do more business with more players in a more open and collaborative fashion."[40] In a collaboration, patents can help identify what each party brings to the relationship and how

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[36]Chesbrough at 216-22 (5/4/09). *See also* Maghame at 169-70 (2/11/09) (stating that Tessera, a $1.2 billion company, has signed up over 50 major companies as licensees); Lord at 174 (2/11/09) ("[Amberware] decided from the outset that the flexibility of the licensing business model made a lot of sense for the company."); Ryan at 51 (4/17/09) (predicting an increasing number of pure invention and innovation companies that license their technologies).

[37]A STRATEGY FOR AMERICAN INNOVATION, *supra* note 1, at ii, 6-7; BRANSCOMB & AUERSWALD, *supra* note 2, at 35 (arguing that inventions compete for development funding in a "Darwinian Sea" with "big fish and little fish contending, with survival going to the creative, the agile, the persistent").

[38]Chesbrough at 216 (5/4/09) ("[I]ntellectual property can enable this division of the innovation labor."); Arora at 29-31 (3/19/09) (a market for technology is necessary to establish a division of labor in innovation); Bessen at 45 (3/19/09).

[39]Stern at 37-41 (3/19/09) (discussing the hypothesis that "effective intellectual property promotes trade in the market for ideas, and, therefore, enhances the efficient cooperative commercialization of new technology"); *id.* at 42 (licensing by entrepreneurs increases dramatically immediately following patent grant); Meyer at 69 (2/12/09) (patents encourage "the dissemination of knowledge that's developed by one set of individuals and then can be used throughout the economy").

[40]Horton at 147 (3/19/09). *See also* Kieff at 60-61 (3/19/09) (patents and strong patent rights facilitate coordination among owners of complementary assets).

products of the collaboration will be managed.[41] In a technology transfer agreement, patents can define the rights to be transferred.

Thus, patent transactions (licensing and sales) form the basis of many technology transfer agreements.[42] Patent transactions that occur as part of a technology transfer agreement can be considered ex ante because they occur *before* the purchaser has obtained the technology through other means. Such ex ante patent transactions accompanied by technology transfer have great potential for advancing innovation, creating wealth and increasing competition among technologies.[43]

A. Patent Exclusivity Encourages Invention, Development and Disclosure

Patents play additional roles in facilitating open innovation and technology transfer that go beyond defining rights and supporting ex ante patent transactions. They can encourage sellers of technology to invent in the first place and buyers of technology to make the purchase and invest in further development.[44] By giving a patent owner the right to exclude others from making, using or selling the invention for 20 years,[45] a patent enables him to capture returns from R&D investment by preventing others from appropriating the invention and driving down prices through infringing competition.[46]

For the patent system to promote innovation effectively, it must do more than encourage invention. It must also encourage the development of inventions to the point of

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[41]Miller at 154 (3/18/09); Griswold at 159 (3/18/09); OPEN INNOVATION: RESEARCHING A NEW PARADIGM, *supra* note 7, at 10; Chesbrough at 227-28 (5/4/09); Biotechnology Industry Organization (BIO) Comment at 2 (5/15/09).

[42]Phelps at 250 (5/4/09) (intellectual property rights are the necessary "scaffolding" to build a bridge between two parties).

[43]Ex ante patent transactions contrast with *ex post* patent transactions, which occur *after* the user of the technology has invested in its independent invention and development, without input from the patentee. In this case, the licensee/purchaser already practices the patented technology when approached by the patent owner, so the patent transaction transfers only a legal right, not technology. Chapter 2 discusses the effects of ex post patent transactions on innovation and competition among technologies.

[44]*See* Miller at 154 (3/18/09) (P&G's open innovation model depends on strong patent protection).

[45]35 U.S.C. § 154(a)(2).

[46]FREDERIC M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE (3d ed. 1990); Kenneth Arrow, *Economic Welfare and the Allocation of Resources for Innovation*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609 (1962). *See also* Thomson at 88-89 (5/4/09) (patent licensing provides revenues to cover R&D expense while preventing competitors from copying, "under sell[ing] your price and driv[ing] you out of business").

commercialization, either by the original inventor or through technology transfer by another firm.[47] An invention may require extensive development before any commercial application is possible.[48] In a modern economy, development accounts for more than three-fourths of industrial R&D expenditures.[49] One panelist explained, "[t]he creation of an idea is frequently the least costly and least time consuming aspect of product success. Development budgets vastly exceed research budgets in R&D intensive companies. Much more time and substantially more investment is required to commercialize a product or service embodying an invention than to create the invention in the first place."[50]

Through the patent, an inventor or purchaser of technology can carve out an exclusive area for development and commercialization in the hope of recouping development costs.[51] For instance, the ability of the patent system to protect early-stage invention and allow investors to recoup development costs is critical to the biopharmaceutical industry, where product development is lengthy, costly and unpredictable.[52] Panelists from a wide range of other industries, including the pharmaceutical and medical device industries,[53] diverse manufacturing

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[47]Kieff at 60 (3/19/09).

[48]The period between the basic research generating an invention and the innovation resulting in a commercializable product has been called the "Valley of Death" to dramatize the practical, technological and financial difficulties of early-stage development. *See* BRANSCOMB & AUERSWALD, *supra* note 2, at 35-41 (detailing those difficulties).

[49]SCHERER & ROSS, *supra* note 46, at 440.

[50]McCurdy at 43 (12/05/08) (IBM's development budget was 20 times greater than its research budget).

[51]SCHERER & ROSS, *supra* note 46, at 444; Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON., 265, 271-72, 276 (1977); Katznelson at 22-23 (3/18/09) (describing how development process evolves and the need to file continuation applications to protect potential products); Horton at 146-47 (3/18/09) (patent rights are needed to support "a return on the successful investments sufficient to make up for the unsuccessful investments").

[52]Shema at 15-16, 25 (5/4/09) ("ZymoGenetics and its products would not exist but for patents and but for confidence in a strong U.S. patent system."); Soderstrom at 9-10 (3/18/09) (initial biotech inventions are "a long way from the marketplace and . . . require a substantial investment over a period of time"); FED. TRADE COMM'N, EMERGING HEALTH CARE ISSUES: FOLLOW-ON BIOLOGIC DRUG COMPETITION 28-30 (June 2009) (describing the innovation cycle for biopharmaceuticals); Pharmaceutical Research and Manufacturers of American (PhRMA) Comment at 5-6 (2/10/09).

[53]Myers at 221 (3/18/09) ("[I]nnovation by our R&D operations and strong patent protection for that innovation is critical to [Pfizer's] success."); Jensen at 218 (3/18/09) (medical device).

industries,[54] and the IT sector[55] emphasized the importance of patents to a robust innovation strategy.[56]

Patents can also facilitate open innovation and technology transfer by disclosing available technology. The disclosure of scientific and technical information is part of the consideration that the inventor gives the public in exchange for the exclusive patent right. By offering protection from appropriation even after the invention becomes public, patents encourage inventors to make public what they might otherwise keep secret. That disclosure provides information to potential buyers and helps identify opportunities for collaboration.[57] Having patents and patent applications can also protect start-ups from copying when they must disclose their inventions to potential investors and collaborators.[58]

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[54]Griswold at 142-43 (3/18/09) (importance of patent system to 3M); Horton at 147 (3/18/09) (at GE, "we see IP as a very strong motivating force to drive innovation and investment in R&D"); Stec at 152 (3/18/09) ("patents are very important to Ford"); Phillips at 152 (3/18/09) ("But for a strong patent system in the United States, much of [Exxon's] technology would not be developed or if developed would not be licensed.").

[55]Rodgers at 136 (3/18/2009) ("Qualcomm's "R&D is dependent on a strong patent system."); Lutton at 90 (5/4/09) ("Patents do allow [Apple] to quantify, capture, protect, and in some cases license the value of our innovations."); Harris at 72 (3/18/09) (AOL holds 500 patents and uses patents to encourage innovation); Guitierrez at 93, 129-30 (5/4/09) (IP, including patents, is important for protecting innovation in the software industry where barriers to copying are low).

[56]As documented and discussed at length elsewhere, however, the role that patents play in protecting a company's technology and how that role compares to other means of recouping R&D costs varies by industry and by the particular circumstances of the company and technology involved. For instance, first mover advantage and trade secrets are often important methods of recouping R&D investments, especially in the IT sector and software industry. *See* 2003 FTC IP Report, ch. 3, at 1-3; JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008); DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT (2009); W.M. Cohen, R. R. Nelson, & J.P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*, (Nat'l Bureau of Econ. Research, Working Paper No. 7552, 2000).

[57]SCHERER & ROSS, *supra* note 46, at 444. *See* Katznelson at 40-42 (3/19/09) (reviewing patents provides technical information and leads to design-around); F. Scott Kieff*, Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327 (2006) (patents encourage collaboration).

[58]Katznelson at 27, 34 (3/18/09); Van Pelt at 119-20 (5/4/09) (start-ups in the IT sector may also seek patents to provide protection against a large firm adopting its technology); Arora et al., *supra* note 26*,* at 18-19; Hall at 204 (5/4/09).

B. Patenting by Small Companies and Start-ups

The ability of patents to play several roles in facilitating open innovation can be particularly important to small companies and start-ups because they often transfer their technology to larger companies for commercialization. That dynamic, coupled with the dramatic growth in the amount of R&D conducted by small companies, warrants a closer examination of how small companies pursue and use patents to further innovation. That information can help identify the issues that should inform any attempts to align patent and competition policy.

In some sectors, patenting by start-ups appears to be common. One study of start-ups founded between 1987 and 1999 revealed that patenting by start-ups was common in the medical device and semiconductor sectors.[59] A 2008 survey of high-technology entrepreneurs also found that patent ownership was widespread among responding venture capital-backed start-ups in the biotechnology, medical device and IT hardware industries, although less common in the software industry.[60] Patenting may be common because start-ups view it as an important means of securing competitive advantage from their technologies.[61]

Panelists representing start-ups explained that having patents was important to their ability to attract investment capital.[62] Without a product, one of a start-up's most valuable assets may be its patent estate, and investors may view patents as important for recouping their investment, according to panelists.[63] Investors may also view patents as a signal of technical

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[59]Among those that had received venture capital funding, for every $10 million invested, medical device start-ups filed an average of nine patents, semiconductor firms an average of 6.5 patents, and software firms an average of about three patents per $10 million invested. Ziedonis 188-93 (12/4/09); Rosemarie Ziedonis, *Startups as Sources of New Technologies . . . and Patents*, presented at FTC Hearing: The Evolving IP Marketpace (May 4 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/may4/docs/rziedonis.pdf. In each of the three sectors, larger, publicly traded firms have similar patenting rates per R&D spending dollar as do the start-ups of this study. Hall at 200-01 (5/4/09); *see* Bronwyn Hall, *FTC Panel on Markets for IP and Technology*, presented at FTC Hearing: The Evolving Marketplace (May 4, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/may4/docs/bhall.pdf.

[60]Graham et al., *supra* note 34, at 1277 tbl.1 (2010) (97% of responding, venture capital backed biotechnology start-ups sought patents; 94% for medical device; 91% of IT hardware; 67% of software). Start-ups without venture-backing were less likely to hold patents. *Id.*; *see also* BREITZMAN & HICKS, *supra* note 32 (reporting on patenting rates by small companies).

[61]Graham et al., *supra* note 34, at 1287-90.

[62]Sousa at 89, 116-17 (5/4/09) (explaining that investors in solar cell technology company wanted to see that a start-up has patents, but not all are sophisticated about the content and quality of individual patents); *but see* Devore at 43 (5/4/09) ("Most venture capitalists use attorneys who are trained . . . to actually look through the portfolios . . . freedom-to-operate analysis is getting more and more savvy.").

[63]Singer at 228-29 (3/18/09) ("[W]ithout that patent estate, there's really nothing for the venture firm to make an investment in."); Devore at 31 (5/4/09) (venture capitalists seek "the ability to claim the ongoing

merit and promise, or as a defensive measure supporting freedom to operate where the patents of competitors present a risk.[64] The founder of a medical device company elaborated, "the patent was very important because significant investment was necessary. . . . Every time we got serious with a venture capitalist, they wanted to understand if our patents had teeth, if we could really protect our innovation, and fortunately we did."[65] Panelists representing IT start-ups stated that those companies often needed patents to attract investment,[66] although the importance of having patents depended on the business model of the start-up.[67] A survey of start-up companies confirms that patents play an important role in attracting all types of investment, but in particular venture capital,[68] although the degree of importance appears to vary by industry.[69]

For some start-ups, one important feature of the patent system's exclusive right is that it can allow a new entrant to obtain and maintain a competitive advantage in the market. In some cases, when a new entrant challenges an entrenched incumbent with market power, the new entrant's patents may be critical to its ability to survive and inject competition into a product market. For instance, one panelist described how patent protection allowed him, as an independent inventor, to develop a medical device invention into a start-up and ultimately a NASDAQ-traded company. His product quickly took market share from the market leader because of its significant advantages. But that market leader began infringing his patent in an

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rights to any of the IP that comes from the future research"); Bellon at 227-28 (3/18/09).

[64]*See* Graham et al., *supra* note 34, at 1306-07; Graham at 217 (4/17/09); Cockburn at 218 (4/17/09); Van Pelt at 87 (5/4/09) (IT start-ups see patents as a risk factor as well); Lutton at 123 (5/4/09) ("The patent value and its necessity to an enterprise is judged really in relation to the business options that it creates.").

[65]Kiani at 13 (3/18/09); Bright at 30-31 (5/4/09) (At a medical device start-up, "the amount of time that I spend answering questions on the IP is significant.").

[66]Woolston at 33 (3/18/09) ("the world definitely changes when a patent issues"); Soderstrom at 35 (3/18/09) (in the IT sector, you "don't even have a conversation" with potential licensors and investors until a patent issues).

[67]Van Pelt at 118-19 (5/4/09) (explaining the role of patents in different business models).

[68]Graham et al., *supra* note 34, at 1306-07. *See also* PhRMA Comment at 6-7 (2/10/09); BIO Comment at 1-2 (5/15/09); American Intellectual Property Law Association Comment at 1-2 (5/15/09); Lasersohn at 185 (2/11/09). Patents appear less important but not irrelevant for attracting investment in software start-ups. Graham et al., *supra* note 34, at 1308-1309.

[69]Patents appear more important for attracting investment to biotechnology and medical device start-ups compared to software and Internet start-ups. Graham et al., *supra* note 34, at 1282-83; Lemley at 194 (4/17/09) (patents may help attract venture capital for software, but investors place less emphasis on validity and scope of the patents). *See also* Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-ups*, Research Paper No. 057 (2006), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=802806; R. J. Mann, *Do Patents Facilitate Financing in the Software Industry*?, 83 TEX. L. REV. 961 (2005).

attempt to win back customers. Patent litigation, although long and arduous, was successful. He explains, "we had many obstacles, and despite the frustrations we had with the patent system, without it, we wouldn't be here today."[70]

Many start-ups seek patents with less focus on entering the market alone and more to improving their chances of entering a successful acquisition or collaboration agreement with a larger firm.[71] For instance, panelists report that a biotech start-up's patent position is critical to the acquisition decision. Before making the acquisition, the larger company will evaluate whether the start-up's patents provide sufficient protection for an exclusive market position and whether it will have freedom to operate.[72] Panelists report that a start-up's patent position is important to acquisition decisions in the medical device industry also.[73]

Several factors may motivate the acquisition of a start-up in the IT industry, but panelists report that patents can sometimes be a significant element of the acquisition decision.[74] The more an acquisition focuses on obtaining and developing new technology, the more important a start-up's patent position will be.[75] One IT panelist described attractive acquisition targets as forward looking, with good technology, and a good patent position.[76] Patents can establish the "bona fides" of the acquisition target, especially when the acquiring company seeks to use the new technology to differentiate its product.[77] Another panelist explained the patent protection also gives the acquiring company "the opportunity to determine the future course of that technology beyond just what's inherent in trade secret and knowhow protection."[78]

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[70]Kiani at 12 (3/18/09); *see also id*. at 11-16; Masimo Home Page, http://www.masimo.com.

[71]Graham et al., *supra* note 34, at 49-51.

[72]Watt at 48 (5/4/09) (noting that Amgen will not invest in a start-up if the patents are not viable, if they do not afford freedom to operate, or if they cannot create sufficient exclusivity to reward the investment).

[73]Bright at 21-22 (5/4/09) (utilizing start-ups' intellectual property is efficient).

[74]Thompson at 107 (5/4/09); Lutton at 124 (5/4/09) (start-ups want to obtain patents because they preserve options that a later-acquiring entity may want to exploit).

[75]Van Pelt at 105, 118-19 (5/4/09); Rogers at 103-04 (3/18/09) (start-up's patent position is "absolutely critical" to acquisition decision); Sarboraria at 104 (3/18/09) (agrees); Krall at 106-07 (3/18/09) (acquisition strategy of adding complimentary technology requires an examination of the target's patent position).

[76]Rogers at 103 (3/18/09).

[77]Guitierrez at 102-03 (5/4/09).

[78]Lutton at 102 (5/4/09).

IV. AREAS OF PATENT POLICY THAT AFFECT OPEN INNOVATION AND TECHNOLOGY TRANSFER

The patent system contains multiple areas of law and policy that affect the ability of patents to facilitate open innovation, technology transfer and ex ante patent transactions. Chief among the attributes of a well-functioning patent system in this regard are appropriately granted, valid rights with well-defined boundaries that provide clear notice of what technology is protected and what is not. Panelists were clear about the importance of these attributes,[79] but they expressed concern about the uncertainty that pervades throughout the patent system and its effect on innovation and competition.[80]

Panelists identified the uncertain validity of issued patents as an important problem.[81] Purchasers of technology often want dependable patent coverage before investing the funds necessary for development and commercialization. They may decide against an investment if not sufficiently confident of the protection provided by key patents, according to some panelists.[82] Moreover, patents of questionable validity can distort competition and inhibit innovation by discouraging firms from conducting R&D in areas that the patent improperly covers and raising costs through litigation or unnecessary licensing.[83] The FTC's 2003 IP Report discusses the importance of patent quality for achieving a proper balance between exclusivity and competition. Because that report makes recommendations for improving patent quality,[84] this report will not

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[79]*See e.g.,* Phelps at 250 (5/4/09); Crean at 96-97 (5/4/09); Stern at 42-43 (3/19/09) (clear and timely patent rights are needed to facilitate a market for ideas); Horton at 164-65 (3/18/09) (clear patent rights are needed to define technology to be transferred and facilitate collaborative relationships); Bessen at 74-75 (3/19/09) (same).

[80]Wagner at 192 (4/17/09); Cockburn at 192-93 (4/17/09); Graham at 142-43 (4/17/09) (uncertainty over the scope and validity of patents adds transaction costs to technology transfer and injects inefficiencies into developing markets for IP).

[81]*Id.*; Chesbrough at 228 (5/4/09); Stern at 40-41 (3/19/09).

[82]*See* DeVore at 31 (5/4/09); Shema at 32 (5/4/09).

[83]2003 FTC IP Report, Exec. Summ., at 5-7.

[84]For instance, the report recommends that Congress establish a post-grant review procedure for challenging patent validity and change the standard of proof for invalidating patents from clear and convincing to preponderance of the evidence. 2003 FTC IP Report, Exec. Summ., at 5-7. Some panelists suggested a post-grant review procedure for patents as one way to address the problem of patent quality. Graham at 143 (4/17/09). Other panelists argue that a validity challenge to a start-up's patent can "shut down" its ability to raise the capital needed to develop an invention. Woolston at 57-60 (3/18/09) (discussing the problems of a start-up whose patent is undergoing re-examination in the patent office); Soderstrom at 60 (3/18/09).

delve into that issue. Patent quality remains vitally important for achieving the balance of exclusivity and competition that best enhances consumer welfare, however.

Panelists also identified ill-defined patent boundaries as an important issue for the patent system's ability to facilitate technology transfer and ex ante patent transactions.[85] Patents that do not clearly identify and define the protected technology undermine attempts at contracting and prevent potential licensors from finding available technologies through a patent search, according to panelists.[86] One panelist explained, "if you don't have IP rights that are understood by the purveyor of them and the receiver of them, you don't have the necessary scaffolding to build a good . . . bridge there between the two sides."[87] These concerns directly implicate the patent system's notice function, meaning the ability of a patent to inform the public of what technology it protects. Thus, improvements in the notice function, proposed in Chapter 3, can enhance the ability of the patent system to promote innovation through technology transfer.[88]

Remedies (damages and permanent injunctions) awarded following a finding of patent infringement presented another area of concern for panelists who represent small companies, start-ups and others that frequently engage in technology transfer. These panelists worried that recent proposals, described in Chapter 6, concerning damages could lead to systematically lower damage awards. They argued that reducing the value of patents or injecting additional uncertainty and complexity into damages calculations would undermine the patent system's incentives to invest in risky R&D. Lower damages would also encourage infringement rather than licensing, they argued.[89] Chapter 2 presents the competing concerns of other panelists that inflated damage awards distort competition among technologies and encourage unproductive litigation. Chapters 4 through 7 attempt to align patent damages law with competition policy by

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[85]Chesbrough at 228 (5/4/09); Stern at 40-41 (3/19/09).

[86]Lemley at 147-48 (4/17/09) (observing that notice problems contribute to "leav[ing] a lot of transactional money on the table in the sense that transactions that should have occurred, that would benefit both the buyer and seller, don't occur"); Bessen at 50 (3/19/09) ("deals don't happen that could happen"); Wagner at 192 (4/17/09) ("every bit of uncertainty . . . undermines" the ability to engage in technology transfer).

[87]Phelps at 250 (5/4/09).

[88]There is a trade-off between clear notice and the scope of patent protection, however. Changes that might significantly increase notice might not fully protect an invention and decrease incentives to innovate. Chapter 3, Section IV.B.1, *infra,* discusses this trade-off.

[89]Rhodes at 196 (2/11/09) (if you "decrease damages, you do lose part of the deterrent [e]ffect against infringement"); Lasersohn at 183 (2/11/09) ("If you do not allow inventors to capture the full economic value of their invention . . . . the amount of [projects] that will qualify for venture capital financing will decrease."); NanoBusiness Alliance Comment (2/15/09) ("Changes which reduce our ability to receive adequate compensation for infringement of those patents will make it difficult to protect our intellectual property, and therefore will discourage investment in our field.").

balancing these concerns and recommending principles that courts should apply when calculating damage awards.

Similarly, some panelists worried that under the Supreme Court's 2006 decision in *eBay, Inc. v. MercExchange, LLC*,[90] firms engaged in patent licensing might not be able to obtain a permanent injunction following a finding of infringement. In that case, the Court rejected a "general rule" supporting a permanent injunction and instead announced four equitable factors that a patentee must satisfy to obtain an injunction. Without the ability to obtain a permanent injunction, some panelists argued, their technology might be taken by manufacturing companies without a license.[91] This possibility could decrease the ability of start-ups and technology transfer companies to attract investment and enter into ex ante patent transactions, according to some panelists.[92] Others welcome *eBay's* flexibility because it decreases the ability of "non-practicing entities" to extract inflated royalties that distort competition among technologies based on the threat of preventing all sales of an infringing product.[93] Chapter 8 presents an analysis that balances these concerns and aligns injunction law with competition concerns.

V. CONCLUSION

The growth of open innovation, especially as evidenced by the dramatic rise in R&D by small companies, involves technology transfer. This trend benefits consumers in multiple ways, including increased levels of innovation and more competition in markets for technology. The patent system supports open innovation and technology transfer by encouraging investment in invention and development, by providing protected disclosure of technology and by defining rights that facilitate contracting.

The notice function of patents and remedies following infringement both implicate how well the patent system can fulfill these roles and promote innovation. Both areas of law also have a significant impact on how the patent system affects competition. The following chapters describe that impact. They also make recommendations for balancing concerns about the importance of patent exclusivity with competition and achieving the proper alignment of patent law and competition policy.

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[90]547 U.S. 388 (2006).

[91]Cassidy at 165-67 (2/12/09); Lord at 174-75 (12/11/09); Rhodes at 165 (2/11/09) (effective remedies for infringement needed to prevent free-riding on others' R&D).

[92]Ware at 148 (2/12/09) (expressing concern that "venture capitalists will take their funds elsewhere, and small biotech companies will shrink and die rather than grow"); Ware at 456 (2/12/09) (*eBay* could have an adverse effect on university licensing); Katznelson at 53-54 (3/18/09) (describing the effect of *eBay* on start-up licensing and business models); Lasersohn at 184 (2/11/09) (injunctions are critical to promoting investment in new technology).

[93]Chapter 8, Section III.C.

CHAPTER 2
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CHAPTER 2
THE EVOLVING PATENT MARKETPLACE: EX POST PATENT TRANSACTIONS

I. INTRODUCTION

While open innovation and technology transfer are important pathways of innovation, not all patent licensing and sales occur ex ante as part of a technology transfer agreement. In many cases, the licensee or purchaser already uses the patented technology when approached by the patent owner. What it lacks is a patent license to use the technology. These patent transactions occur ex post, *after* a firm has invested in creating, developing or commercializing the patented technology. It needs the ex post license to avoid liability even if it invented the technology independent of the patentee because patent infringement is a strict liability offense. A firm that makes, uses or sells patented technology is liable as an infringer, regardless of how it obtained the technology and whether it knew about the patent.[1]

The ability of patentees to assert their patents against infringers is important to the patent system's role in promoting innovation and facilitating technology transfer. The threat of a patent infringement suit deters infringement and safeguards the exclusivity that is the heart of the patent system. A business model based on invention followed by technology transfer can only succeed if a firm can prevent copying and recoup its investment in research and development (R&D).

But ex post licensing to manufacturers that sell products developed or obtained independently of the patentee can distort competition in technology markets and deter innovation. The failure of the patentee and manufacturer to license ex ante with technology transfer results in duplicated R&D effort. When a manufacturer chooses technology for a product design without knowledge of a later-asserted patent, it makes that choice without important cost information, which deprives consumers of the benefits of competition in the technology market. If the manufacturer has sunk costs into using the technology, the patentee can use that investment as negotiating leverage for a higher royalty than the patented technology could have commanded ex ante, when competing with alternatives. The increased uncertainty and higher costs associated with ex post licensing can deter innovation by manufacturers.

Increasing activity by patent assertion entities (PAEs)[2] in the information technology (IT) industry has amplified concerns about the effects of ex post patent transactions on innovation and

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[1] *See, e.g.*, *In re* Seagate Techs., LLC, 497 F.3d 1360, 1368 (Fed. Cir. 2007) (en banc). *See also infra* Chapter 3, at 77.

[2] This report uses the term "patent assertion entity" (PAE) rather than the more common "non-practicing entity" (NPE) to refer to firms whose business model focuses on purchasing and asserting patents that they typically purchase. Taken literally, the term NPE encompasses patent owners that primarily seek to develop and transfer technology, such as universities and semiconductor design houses. Patent assertion entities do not include this latter group. *See infra* Section IV.A of this chapter.

competition. The business model of PAEs focuses on purchasing and asserting patents against manufacturers already using the technology, rather than developing and transferring technology. Some argue that PAEs encourage innovation by compensating inventors, but this argument fails to account for the fact that invention is only the first step in a long process of innovation. Even if PAEs arguably encourage invention, they can deter innovation by raising costs without making a technological contribution.

This chapter examines the causes and effects of ex post patent transactions, including the evolution of the PAE business model. The goal is to identify areas of patent law where improvements could lessen their detrimental effects without undermining the power of the exclusive patent right to promote innovation. Improving patent quality is of paramount importance, as discussed in the 2003 FTC IP Report, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*.[3] Assertion of invalid patents raises costs and deters innovation through licensing and litigation.

Problems with the patent system's notice function are also important. Manufacturers often license ex post because they were not aware of the patent ex ante. Multiple factors can contribute to notice failure, including overbroad, vague claims, the large number of patents potentially relevant to information technology (IT) products, and the pendency of patent applications in the Patent and Trademark Office (PTO). Improvements to the notice function, discussed in Chapter 3, could help decrease the need for ex post transactions while supporting ex ante technology transfer agreements and innovation.

Patent remedies law can unduly encourage ex post transactions when it results in patentee compensation that exceeds the economic value of the invention. If remedies law awards more after a finding of infringement than the patented technology could have commanded when competing with alternatives ex ante, it creates incentives for patentees to wait and seek ex post licensing. Any adjustments in remedies law must be careful not to undermine the patent system's incentives to innovate, however. Chapters 4-8 of this report draw on the insights and information of this chapter and Chapter 1 in analyzing the operation of patent remedies and making recommendations to improve the alignment of those areas of law with competition policy.

II. CONCERNS WITH EX POST PATENT TRANSACTIONS

Ex post patent transactions can have both beneficial and detrimental effects on innovation where the licensee obtained the technology independent of the patent owner. They can also distort competition in markets for technology.

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[3] FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, Exec. Summ., at 1 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

A. Beneficial Effects

The ability of patentees to allege patent infringement and enter ex post patent transactions is a necessary feature supporting the patent system's incentives to innovate. The patent right cannot be exclusive without it. A patent suit can stop infringement and restore an exclusive market position. The threat of suit can deter infringement and enable a patent owner to market its product free of copycat competitors.[4] Alternatively, threat of suit can lead an infringer to pay royalties to use the invention. Either royalty payments or an exclusive market position can allow a patentee to capture returns from its investment in making and developing an invention, which creates incentives for innovation.[5]

Ex post patent assertions and transactions also provide essential support to business models based on ex ante licensing and technology transfer. A panelist from a specialized R&D firm that licenses its technology to manufacturing firms explained that "there isn't another choice other than to litigate" if it "cannot negotiate licenses with people" who use its technology.[6] Another panelist argued that the ability to sue for patent damages was necessary to effectively negotiate technology transfer agreements, since otherwise large firms might simply copy the technology and refuse to pay.[7]

B. Detrimental Effects

When a company commercializes technology that it invented independently and later faces a patent assertion, the resulting ex post license provides no direct benefit to consumers, however.[8] The patentee's act of invention did not contribute to the success of the manufacturer's new product. A manufacturer's royalty payment may raise costs to consumers, but it obtains only the avoidance of infringement litigation, not the benefit of the technology itself. Moreover, the

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[4]*See* Chapter 4 (discussing the role of remedies in safeguarding the patent system's incentives to innovate and deterring infringement); Chapter 8, Section IV.A (discussing the role of injunctions in deterring infringement). *See also* Epstein at 108-09 (5/4/09) (emphasizing the importance of patent protection where a technology can be easily copied once it is seen in the marketplace).

[5]*See* Chapter 1, Section II.A.

[6]Maghame at 169-70 (2/11/09).

[7]Lord at 174-75 (2/11/09) (explaining that potential licensors might say "thank you for teaching us about your technology, we're going to go ahead to use it and don't call us, we'll call you").

[8]This analysis of the detrimental effects of ex post patent transactions does not apply when an infringer copied the patentee's technology directly (e.g., by reading the patent) or indirectly (e.g., by copying it from products or services that resulted from the patentee's discovery).

failure to transfer the technology ex ante and the corresponding duplication of inventive effort by the infringer and patentee can reflect a social loss and "inefficient commercialization."[9]

In this circumstance, patent litigation or royalty payments increase the manufacturer's costs and risk, deterring innovation.[10] Those costs reduce the manufacturer's returns on its innovative effort, which could lower its incentive or ability to make future investments in R&D.[11] The potential for later patent assertions creates a risk that a manufacturer's costs will increase and its return on investment will decrease after it has developed and commercialized a product. That uncertainty can also deter the investment in the research, development and commercialization necessary to develop innovative products.[12] Panelists and commentators argued that such patent transactions deter rather than promote innovation by raising costs through a "tax."[13] Some have characterized patent assertion against independently created technology as pure rent-seeking.[14]

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[9]Stern at 43 (3/19/09) ("But if everything is being done ex-post, what you essentially have is inefficient commercialization followed – because the technology is not being transferred effectively ex-ante – followed by costly litigation.").

[10]*See generally infra* Chapter 3, Section II (discussing how poor notice can inhibit innovation and competition).

[11]*See, e.g.*, Yen at 51 (12/5/08) (estimating average defense costs for large IT companies of "between $5 to 10 million" and stating that "every assertion we receive distracts our engineers from innovation and productive efforts" that could "otherwise be spent on developing new products"); Quatela at 74 (4/17/09) (describing how litigation diverts engineering resources away from innovation); Kappos at 122 (3/19/09).

[12]*See* Kappos at 132 (3/19/09) (uncertainty regarding patent scope can make firms "steer clear of innovations that [they would] otherwise want to invest in"); Menell at 127-28 (5/5/09) (the inability to know the potential damages that might result from projects under development "just chills . . . innovation unnecessarily").

[13]*See* Daniel P. McCurdy, *Patent Trolls Erode the Foundation of the U.S. Patent System*, Sci. Progress, Fall & Winter 2008/2009 at 82 (the patent system's treatment of NPEs "can actually serve to diminish competition, and increase prices to consumers, by rewarding entities to not put products and services in the market but rather taxing those that do"), *available at* http://www.scienceprogress.org/wp-content/uploads/2009/01/issue2/mccurdy.pdf; Brian Kahin, Written Submission, *The Patent Ecosystem in IT: Business Practice and Arbitrage*, at 10-12 (Dec. 5, 2008), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/dec5/docs/bkahin2.pdf.

[14]*See* Merges at 254 (5/4/09); Ziedonis at 259 (5/4/09) (contrasting a "collaborative model" using patents as "scaffolding" with "pure rent-seeking" designed simply to enforce patents); Software & Information Industry Association Comment at 2, 3 (2/5/09) (NPEs "typically do not innovate," but rather "simply wait for their targets to be successful"); Valz at 239 (12/5/08) ("NPE litigation does suppress value-added licensing activity and drains resources from marketplaces"); Kahin at 63 (12/5/08) ("[t]here's an incentive to hold back your patents until the technology represented by the patent is embedded in a product or a standard or the marketplace"); Agisim at 211 (2/11/09).

Ex post patent transactions can also distort competition in technology markets and deprive consumers of the benefits of that competition. A manufacturing company may not learn the true cost of its choice among competing technologies when designing its product until the ex post transaction is complete.[15] If the company had been aware that a particular technology was subject to patent licensing fees, it might have adopted a lower-cost technology. Or it could have negotiated lower fees based on the availability of alternatives. Redesign of the product may be costly following commercialization, leading the company to pay the licensing fee rather than alter its product.[16] Thus, the product may be more costly to produce with the patented technology than it would have been if there had been full and effective competition in the technology market.

III. CAUSES OF EX POST TRANSACTIONS

A better alignment of the patent system with competition policy could help address concerns about the detrimental effects of ex post patent transactions on innovation and competition while preserving the benefits of these transactions. Identifying the adjustments to patent law and policy that might accomplish this goal requires that we first explore the causes of ex post transactions.

A. Patent Notice Problems and Patent Quality

In some industries, manufacturers routinely search for patents they must license prior to developing or launching a new product to ensure their freedom to operate. These steps minimize the risk of later patent assertions and ex post transactions.[17] A potential licensee that has found relevant patents can then negotiate a license with the patent holder, adopt alternative, noninfringing technology or abandon the project. The competition between the patented technology and alternatives constrains the royalties that a prospective licensee would pay to license the patent.[18] Consumers can benefit from competition through lower prices or better products.

Ex post patent transactions that can distort competition arise in part from the failure of manufacturing firms to identify patents that cover their products and clear patent rights in

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[15] *See infra* Chapter 3, at 6-7.

[16] *See infra* Chapter 3, Section II (discussing costs of disputes after product launch); Chapter 8, Section IV.B (discussing patent hold-up).

[17] *See* McNelis at 24-27 (5/5/09) (describing the differences in freedom to operate searches in the IT and life sciences sectors); Durie at 17-19 (5/5/09) (describing freedom to operate searches in the pharmaceutical, biotechnology and IT sectors). *See also infra* Chapter 3, Section III.C.

[18] *See* Chapter 7, Section III.A; Gregory K. Leonard & Lauren J. Stiroh, *A Practical Guide to Damages*, *in* ECONOMIC APPROACH TO INTELLECTUAL PROPERTY POLICY, LITIGATION AND MANAGEMENT 27, 52-58 (Gregory K. Leonard & Lauren J. Stiroh eds., 2005).

advance of commercialization.[19] Manufacturers can fail to identify relevant patents for numerous reasons. For instance, panelists argued that ambiguous claim scope and patent assertions that unreasonably stretched the reach of claims to cover seemingly unrelated products make it impossible to identify all patents that they might eventually face in litigation.[20] In some cases, a patent application may be pending in the Patent Office when the manufacturer searches.

These concerns directly implicate the patent system's notice function. Thus, improvements to the notice function, proposed in Chapter 3, could help decrease the extent of ex post patent transactions and better align the patent system with competition. At the same time, improvements to the patent notice function can facilitate ex ante patent transactions and technology transfer, as discussed in Chapter 1. This result could benefit both innovation and competition.

Panelists from the IT industry explained that manufacturers face an additional challenge in trying to identify and clear patent rights due to the large number of patents that cover most IT products. They maintained that an enormous number of potentially relevant, overlapping patents make identifying the applicable rights prior to product launch prohibitively costly.[21] The IT patent landscape involves products containing a multitude of components, each covered by numerous patents. The high level of patenting in the IT industry[22] is in part attributable to the incremental nature of innovation in IT products, where small changes can be patentable. This contrasts with the relationship between products and patents in the pharmaceutical and biotech

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[19]*See* Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1445 tbl.1 (2009) (reporting findings from a study indicating that in the vast majority of cases, defendants do not have information about the patent prior to the patent holder asserting a claim of infringement).

[20]Harris at 123 (3/18/09) (reporting that searches are unlikely to identify patents that might be asserted, since claim scope is often stretched unpredictably); Luftman at 220-21 (2/12/09) (describing NPE assertion of patents covering smart cards against smart phones).

[21]*See, e.g.*, Durie at 18 (5/5/09) ("In my experience on the IT side, it is virtually impossible to conduct a meaningful patent clearance" for complex, multicomponent products.); Krall at 114-15 (3/18/09) ("[i]n the tech industry doing [patent clearance] searches is almost cost-prohibitive"); Sarboraria at 120 (3/18/09); Phelps at 262-63 (5/4/09) (doing a patent clearance "on the front end" is "pretty ineffective" due to the number of patents and many different entities who might have relevant patents). *See also* Chapter 3, Section II.C.

[22]In 2009, IT companies held all of the first ten positions in the list of top patent owners, and nearly all of the top 25. *See* Intellectual Property Owners Ass'n, Top 300 Organizations Granted U.S. Patents in 2009 (May 24, 2010), *available at* http://www.ipo.org/AM/Template.cfm?Section=Top_300_Patent_Owners&CONTENTID=25899&TEMPLATE=/CM/ContentDisplay.cfm&bcsi_scan_1238f9a5e0c9665c=VpkygkCf8Ar0tgDOiVjpyltE0VQBAAAAY1ADAA==&bcsi_scan_filename=Template.cfm. *See also* Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 46 (2005) (IBM, the world leader, "has amassed over 25,000 U.S. patents" since 1994).

industries where innovation is generally directed at producing a discrete product covered by a small number of patents.[23]

The high level of patenting in the IT industry also results from the IT operating companies' strategy of protecting their freedom to operate by developing large defensive patent portfolios that they can assert against a competitor that brings an infringement action.[24] One commentator explains that this strategy usually involves acquiring a large quantity of often low quality patents, meaning those that are vague, likely invalid, or that provide narrow coverage of a feature having little commercial value.[25] Indeed, IT products are often surrounded by "patent thickets" – densely overlapping patent rights held by multiple patent owners.[26]

While improving the notice function of patents would help address this problem, raising patent quality will also be central to any solution. Doing so would decrease the number of overbroad or invalid patents that can be asserted against products on the market. IT panelists complained that they frequently faced suits with little merit based on questionable patents, seeking high settlements that reflect the high cost of defending these actions[27] and uncertainty regarding litigation outcomes and potential damage awards.[28] The FTC's 2003 IP Report

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[23] *See* DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 53-54 (2009). For a broader discussion of the differences between industries with repect to innovation and the patent system, see *id.*, Chapters 4-5.

[24]*See, e.g.*, 2003 FTC IP Report, ch. 3, at 35; Krall at 86 (3/18/09) (one reason "to have a portfolio [is] that you can use [it] to defend yourself or defend your customers or your technology communities if they are approached or if they have patent assertions against them by your competitors"); Gutierrez at 128 (5/4/09) (portfolio size "absolutely matter[s]").

[25]Parchomovsky & Wagner, *supra* note 22, at 69 (describing "the problem of patent portfolios, where large numbers of low-quality patents are obtained with little regard to their validity or actual value," due to their value as an element in a portfolio).

[26]Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, *in* INNOVATION POLICY AND THE ECONOMY 119 (Adam B. Jaffe et al. eds., 2000); 2003 FTC IP Report, ch. 3, at 34, 52; Thorne at 117 (3/18/09) ("In the high tech business a simple product can have a thousand or more patents [read] on it . . . ."); *see also* Cockburn at 232-33 (4/17/09) (defining a patent thicket as "a large number of patents, . . . potentially overlapping, held by numerous people").

[27]*See, e.g.*, Durie at 69 (5/5/09) (estimating normal patent litigation costs of $4 to $5 million). The American Intellectual Property Law Association's most recent economic survey found that for patent litigations in which over $25 million was at stake, the cost of litigating a case to completion averaged $6.25 million. AM. INTELL. PROP. LAW ASS'N., REPORT OF THE ECONOMIC SURVEY I-131 (2009).

[28]*See, e.g.*, Yen at 51-53 (12/5/08) (the difficulty of challenging "patents of questionable validity and weak arguments of infringement" together with "uncertainty in the calculation of damages" lead IT defendants to settle "unmeritorious" infringement claims and plaintiffs to "request royalties of a magnitude far beyond the . . . fair value of the alleged use"); Slifer at 131-32 (3/18/09) ("uncertainty of

explains that licensing fees for questionable patents can deter innovation and makes recommendations for improving patent quality.[29]

B. Patent Remedies

Panelists from the IT industry and commentators assert that patent damages law plays an important role in motivating ex post patent transactions. Ex ante licensing negotiations are largely driven by the parties' views on the likely commercial value of the technology in light of available alternatives. Ex post licensing negotiations, on the other hand, are largely driven by how the parties believe they will fare in infringement litigation, including the size of any potential damages award. Although most patent assertions conclude with license agreements or settlements, court awarded damages and injunctive relief "provid[e] a benchmark" for these negotiations.[30] IT panelists suggested that patent owners' expectations for recovery in their industry may be unduly affected by very large, well-publicized damage awards that they called "outlier" jury verdicts.[31] They argued the increase in patent assertions, patent litigation, and ex post patent transactions in their industry is "driven largely by the litigation process and the promise of recovery," the hope for a large damage award.[32]

Damage awards that exceed the economic value of the patent, i.e., the amount a patent license could have commanded in an ex ante patent transaction when the patented technology competed with alternatives, can distort competition among technologies. Such damage awards

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how the patent is going to be interpreted [and] the uncertainty of how a jury is going to view damages" makes NPE litigation a "good business model"); Simon at 161-62, 202 (2/11/09); Massaroni at 192-93 (2/12/10) (suggesting that hold-up in the IT industry generally involves the assertion of "a patent of dubious quality and prominence" which is "not infrequently the product of a contorted history of continuations"). *But cf.* C.J. Michel at 104-05 (12/5/08) (suggesting that it is unhelpful to speak of patents that are "'lacking quality'" or "'questionable'").

[29]2003 FTC IP Report, Exec. Summ., at 5.

[30]Underweiser at 159-60 (2/11/09); Marian Underweiser, *Towards an Efficient Market for Innovation* 1, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009) ("Court awarded reasonable royalty determinations provide the backdrop against which all patent settlements and patent licensing activities are measured . . . ."), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/feb11/docs/munderweiser.pdf.

[31]Reines at 33 (2/11/09) ("many of the cases never get to complaint and never get to trial, so that . . . anomalous outcomes at trial or fear of anomalous outcomes at trial can drive a whole range of decision-making that's all the way upstream").

[32]Lutton at 91 (5/4/09). *See also* Amster at 144 (5/4/09); Gutierrez at 143 (5/4/09) (explosion in litigation is causing inflation in the market for patents to some extent); Crean at 135 (5/4/09) ("if your plan is not to go out and license and litigate or have an offensive licensing program, it at times can be challenging to justify the purchase price that is currently in the marketplace").

can also encourage ex post transactions over ex ante transactions accompanied by technology transfer. As explained in Chapter 4, for these reasons, it is important that damage awards match the ex ante economic value of the patent. On the other hand, it is important that patent damages preserve the patent system's ability to create incentives for invention and innovation, as discussed in Chapter 1. Chapters 4 through 7 provide principles and recommendations on how patent damages law can balance these competing concerns.

Under some circumstances, the grant or threat of a permanent injunction can lead an infringer to pay higher royalties than it would pay in a competitive market for a patented invention. This outcome also can encourage patentees to pursue ex post transactions. At the time a manufacturer faces an infringement allegation, switching to an alternative technology may be very expensive if it has sunk costs in product design and 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 economic value of the patented invention compared to alternatives, but also a portion of the costs that the infringer would incur if it were enjoined and had to switch, called the hold-up value.[33] As discussed in Chapter 8, one challenge for injunction analysis under *eBay, Inc. v. MercExchange, LLC*[34] is to protect the critical importance of patent exclusivity for innovation while recognizing that, in some instances, patent hold-up through injunctions can undermine innovation and harm consumers.

IV. DEVELOPMENTS IN SECONDARY PATENT MARKETS BASED ON EX POST PATENT TRANSACTIONS

Concerns about ex post patent transactions have increased in recent years because the extent and nature of these transactions have changed, at least in the IT industry. Patents in the IT industry are often bought, sold and licensed as assets whose value depends on the amount of rent that can be extracted from manufacturers already using the technology. Such ex post transactions form a secondary market for patents that has a very different impact on innovation and competition than does the market for technology discussed in Chapter 1. Examining the operation of this secondary market and the players in it helps shed light on the extent of the problems associated with ex post patent transactions and the need to examine patent law in light of these problems.

A. Increasing Litigation and Patent Sales in the IT Industry

Panelists from IT manufacturing companies uniformly reported a dramatic increase in the number of patent infringement lawsuits filed against their companies compared to seven to ten

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[33] *See* Chapter 8, Sections III & IV (describing the problem of hold-up effectuated by the threat or award of a permanent injunction).

[34] 547 U.S. 388 (2006).

years ago. For several companies, the number of lawsuits at least quadrupled in that period.[35] IT companies also report that the number of patents offered to them for purchase or license has significantly increased.[36] Panelists noted that some of the offerings are "barely disguised assertions" threatening that "if you don't buy these patents somebody else will who will sue you."[37] Some offers include claim charts showing how the company's products infringe or draft patent infringement complaints.[38] An IT company's primary interest in purchasing such patents is usually to avoid suit.[39] Panelists complained that evaluating this deluge of patent offers and fighting patent litigation diverts resources from R&D efforts.[40] Moreover, the patent licenses and purchases resulting from these assertions are primarily ex post transactions in which the manufacturer pays for technology that it is already using without any knowledge of the patent, according to panelists.[41]

Recent scholarship suggests that these patent assertions are unlikely to stem from copying. According to one study, patentees rarely allege that defendants in patent litigation have

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[35]Yen at 49 (12/5/08) (reporting a "quadrupling in the past five years" of patent litigation at Cisco where "virtually all of these cases have been with non-practicing entities"); Lutton at 91 (5/4/09) (reporting that Apple faced seven IP suits in 2006 compared to 30 in 2009); Sarboraria at 75 (3/18/09) (Oracle had no IP litigations prior to 2000 and had over 20 in 2009, nearly all NPE); Luftman at 154 (2/12/09) (Palm facing six infringement suits in 2004 compared to 15 in 2009, all but one involving NPEs); Harris at 130 (3/18/09) (AOL faces 30% increases in patent litigation each year for last two years). While overall patent litigation has not risen during this period, one researcher reports that the number of defendants named in patent litigation has increased by approximately 50% since 2004. *See* Kyle Jensen, Counting Defendants in Patent Litigation (Oct. 27, 2010), *available at* http://www.patentlyo.com/patent/2010/10/guest-post-counting-defendants-in-patent-litigation.html.

[36]Sarboraria at 93 (3/18/09) (reporting a "tremendous increase in the offers to sell patents"); Slifer at 88 (3/18/09) (reporting offers of portfolios "at least weekly"); Krall at 91 (3/18/09); Thorne at 90 (3/18/09) (estimating that there were between 10,000 and 20,000 patents potentially relevant to Verizon's business for sale in 2008).

[37]Krall at 91-92 (3/18/09); *see also* Yen at 49-50 (12/5/08).

[38]Lutton at 147 (5/4/09).

[39]Slifer at 98-99 (3/18/09) ("have to see if there are [patents] in there that would be critical to what we're doing and what might fall into the wrong hands"); Thorne at 97-98 (3/18/09) ("We're only buying things that we think might be asserted against us."); Krall at 99-100 (3/18/09); Bergelt at 36 (4/17/09) (patents acquired by open source affiliate because IP "could potentially represent a threat").

[40]Krall at 91 (3/18/09) (time devoted to review has doubled); Thorne at 95-96 ("very hard with the volume of patents to make a realistic decision" since evaluating each patent costs "at least the small number of thousands of dollars per patent"). *See also supra* at notes 11, 27-28.

[41]Sarboraria at 129 (3/18/09) (reporting that in the "vast majority" of cases "the first notice of the patent was the filing of the lawsuit"); *see also* Yen at 50-51 (12/5/08); Krall at 127-28 (3/18/09); Thorne at 129 (3/18/09).

copied the patented technology, as might be expected if infringement had occurred after technology transfer negotiations. Based on examination of complaints and other court documents, the study found indications of potential copying claims in only 10.9% of all actions, and only 3.2% of IT sector actions.[42] Moreover, only 4.2% of IT sector cases included allegations indicating that there had been any prior business dealing between the parties.[43]

According to panelists, the increase in IT litigation and patents offered for sale can be almost entirely attributed to assertions made by patent assertion entities – typically called non-practicing entities – rather than competitors.[44] The literal definition of non-practicing entity is broad enough to encompass the start-ups, universities, and design houses discussed in Chapter 1. But the term NPE also commonly refers to firms that obtain nearly all of their patents through acquisition or purchase in order to assert them against manufacturers.[45] Such firms are sometimes called "trolls" by detractors.[46] For clarity, this report refers to these firms as patent assertion entities (PAEs).[47] For the most part, PAEs purchase patents, and then sell or license them as assets whose values are based on the amount of licensing fees that can be extracted from operating companies already using and marketing the technology, or they facilitate others who make the assertions.[48] PAEs can also include patentees that "have turned their focus away from

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[42]Cotropia & Lemley, *supra* note 19, at 1445 tbl.1.

[43]*Id*. Concerns about the detrimental effects of ex post patent transactions do not apply when accused infringer has copied technology from a patent directly or indirectly. *See supra* note 8.

[44]Thorne at 81 (3/18/09) (reporting that all but one of two dozen patent suits pending against Verizon were brought by NPEs who purchase patents to assert them); Sarboraria at 75 (3/18/09) ("virtually all" patent assertions against Oracle were brought by NPEs); Krall at 127 (3/18/09) (NPEs account for a "majority" of the patent litigation against Sun); Harris at 72 (3/18/09) (NPEs "primarily" responsible for patent assertions faced by AOL).

[45]Some describe NPEs (or PAEs) as employing a "form of arbitrage [that] involves buying patents from those poorly positioned to exploit them, and licensing them to or asserting them against primarily large enterprises, which are in fact making use of the patented technology." Robert P. Merges, *The Trouble with Trolls: Innovation, Rent-Seeking, and Patent Law Reform*, 24 BERKELEY TECH. L.J. 1583, 1588 (2009) (summarizing the views of other commentators and criticizing their suggestions that such an explanation justifies such transactions as socially desirable).

[46]*See* Merges at 247 (5/4/09) ("[I]n a lot of patent troll situations [] what's bothersome about them is that, in fact, there is no information changing hands; it's strictly a legal relationship. It's strictly an agreement to make a lawsuit go away.").

[47]Colleen V. Chien, *From Arms Race to Marketplace: The New Complex Patent Ecosystem and Its Implications for the Patent System*, 62 HASTINGS L.J. 297, 328 (2010) (defining patent assertion entities as entities that "are focused on the enforcement, rather than the active development or commercialization of their patents").

[48]*See* Hoffman at 119 (4/17/09) ("[I]t's the size of the market that potentially applies to the patent . . . . [I]t has to do with essentially how effective will [the claims] be in an assertion strategy? How likely am I

the active development or practice of their patents and have moved towards patent enforcement."[49] Some commentators describe business strategies built around "being infringed,"[50] while others identify businesses that operate as "opportunistic litigation mills" and do not innovate.[51] Although most PAEs suits are against large companies, they have asserted patents against small companies and start-ups as well.[52]

PAEs have become pivotal players in the market for patents, especially in the IT sector.[53] A recent survey showed that nearly one-third of IT licensing executives reported that "trolls" had had a significant impact on their organization; the corresponding figure did not exceed five percent for any other industry.[54] One commentator estimates that PAEs have accounted for about 90% of patents purchased at auction in the past few years.[55] Although data tracking the PAEs in

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to generate either damages or royalties if I assert these patents and how big is the market?"); Valz at 236 (12/5/08) (NPEs "have fueled a secondary market for patents which has really intensified this whole idea of licensing without true technology transfer which helps to support innovation").

[49]Chien, *supra* note 47, at 329.

[50]Brian Kahin, *Patents and Diversity in Innovation*, 13 MICH. TELECOMM. TECH. L. REV. 389 (2007) ("'Being infringed' has become a profitable business model for entities with no products on the market. Variations on this model include attacking deep-pocketed companies with large sunk investments in products, ambushing widely implemented industry standards . . . , and pursuing licensing fees from small users that lack the resources to litigate.") (*quoting* Markus G. Reitzig, Joachim Henkel & Christopher Heath, *On Sharks, Trolls, and Other Patent Animals – 'Being Infringed' as a Normatively Induced Innovation Exploitation Strategy*, *available at* http://ssrn.com/abstract=885914).

[51]Merges, *supra* note 45, at 1599.

[52]*See, e.g.*, Joe Mullin, *The Prior Art, Patent-Litigation Weekly: The Photo-Sharing Files* (May 29, 2009) (reporting on litigation brought by an NPE on image-sharing patents against 60 companies, mainly "small, family-run start-ups"), *available at* http://thepriorart.typepad.com/the_prior_art/2009/05/patentlitigation-weekly-the-photosharing-files.html.

[53]Chien, *supra* note 47, at 312, 315, 341-44 (explaining forces that have led to increase in PAE activity and their role in the secondary patent market); *see* Coalition for Patent Fairness and the Business Software Alliance Comment (2/5/09) at 3 ("The growth of NPEs represents by far the most significant change in the patent marketplace."). Patent Freedom classifies over 90% of the NPE actions it has identified as involved the IT sector. Patent Freedom, Key Information By Product Category, *available at* https://www.patentfreedom.com/research-pc.html.

[54]Iain M. Cockburn, *Licensing: A View from the Trenches* 7, presented at FTC Hearing: The Evolving IP Marketplace (April 17, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/apr17/docs/icockburn.pdf. *See also* Cockburn at 158-59 (4/17/09).

[55]Chien, *supra* note 47, at 314-15.

the patent marketplace are not available, panelists and commentators have emphasized the central role they have played in expanding the demand for patents in the marketplace.[56]

Researchers have compiled data on the litigation activity of PAEs and the somewhat more broadly-defined group covering all NPEs. Patent Freedom, an IT industry group, reports that the number of patent infringement cases filed by NPEs more than doubled from about 200 during the 2002-2004 period to over 500 in 2008.[57] While the total number of litigations decreased by about 20% to above 400 between 2008 and 2010, the number of operating companies litigating with NPEs increased by over 25% during the same two-year period.[58] One study found that PAE-initiated lawsuits accounted for 26% of the defendants sued on computer-related patent actions brought between January 2000 and March 2008, including 30% for software and 40% for financial services.[59] Another found that NPEs together represent over 80% of the suits filed involving the most-litigated patents (measured as the 106 patents found to have been litigated eight or more times between 2000 and 2007), concluding that "[n]onpracticing entities are clearly an important phenomenon in the modern patent system."[60]

B. Evolving Patent Assertion Business Models

The purchases, patent assertions, ex post patent transactions, and litigation activities of PAEs take place in a secondary market for patents that includes many types of actors. New

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[56] *See* Malackowski at 49 (4/17/09) ("aggregators who brought capital [] attracted the attention of sellers"); Chien, *supra* note 47, at 312 ("IV [Intellectual Ventures] has had a tremendous influence in developing the market"); Hoffman at 46 (4/17/09); Harris at 95 (3/18/09) (reporting that "the actual purchasing market is really drying up" because "patent aggregators aren't buying as many").

[57] Patent Freedom, Patent Lawsuits Involving NPEs Over Time, *available at* https://www.patentfreedom.com/research-lot.html (cautioning that the data can include duplicates due, e.g., to related cases and transfers, and fail to include some actions).

[58] *Id*.

[59] Colleen V. Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents*, 87 N.C. L. REV. 1571, 1601 tbl. 4 (2009). This review found that NPEs (defined consistently with PAEs) accounted for a smaller portion – 17% – of all computer-related patent actions over that period, reflecting the tendency of NPEs to sue multiple defendants in a single action. *Id.* at 1600, tbl. 3.

[60] John R. Allison, Mark A. Lemley & Joshua Walker, *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 26, 32 (2009). In a subsequent study, these authors found that NPEs, who mainly assert patents against IT products, win only about 10% of their litigated patent cases, which is significantly lower than the win rate of other patentees. John R. Allison, Mark A. Lemley & Joshua Walker, *Patent Quality and Settlement among Repeat Patent Litigants* (Stanford Law and Economics Olin Working Paper, No. 398, at 10 tbl. 3, Jan. 29, 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1677785.

business models, some of which are increasingly sophisticated and complex,[61] have emerged over the past ten years to capitalize on that market. One panelist described 17 business models designed to promote the sale and/or licensing of patent assets.[62] These business models fall into several broad categories, described below, although an individual firm's activities may place it in more than one category. Knowledge of this fast-changing area can help inform policy responses to the detrimental effects of ex post patent transactions.

Patent enforcement and licensing companies. These firms acquire an interest in patents and assert them against operating companies that they claim are infringing. When operating companies refuse to license, the patent enforcement firms assemble the legal and financial resources required to pursue patent litigation. Patent enforcement firms may also file an infringement lawsuit before opening licensing negotiations.[63] Typically, their primary activities are buying, selling, licensing and litigating patents.[64] They do not conduct research, development, technology transfer or commercialization activities. Some patent enforcement firms have been formed by patent litigation attorneys.[65]

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[61]*See generally* Chien, *supra* note 47, at 312, 315, 326-31, 341-44; Peter N. Detkin, *Leveling the Patent Playing Field*, 6 J. MARSHALL REV. INTELL. PROP. L. 636 (2007); Raymond Millien & Ron Laurie, *Meet the Middlemen*, 28 INTELL. ASSET MANAGEMENT MAGAZINE 53, 53-54 (Feb./March 2008), *available at* http://www.iam-magazine.com/issues/article.ashx?g=449a0f0e-630b-4c51-8fb4-2a4fe550f03c.

[62]Millien at 21 (12/5/08). *See also* Raymond Millien, PCT Capital, LLC, *The IP Marketplace Players*, slides 9-10, presented at FTC Hearing: The Evolving IP Marketplace (Dec. 5, 2008), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/dec5/docs/rmillien.pdf (listing and briefly describing the 17 business models).

[63]Panelists from IT companies reported that NPEs are more frequently filing an infringement suit before approaching operating companies about licensing in order to preempt a declaratory judgment suit by the operating companies. Krall at 128 (3/18/09) (explaining that "it was rare we saw any demand letters" after the *MedImmune* decision); Sarboraria at 129 (03/18/09) (stating that Oracle has "seen a decrease in numbers of assertion letters post-*MedImmune*"). *See also* Miller at 227-28 (12/5/08) (describing how the *MedImmune* decision has lowered the showing needed for potential infringers to bring a declaratory judgment action). *See* MedImmune, Inc. v. Genentech, Inc. 549 U.S. 118 (2007) (patent licensee may bring declaratory judgment action challenging patent validity).

[64]Millien & Laurie, *supra* note 61, at 53-54.

[65]Joe Mullin, *Patent Litigation Weekly: Spangenberg Speaks, Says Sue First, Ask Questions Later*, LAW.COM, May 21, 2010, *available at* http://www.law.com/jsp/cc/PubArticleCC.jsp?id=1202458625096; Martha Neil, *Ex-Kirkland Partner Buys 4,500 Patents, Forms New Firm to Sue Infringers*, ABA Journal (June 1, 2010), *available at* http://www.abajournal.com/news/article/ex-kirkland_partner_buys_4500_patents_forms_new_firm_to_sue_infringers.

One panelist described his firm, Acacia, as an intermediary between small patent holders, who otherwise would lack the resources to enforce their patents, and large alleged infringers.[66] He explained that Acacia facilitates licensing by screening out many patents and "giving inventors realistic expectations" regarding the value of their inventions.[67] While initially, failed start-ups and independent inventors supplied many of the patents purchased by PAEs,[68] a large portion now originate with practicing entities, including large corporations.[69] As one panelist explained, companies that had been accumulating patents for defensive purposes have recently decided that "they have adequate defenses" and now want "to start generating some return on that portfolio, either through licensing or through sales."[70]

Litigation finance firms. Litigation finance firms raise money from institutional investors and others to provide capital and other resources to support the patent enforcement efforts of small companies and independent inventors.[71] In exchange, they take a financial

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[66] Ryan at 32-33 (4/17/2009); *id*. at 69-70 ("the patent [can be] rendered moot by the [high] cost[s] of enforcement"). Acacia cited testimonials from small-inventor clients on the benefits of this intermediary relationship. *Id*. at 33-34 (4/17/09). *See also* Acacia Technologies, Testimonials http://acaciatechnologies.com/testimonials.htm (compiling testimonials by patentees that worked with Acacia).

[67] Ryan at 63-64 (4/17/09).

[68] Ryan at 43 (4/17/09) ("I think the markets kind of started with small companies and individual inventors who had no way to monetize"); Delgado at 44 (4/17/09) (noting the "progression from smaller independent inventors to very sophisticated companies" auctioning their patents); Malakowski at 44 (4/17/09) (agreeing with Delgado); Ziedonis at 197-99 (5/4/09) (describing the recent increase in the number of patents held by failed IT start-ups at the time of liquidation and the implication for the supply of patents to the secondary market).

[69] *See, e.g.*, Chien, *supra* note 47, at 314 (observing that half of all patents offered for sale on Ocean Tomo came from practicing entities, and one-quarter from major IT companies such as Sun, IBM, AT&T, 3Com, and Motorola). A number of panelists noted this trend. *See* Thorne at 126 (3/18/09) (remarking that "patents that were originally prosecuted . . . [by] [F]ortune 50 companies" are now the "[m]ain source of what we see" in the secondary market); Hoffman at 42-43 (4/17/09) (observing that patent sales by large corporations have "dramatically increased in the last couple of years"); Ryan at 44 (4/17/09); Epstein at 95 (5/4/09) (sales of patents were "considered anathema or unforgivable sin for large corporations" a few years ago, but he has sold patents for "some of the very largest corporations in America").

[70] Hoffman at 42 (4/17/09). *Id.* at 45 ("[T]he market has transformed pretty dramatically in the last six, maybe eight months" in terms of increased offerings by large companies and decreased demand.).

[71] *See, e.g.*, Millien & Laurie, *supra* note 61, at 55; Tomoya Yanagisawa & Dominique Guellec, *The Emerging Patent Marketplace* 35 (OECD STI Working Paper 2009/9, Dec. 22, 2009) (describing firms that provide "financial support and expertise" to firms who wish to engage in "IP exploitation activities"), *available at* http://www.oecd.org/dataoecd/62/55/44335523.pdf?bcsi_scan_DA3493EE5FC9D524=QoTyUHsEURXc

interest in patent portfolios. For example, Altitude Capital Partners makes strategic investments in patent owners who are seeking to enforce patents. It also evaluates patent portfolios and designs enforcement approaches.[72] One panelist reported that contingent fee arrangements are becoming less common for small companies, but that institutional investment funds will now partner with small companies and independent inventors to support patent enforcement.[73]

Patent aggregators. Patent aggregators build very large portfolios of purchased patents and implement a licensing strategy to earn returns for investors.[74] The most prominent aggregator is Intellectual Ventures (IV), which was founded in 2000 and began operations in 2003. IV has reportedly amassed more than 30,000 patents.[75] One panelist estimated that IV accounted for half of all patent purchases over the past few years, and that its recent reduction in purchases had significantly diminished demand in the market for patents.[76]

Intellectual Ventures makes patent acquisitions through funds, which have reportedly raised $5 billion, and returned $1 billion to investors to date.[77] The main revenue stream for the funds reportedly comes from partnership or licensing fees paid by large IT companies.[78] While not ruling out legal actions, IV emphasized through much of its history that it always reached voluntary licensing agreements.[79] However, in 2009, it began transferring patents to third parties

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jNxwO6gSwQoAAACA+jsE&bcsi_scan_filename=44335523.pdf.

[72]Altitude Capital Partners, Home Page, http://www.altitudecp.com/criteria.html.

[73]Malackowski at 77-78 (4/17/09).

[74]Millien & Laurie, *supra* note 61, at 54.

[75]Nathan Myhrvold, *The Big Idea, Funding Eureka!*, HARV. BUS. REV., Mar. 2010, at 8; Nigel Page, *IV Shifts Gear*, 36 IAM MAGAZINE 3, 7 (July/Aug. 2009).

[76]Hoffman at 45-46 (4/17/09).

[77]Myhrvold, *supra* note 75, at 9.

[78]Page, *supra* note 75, at 5; Amol Sharma & Don Clark, *Tech Guru Riles the Industry By Seeking Huge Patent Fees*, WALL ST. J., Sept. 17, 2008 (reporting payments for licenses and investment stakes "in the range of $200 million to $400 million" from Verizon and Cisco), *available at* http://www.signallake.com/innovation/IntellectualVentures091708.pdf.

[79]Sharma & Clark, *supra* note 78 (*quoting* Nathan Myhrvold as explaining if he gave such an assurance, the alleged infringers "will rip me off totally").

to bring litigation.[80] And at the end of 2010, IV began enforcing patents directly, bringing several high-profile actions against major segments of the high tech industry.[81]

Some industry participants have expressed concerns that IV's ability to assert a virtual armada of patents gives it an unusually strong bargaining position. One panelist described IV as betting on a "volume strategy," based on approaching potential licensees with a large portfolio and asking them "how much do you want to bet that at least one of them is really good."[82] Panelists suggested that it would not be pragmatic to refuse to license similar offers.[83]

Defensive buying funds. Responding to the rise of IV and other PAEs, "defensive aggregators" acquire patents on behalf of a group of potential PAE targets. Participating firms pay a fee to support patent purchases and the fund licenses back the patents to them. The purchases take patents "off the street" by preventing a PAE from acquiring and asserting the patents against members.[84] The defensive buying funds generally resell the patents into the marketplace, subject to the licenses, to reduce members' costs and prevent non-members from free-riding on their activities.[85] One panelist explained that this business model can help IT firms manage their potential liability and take advantage of arbitrage opportunities in the market for

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[80]*See* Zusha Elinson, *Intellectual Ventures Takes Indirect Route to Court*, LAW.COM (Sept. 1, 2009) (reporting that in at least one case, IV reportedly retained a share in any licensing of litigation revenues obtained by the firm that acquired the patent), *available at* http://www.law.com/jsp/article.jsp?id=1202433490140. IV has also transferred patents to a member to use in a counterclaim in patent litigation. *See* Zusha Elinson, *Verizon Patent Case Marks a First For Intellectual Ventures*, LAW.COM, Feb. 26, 2010, *available at* http://www.law.com/jsp/article.jsp?id=1202444656758.

[81]*See* Don Clark & Dionne Searcey, *Big Patent Firm Sues Nine Tech Firms*, WALL ST. J., Dec. 9 2010, *available at* http://online.wsj.com/article/SB10001424052748703493504576007444122372926.html?mod=Patently-O

[82]Hoffman at 121-22 (4/17/09). Myhrvold himself emphasizes the challenges posed by the volume of Intellectual Venture's holdings, telling potential licensees "I can't afford to sue you on all these, and you can't afford to defend on all these." Sharma & Clark, *supra* note 78.

[83]Delgado at 122-23 (4/17/09) (opining that not licensing would be "an expensive endeavor and [] probably not an incredibly practical one"); Quatela at 123 (4/17/09) (emphasizing the high cost of analyzing a significant number of patents).

[84]Millien and Laurie, *supra* note 61, at 57.

[85]Hoffman at 53 (4/17/09); Bergelt at 53-54 (4/17/09); Amster at 97-99 (5/4/09).

patents.[86] Such defensive buying funds include Allied Security Trust,[87] and RPX (Rational Patent Exchange).[88] One panelist reports that Allied Security Trust has been "successful" in helping to address the volume of patents on the market.[89] RPX reported in 2010 that it had 35 members and had spent "$200 million to acquire more than 1,300 patents and patent rights" covering IT technology.[90]

Intermediaries. Licensing agents, brokers and other consultants have emerged to help clients navigate the complex patent landscape and make deals.[91] They help patent owners find licensees and buyers. Other mechanisms, such as patent auction houses and online technology exchanges, also attempt to connect patent owners and potential customers with varying levels of success.[92]

V. EFFECT OF SECONDARY PATENT MARKETS AND PAE ACTIVITY ON INNOVATION AND COMPETITION

Over the past several years, the patent community has debated the effect of increasing PAE activity and patent market complexity on innovation and competition and how patent policy

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[86]Bergelt at 41 (4/17/09).

[87]Allied Security Trust is a nonprofit purchaser and seller of patents, whose members are large high-tech operating companies. *See* Scott Moritz, *Big Tech Gets Legal Aid in the Patent Wars*, FORTUNE (June 30, 2008), *available at* http://money.cnn.com/2008/06/30/technology/patents.fortune; Allied Security Trust, Home Page, http://www.alliedsecuritytrust.com/AcquiredPortfolios.aspx.

[88]Amster at 97-98 (5/4/09). Open Innovation Network, designed to protect the Linux community, uses a somewhat different approach – acquiring patents and making them available royalty-free to those who agree not to assert their patents against the Linux system. http://www.openinventionnetwork.com/patents.php.

[89]Krall at 92 (3/18/09).

[90]Press Release, RPX Corp., RPX Membership Jumps to 35 Companies (Feb. 16, 2010), *available at* http://www.rpxcorp.com/index.cfm?pageid=32&itemid=6.

[91]*See* Hoffman at 35 (4/17/09) (broker and strategic advisor describing his "role as helping the market be as efficient as possible in valuation and transferring of patents"); Millien & Laurie, *supra* note 61, at 54-55. *Cf.* Cockburn at 213 (4/17/09) (suggesting that one of the main situations in which deals fail is where the parties "don't have an informed intermediary or a broker").

[92]Ocean Tomo ICAP has pioneered live auctions for selling patents, and has plans to develop additional platforms, including online mechanisms, for selling IP rights. *See* Malackowski at 14-21 (4/17/09) (discussing the OceanTomo live auctions and related platforms under development). Actual transactions have been very limited to date, however. Lemley at 146-47 (4/17/09) (there are "a relatively small number of patents being sold for a relatively small amount of money" at auctions). Other firms are actively pursuing innovative platforms for IP transactions. *See, e.g.*, Yanagisawa & Guellec, *supra* note 71, at 15-22 (reviewing a variety of such endeavors).

should respond. The effect of these developments, like the effect of ex post transactions generally, can be detrimental to innovation. Moreover, some of the asserted benefits of PAE activity appear, on closer inspection, ambiguous at best. Understanding those effects helps patent policy to respond in ways that better align the patent system with competition policy, support the beneficial effects, and lessen the detrimental ones.

The active secondary market for patents facilitated by patent intermediaries has increased the liquidity of patents and provided corresponding benefits to patent owners, according to panelists.[93] Both large and small companies are better able to find buyers for patent portfolios that they no longer need or wish to maintain. Selling those portfolios allows companies to recoup some return on the associated R&D investment and raise funds that can be used to support other innovative efforts.[94] Manufacturing companies can also benefit from an active patent marketplace when they seek to purchase patents that will give them the patent portfolio and freedom to operate needed to move into a new product area.[95]

Supporters of the PAE business model argue that when PAEs purchase patents from independent inventors and small companies in order to assert them, the PAEs provide needed compensation and funding that inventors could not receive otherwise.[96] Panelists from PAEs explained that independent inventors have great difficulty negotiating royalty payments from large operating companies because they cannot credibly threaten expensive infringement suits. A PAE may serve as "an intermediary between large companies, who use new patented technologies on their products, and the small companies who invented and patented these

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[93]James F. McDonough III, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 190 (2006) ("Patent trolls provide liquidity, market clearing, and increased efficiency to patent markets . . . .").

[94] Quatela at 43 (4/17/09) (reporting that Kodak has recently begun targeted selling of patents largely to "fund the transformation that the company is experiencing from an analog manufacturing space to a digital space").

[95]Gutierrez at 115 (5/4/09) ("when you're entering into a new area and you feel that you're exposed, one of the tools that companies will use is the acquisition of patent portfolios in the market"); Lutton at 136 (5/4/09) (praising "the emergence of an efficient marketplace" enabling firms "to align the portfolio with business needs").

[96]Ryan at 32-34 (4/17/09); Detkin, *supra* note 61, at 636 ("Small companies and individuals have few good options for licensing their patents or developing their inventions without interference from infringers."); Yuichi Watanabe, *Patent Licensing and the Emergence of a New Patent Market*, 9 HOUS. BUS. & TAX L. J. 445, 451 (2009) ("smaller patentees cannot set up an effective licensing operation using conventional business models that are used by the bigger corporations"); John Johnson, Gregory K. Leonard, Christine Meyer & Ken Serwin, *Don't Feed The Trolls?*, 42 LES NOUVELLES 487, 489 (Sept. 2007) ("The argument espoused by the patent trolls and individual inventors is that patent troll activity helps even the playing field between the individual inventor and the large corporation.").

technologies."[97] Representatives of PAEs maintain that their patent purchases and assertions against operating companies promote innovation by compensating inventors who can then direct their energies toward making more inventions.[98]

Even if it is correct that PAEs incentivize and fund the work of inventors, the effect of this activity on innovation can be detrimental if efforts focus only on ex post licensing and not ex ante technology transfer. Paying inventors only to invent and patent may generate more invention and patents, but it may not generate more innovation. Invention is only the first step in an often lengthy and expensive development process to bring an innovation to market.[99] More invention creates the potential for more innovation but does not guarantee it.[100] To the extent that patenting and ex post licensing increase the risk and expense of the development and commercialization process of others without providing new technology ex ante, that activity deters innovation.[101]

Representatives of PAEs also argue that the inventors of the patents they assert would prefer to license their inventions ex ante as part of a technology transfer agreement rather than ex post, but the large companies that could develop those inventions largely ignore them.[102] Representatives of large companies explained that they generally viewed early-stage invention of the type offered in a bare patent license as insufficiently developed to present a good opportunity for bringing new technology into the company.[103] Large companies seeking to acquire

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[97]Ryan at 33 (4/17/09). *See also* Detkin, *supra* note 61, at 644 (describing NPEs as "play[ing] a role in matching patent owners with patent users").

[98]Detkin at 36 (12/5/08) ("Folks come to us and say, I have invented something cool, I want to go back to inventing, will you help me monetize this. We have capital for that."); Myhrvold, *supra* note 75, at 8 (describing how Intellectual Ventures buys patents from inventors who "prefer to just hand off their invention to a licensee and move on to the next great idea").

[99]Chapter 1, Section III.A.

[100]Economist Martin Weitzman notes, "the ultimate limits to growth may lie not as much in our ability to generate new ideas, so much as in our ability to process an abundance of potentially new seed ideas into usable forms." LEWIS M. BRANSCOMB & PHILLIP E. AUERSWALD, DEPT. OF COMMERCE, BETWEEN INVENTION AND INNOVATION: AN ANALYSIS OF FUNDING FOR EARLY-STAGE TECHNOLOGY DEVELOPMENT 1-2 (2002).

[101]Johnson et al., *supra* note 96, at 490 ("Patent troll activity may tend to an increase in the amount of inventive activity through its positive effect on patent value. At the same time, patent troll activity may inhibit development and commercialization of new inventions by adding unwarranted costs to the commercialization process.").

[102]Detkin at 30-32 (12/5/08); Ryan at 32-33 (4/17/09).

[103]McCurdy at 74 (12/5/08); Delgado at 61-62 (4/17/09). Panelists from large companies also explained a reluctance to speak with independent inventors for fear that the information exchanged might be used

technology from start-ups often prefer those that have already proceeded successfully to later stages of development and proven viable.[104] This is consistent with the experience of large companies seeking to sell their own internally-developed technology. Microsoft found that simply offering a bare license was insufficient to generate interest in potential buyers. More development and infrastructure was needed.[105]

Another argument that PAE activity supports innovation looks to the "salvage value" of patents. Some patents purchased and asserted by PAEs originate with failed start-up companies.[106] Some panelists and commentators assert that the ease with which start-ups can sell their patents into the secondary patent market if the company fails helps them attract much-needed investment. The increased liquidity generated by an active patent market arguably makes it easier for patentees to obtain financing by using their patents as collateral.[107]

Other panelists and commentators challenged this contention, however. One noted that the amounts PAEs paid to inventors was too small to provide a significant incentive to invent or funding for future work.[108] Another explained that the salvage value of patents from a failed start-up was too small to encourage the significant investment most start-ups need to develop and

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to support a later allegation of willful patent infringement against them. Quatela at 56 (4/17/09); Delgado at 57 (4/17/09).

[104]BRANSCOMB & AUERSWALD, *supra* note 100, at 37-38 (describing lack of funding for early-stage technology development). A panelist representing a large biotech company noted that he is less likely to license in basic research and is more concerned with bringing in product opportunities. Watt at 27 (5/4/09). *See also* Lutton at 101 (5/4/09) (licensing a "patent right alone" is the least common vehicle for bringing new technology into the company).

[105] "We put 50 technologies on our website, and we said come and get them. And nothing happened. We learned a very powerful lesson. And that is you just can't throw technology out there and expect it to succeed. If you really want it to succeed you had to build an infrastructure around it." As a result, Microsoft has made venture capital, managers, and complementary technologies available to aid potential licensees. Phelps at 247-48 (5/4/09).

[106]Massaroni at 151 (2/12/09) (explaining that in the IT industry many patents "of suspect value" come on the market when a firm exits the market and its assets are sold to satisfy creditors).

[107]Katznelson at 61 (3/18/09) ("the value of the assets . . . [in the] secondary market valuation is an incredibly important gate for investors to make an investment in your company"); Bergelt at 66 (4/17/09) (observing that in the past dozen years "several billion dollars has been" invested in intellectual property and that the IP is all one has "[i]n the event of a default and foreclosure"); *cf.* Sonderstrom at 62 (3/18/09) (agreeing with Katznelson that this is true in some areas, but not in life sciences).

[108]Daniel P. McCurdy, *Patent Trolls Erode the Foundation of the U.S. Patent System*, SCI. PROGRESS 78, 82 (Fall & Winter 2008/2009), *available at* http://www.scienceprogress.org/wp-content/uploads/2009/01/issue2/mccurdy.pdf (NPEs offer "trivial rewards to the inventor").

commercialize viable technology.[109] To the extent that the sale occurs only after a firm or project has failed, it is unlikely that payments for patents provide a significant added incentive to innovators beyond the incentive provided by the hope of a successful, patented product.[110]

In contrast to these uncertain benefits, the harms associated with PAE activity are the harms associated with all ex post patent assertions against manufacturers that have independently created or obtained the technology, as described in Section II.B. above. Such transactions can distort competition in technology markets, raise prices and decrease incentives to innovate. The extent of PAE activity in the IT sector amplifies the potential harm there.

VI. CONCLUSION

Attempts to address concerns about the detrimental effects of PAE activity on innovation and competition must be undertaken with sensitivity to the roles played by a patentee's ability to enforce and transfer its rights. The patentee's ability to allege patent infringement even against independent creators of the patented technology and enter ex post patent transactions is an important feature of the patent system's incentives to innovate.[111] Patent licensing, including ex post licensing, provides support to the business models based on technology transfer described in Chapter 1.[112] Other times, a patentee's most efficient way to monetize his patent is to sell it, making the right to transfer a patent an important component of its value and the patent system's incentives to innovate.[113] Moreover, it is not clear how principles of patent law could be varied depending on the business model of the patent owner. It is difficult to distinguish patent

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[109]Kiani at 63-64 (3/18/09). Academic research has not yet resolved the extent to which the salvage value of patents provides ex ante incentives to invest in R&D. Ziedonis at 199 (5/4/09) (citing this as an unresolved research question while noting that "if these patents are basically sold in bankruptcy proceedings for fire-sale prices, then it's unclear to me how these markets for patents are actually stimulating the financing of these entrepreneurial firm activities").

[110]Merges at 240-41 (5/4/09).

[111]*See* Cotropia & Lemley, *supra* note 19, at 1466 (reporting that the patent litigation system "gives patent owners control primarily over independent invention by third parties" and observing that this may "give inventors extra incentives or perhaps to create more certain rights that more easily can be licensed").

[112]Maghame at 169-70 (2/11/09) (explaining that "there isn't another choice other than to litigate" if an R&D firm "cannot negotiate licenses with people" who use its technology); Lord at 174-75 (2/11/09) (explaining that the ability to sue for patent damages was necessary to effectively negotiate technology transfer agreements to prevent copying).

[113]Ryan at 43 (4/17/09) (explaining that "small companies and individual inventors who had no way to monetize" sell their patents to PAEs).

transactions that harm innovation from those that promote it, and errors that undermine beneficial transactions can harm consumers.[114]

For these reasons, this report explores the conditions of patent law and policy that have created conditions where a patent market based on ex post transactions has flourished and addresses those conditions directly. Those conditions, discussed above, are those that lead to or create incentives for patentees to pursue ex post patent transactions rather than technology transfer: poor patent quality, problems of patent notice, and remedies that do not reflect the economic value of the patented technology. The remaining chapters of this report describe how to align these latter two areas of patent law with competition policy to increase innovation and enhance consumer welfare.

[114]C. J. Michel at 119 (12/5/08) (declaring that "the essential element of property is it is alienable" and asking "[w]hy should I be prohibited from buying patents if that's what I want to do").

CHAPTER 3
PATENT NOTICE: A COMPETITION PERSPECTIVE

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CHAPTER 3
PATENT NOTICE: A COMPETITION PERSPECTIVE

I. INTRODUCTION

Starting from an understanding that "[b]oth competition and patent policy can foster innovation, but each requires a proper balance with the other to do so,"[1] the FTC's 2003 IP Report examined from a competition perspective the problems posed by questionable patents. It found that poor-quality patents were a significant competitive concern and a potential impediment to innovation, and it offered a number of recommendations for improvement. Although it examined a broad array of issues, its primary focus was on patent validity and over-breadth.[2]

The 2008/2009 hearings extended this foundation by examining an associated set of issues raised by the patent system's notice function. Here the focus is on the extent to which patents and patent applications apprise the public – particularly third-party competitors and potential users of patented technology – concerning the metes and bounds of a patent's right to exclude or the potential reach of claims that might emerge from an application. Under its strict liability regime, the patent system confers patent rights and assigns the burden of avoiding infringement to users; as a corollary, the system also needs to facilitate users' ability to identify and understand the patent rights at hand. Otherwise, rivalry may be constrained, and innovation hindered, by misperceptions or uncertainty regarding infringement liability.

As highlighted by Chapters 1 and 2, notice plays a critical role in enabling patents to promote innovation. The technology transfers described in Chapter 1 are most effective when patents provide clear notice of their boundaries. This enables parties to contract efficiently, with confidence as to the technology rights that are conveyed, facilitating both collaboration among firms with complementary expertise and competition among inventions in technology markets. Conversely, the failure of notice in some sectors lies at the heart of problems from ex post patent assertion that may retard rather than promote innovation, as described in Chapter 2. Fundamentally, an effective notice system, in which prospective technology users can ascertain applicable patent rights at reasonable cost and with reasonable certainty, is essential for patents to operate as a property system.[3]

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[1] FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, Exec. Summ., at 1 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

[2] *See id.*, Exec. Summ., at 5 ("A poor quality or questionable patent is one that is likely invalid or contains claims that are likely overly broad.").

[3] *See* Bessen at 46-47 (3/19/09) (explaining that "[f]or a property system to function well, it has to have transparent public boundaries" that can be "predictably interpreted" as well as "clear rules for possession" and "low-cost clearance search").

Yet, until recently,[4] notice concerns have not necessarily been at the forefront of the patent community's attention. By and large, the patent system has focused on prosecuting applications for patent issuance and then litigating issues of validity and infringement. Courts have formulated patent doctrines with these core needs in mind. Notice considerations – largely distinct from these primary objectives – have tended to take a back seat. Sometimes the substantive inquiry has been framed in terms that serve notice objectives as well, such as when the written description in an application is analyzed in terms of what a hypothetical person having ordinary skill in the art would understand. But notice concerns implicate, and become intertwined with the objectives of, multiple other patent law doctrines and procedures, including claim construction, written description, and enablement.

This chapter seeks to highlight public notice as an objective in its own right, one worthy of heightened attention in view of its implications for competition and innovation. It first examines the competitive significance of the notice function in greater detail. Next it reviews the hearing evidence to identify specific notice problems that have emerged. A final section then proposes steps that might significantly enhance public notice, bringing the patent system and competition into better alignment.

II. PATENT NOTICE AS AN AID TO COMPETITION AND INNOVATION

Patent law requires the patentee to distinctly claim his or her invention,[5] thereby "giv[ing] public notice of the subject matter that is protected"[6] and "appris[ing] the public of what is still open to them."[7] Notice promotes the invention, development, and commercialization of innovative products, one of the most important forms of competition,[8] by helping third parties and patentees avoid "uncertainty as to their rights."[9]

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[4]Shortly before issuance of this report the Patent and Trademark Office issued examination guidelines that give considerable emphasis to notice concerns. *See* USPTO, *Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112*, 76 Fed. Reg. 7,162 (Feb. 9, 2011) ("Supplementary Examination Guidelines"). For discussion of other promising recent signs of increased recognition of notice concerns, *see infra* section IV.A.

[5]35 U.S.C. § 112.

[6]Univ. of Rochester v. G.D. Searle & Co., 358 F.3d 916, 922 n.5 (Fed. Cir. 2004).

[7]McClain v. Ortmayer, 141 U.S. 419, 424 (1891).

[8]Indeed, innovative products may "create competition" that transforms a market, challenges entrenched market power, and gives rise to a new industry. JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY, ch. 7 (1976).

[9]Gen. Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 369 (1938).

Such uncertainty can greatly inhibit innovation and competition.[10] "[P]atent infringement is a strict liability offense."[11] Infringers are subject to injunctive relief and, with some limitations, damages,[12] regardless of whether they were aware of the existence of the patent or that it covered their activity.[13] As a result, a firm commercializing a new product and seeking to avoid later infringement allegations is responsible for identifying and licensing patents that read on the product. Inability to effectively "clear" patents can result in burdensome litigation and expensive remedies, even for unintended infringement. Poor patent notice undermines innovation and competition by raising the risk of such infringement and imposing "a very high overhead" on innovation.[14]

Notice and efficient investment in innovation. As the Supreme Court has explained, "[C]larity [regarding patent rights] is essential to promote progress, because it enables efficient

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[10]*See* Ted M. Sichelman, *Commercializing Patents*, 62 STAN L. REV. 341, 361 (2010).

[11]*In re* Seagate Techs., LLC, 497 F.3d 1360, 1368 (Fed. Cir. 2007); *see also* David J. Kappos, *Building Bridges and Making Connections Across the IP System*, 20 FED. CIRCUIT B.J. 273, 275 (2010) ("patent infringement is, by definition, a strict liability tort").

[12]The patent marking requirement, 35 U.S.C. § 287(a), provides that patentees that make, use, sell, or offer to sell a patented article must either mark the article or packaging with the patent number, or be entitled to damages only for infringement that occurs after they provide actual notice to the infringer. *See* Roger D. Blair & Thomas F. Cotter, *Strict Liability and its Alternatives in Patent Law*, 17 BERKELEY TECH. L. J. 799, 800, 801 (2002) (suggesting that the patent system does not impose strict liability "in the purest sense" because, due to the marking requirement, an infringer "is often not liable for damages until the plaintiff puts her on notice"). However, the marking requirement is sharply circumscribed – it does not affect liability for infringement of method or process patents or of idle patents (which do not give rise to products), and it does not place any limits on injunctive relief. *See id*. at 804-07 (also noting that there is no requirement that marking provide actual notice to the defendant); *see generally* JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, PATENT DAMAGES LAW AND PRACTICE § 1:24 (2008) (describing § 287(a) and its limitations).

[13]Blair & Cotter, *supra* note 12, at 800-01 ("a defendant may be liable without having had any notice, prior to the filing of an infringement action, that her conduct was infringing"); Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525, 1525 (2007) ("those who independently develop a technology with no knowledge of the patent or the patentee" may be held liable for infringement).

[14]Menell at 29 (5/5/09); *see also* John H. Johnson, Gregory K. Leonard, Christine Meyer & Ken Serwin, *Please Don't Feed the Trolls?*, 42 LES NOUVELLES 487, 489 (Sept. 2007) (the risk of unforeseen patent claims "adds significant cost to the product development project"); Graham at 142-43 (4/17/09) ("uncertainty . . . over the final boundaries . . . or over the validity of the property right" may "add transaction costs to commercialization, technology transfer and developing markets for intellectual property"); IBM Comment at 2 (2/12/09) ("If the boundary created by the patent claims is ambiguous, the public has inadequate notice of the invention and it is more likely that people will inadvertently infringe."); Am. Intell. Property Law Ass'n Comment at 7 (May 15, 2009).

investment in innovation."[15] If firms can identify and assess the scope of relevant patents in advance of launching a product, they can select technologies based on a knowledge of the applicable patent rights. Conversely, when the notice function fails, firms must make key competitive decisions on product design and R&D directions in the face of uncertainty as to potential patent liability, inhibiting their efforts to innovate and compete.[16]

Poor patent notice may cause firms to cut back on procompetitive innovation, reducing competitive vigor and depriving consumers of new technologies. Firms reduce their R&D expenditures in the face of increased uncertainty.[17] In addition, when there is a "lack of clarity around patent rights," firms "routinely . . . move away from technology areas, move into different technology areas, steer clear of innovations that [they would] otherwise want to invest in."[18] Finally, when firms are unable to identify and assess patent risks before selecting inputs for new products, services, or features, poor patent notice may force them to "choose between the risk of being sued for infringement after they sink costs into invention or production, or dropping innovative or productive efforts altogether."[19]

Coping with poor patent notice. Firms can reduce uncertainty regarding infringement liability by investing time and resources to identify and review patents that might cover a technology used in their new product. Such patent clearance efforts are generally effective in certain industries, such as chemicals, pharmaceuticals, and biotechnology,[20] even if some uncertainty remains.[21] However, when the notice function is poorly served, the costs of identifying and analyzing relevant patents can be onerous.[22] Moreover, in some fields such as IT

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[15]Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 730-31 (2002).

[16]*See generally* JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE 9 (2008) ("Poor notice causes harm because it subjects technology investors to an unavoidable risk of disputes and litigation. The expected cost of inadvertent infringement imposes a *dis*incentive on technology investors.").

[17]Phillips at 202 (3/18/09) ("To the extent that there's uncertainty, unpredictability, risk[, firms are] going to spend less money on R&D."); Menell at 127-28 (5/5/09) (the inability to know the potential damages that might result from projects under development "just chills . . . innovation unnecessarily").

[18]Kappos at 132 (3/19/09).

[19]2003 FTC IP Report, ch.2, at 28.

[20]*See infra* Section III.C.; *see also* Shafmaster at 216 (3/18/09) (Genzyme "make[s] sure before embarking on development pathways that we will have all the rights we need").

[21]*See, e.g.*, Shafmaster at 238 (3/18/09) ("[t]here's always some uncertainty" in assessing a patent); Myers at 238 (3/18/09) ("it's never a matter of having zero risk").

[22]*See, e.g.*, Bright at 38 (5/4/09) (firms "spend a tremendous amount of time studying the specifications, applying the law ourselves"); BESSEN & MEURER, *supra* note 16, at 55 (noting the $20,000 to $100,000 cost of legal opinion letters) and 70 (observing that the cost of clearance "ratchets up" when patents have

and telecommunications, patent notice functions so poorly that even massive efforts might not reliably clear all relevant patents,[23] although businesses frequently choose to go forward despite this uncertainty.[24]

When risks of patent liability are identified, firms may be able to design around patented technology[25] or to license potentially applicable patents.[26] However, in doing so they incur costs – developing and implementing an alternative (and perhaps inferior) technology or paying royalties. When patents provide poor notice of their scope, the resulting uncertainty may force a firm to incur these costs unnecessarily for patents that would not be held to cover their product, burdening innovative activities and raising prices.[27] Similarly, poor notice regarding patent scope can lead patent pools to include patents that are not really essential to implementing a standard.[28]

When poor patent notice leads innovative firms to launch products despite uncertainty regarding potential infringement, they risk facing patent assertions post launch. Resolving these claims often involves expensive and disruptive litigation, including disputes over the scope of

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"fuzzy boundaries").

[23] *See infra* Section III.C.

[24] *See, e.g.*, Harris at 124 (3/18/09) (reporting that AOL goes forward if it is a good business decision to get in the market, despite uncertainty); Rogers at 125 (3/18/09) (explaining that Qualcomm comes to "the best understanding that we can and we make decisions based on it"); Slifer at 125 (3/18/09) (explaining that Micron invests based on "competition and consumers" without expending "much time" on "futile" efforts to achieve certainty).

[25] *See* Simon at 202-03 (2/11/09) (explaining that Intel "almost invariably ha[s] another option" that it would take if its patent exposure were known at the time of the design decision); Horton at 191 (3/18/09) (designing around is "[t]he best avenue" and "almost always the cheapest").

[26] Horton at 173 (3/18/09) ("the most cost efficient way to deal with other[s'] patents is up-front, identify them early, license them in where you can't design around them"); Bellon at 229-30 (3/18/09); Phillips at 202 (3/18/09) (Exxon/Mobil sometimes licenses pending patents to address the risk they pose).

[27] *See, e.g.*, Sprigman at 77 (2/12/09) (indicating that parties enter into licenses based on "interpretations of the claim terms that probably wouldn't have passed muster before the PTO and may not pass muster before a court, but because they are problematic"); Software & Information Industry Association Comment at 5-6 (2/5/09) (describing the pressures on firms to take licenses even when arguments regarding infringement are weak); *but cf.* Horton at 192 (3/18/09) (suggesting that licenses can partly address this problem by making the amount of payments contingent on subsequent determinations of the patent's scope).

[28] *See* Princo Corp. v. Int'l Trade Comm'n, 563 F.3d 1301, 1309-12 (Fed. Cir.) (avoiding resolution of a claim construction dispute by holding that a patent was properly included in a pool as "essential" when it "reasonably might be necessary" to manufacture the relevant standardized products), *vacated for en banc review*, 583 F.3d 1380 (Fed. Cir. 2009), *reinstated in relevant part*, 616 F.3d 1318, 1326 n.1 (Fed. Cir. 2010) (en banc).

unclear patent claims that increase these costs.[29] Furthermore, if the alleged infringer would face large switching costs due to sunk investments based on the patented technology, it may be forced to pay higher royalties than it would have negotiated prior to launch.[30] These risks increase expected costs, reducing firms' incentives to pursue innovative projects,[31] while the associated expenses cause firms to reduce spending on R&D.[32]

Notice and efficient development of patented technology. Poor notice as to a patent's scope undermines the patentee's ability to exploit the patented technology, either by practicing it or transferring it to another firm for commercial development. When the scope of the patent is unclear, a patentee's financial backers ultimately may conclude that the patent does not provide sufficient protection from imitation to justify investing in commercialization.[33] Similarly, uncertainty regarding patent scope may lead potential licensees to misvalue a patent[34] or to decide

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[29]*See* Durie at 71 (5/5/09) (patents that are "imprecise" or "susceptible to many different interpretations" are more difficult to litigate against); Kappos at 122 (3/19/09) ("unclear" or "ambiguous" claims "force[] all participants, at least in the information technology industry, to spend undue amounts of effort on dealing with conflict"); IBM Comment at 2 (2/12/09) (When patents "lack [] clear boundaries . . . . [t]he result is often expensive lawsuits to determine the meaning of the claims, and a costly judgment if those parties are ultimately found to have interpreted the claims, in good faith, incorrectly – or costly settlement in advance of litigation").

[30]*See supra* Chapter 2, Section II; Verizon Comment at 3 (3/20/09) ("[H]igh switching costs can drive high royalty demands, well in excess of the economic value of the patent."); Software & Information Industry Association Comment at 5-6 (2/5/09) (similar); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

[31]*See, e.g.*, BESSEN & MEURER, *supra* note 16, at 131 ("an innovator will look at this risk [that patent litigation may arise] as a cost to weigh against the expected profits from the new technology"); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, *in* 1 INNOVATION POLICY AND THE ECONOMY 119, 126 (2001) (indicating that some companies will "refrain from introducing certain products for fear of holdup").

[32]*See* Yen at 89 (12/5/08) (patent litigation "takes money away from innovation and . . . being able to hire the engineers and have the resources to develop product"); Kappos at 122 (3/19/09).

[33]*See* DeVore at 31 (5/4/09); Shema at 32 (5/4/09); BESSEN & MEURER, *supra* note 16, at 130. The significance of this concern may vary by industry. *See* Lemley at 194 (4/17/09) (observing that while "pharmaceutical companies will not enter into new drug investigations unless they're confident up-front that they have a patent portfolio that will cover those drugs," software industry venture capitalists "don't care . . . what the claim construction is going to end up being").

[34]*See* Kappos at 131 (3/19/09) (explaining that when notice is inadequate "we're either getting or paying the wrong amount for these things because they can't be valued accurately"); Lemley at 147-48 (4/17/09) (identifying poor notice as contributing to markets that "don't drive you to the right price").

not to acquire and commercialize a technology:[35] "if you don't have IP rights that are understood by the purveyor of them and the receiver of them, you don't have the necessary scaffolding to build a good . . . bridge there between the two sides."[36] Purchasers may undervalue good patents due to the difficulty of "tell[ing] the difference between the good stuff and the bad stuff"[37] and may discount the value of patents whose scope is unclear.[38] An inability to accurately price patented technologies thus disrupts the efficient functioning of technology markets and may result in reduced technology transfer and less innovation.

III. THE NATURE AND SOURCES OF NOTICE PROBLEMS

While panelists at the hearings generally agreed that notice is an issue of broad importance to the patent system, participants from different industries reported varying degrees of difficulty in securing adequate notice and split in their overall conclusions regarding the manageability of current problems.

By far the most serious concerns were identified in the IT sector, where some panelists asserted that the notice function "is not well served at all"[39] or declared that "it is virtually impossible to conduct a meaningful patent clearance."[40] As a result, others noted, IT firms frequently do not perform clearance searches when introducing products, instead essentially "ignor[ing] patents."[41] In contrast, panelists who addressed other industries, most notably the pharmaceutical and biotech sectors, indicated that the notice function "by and large" is "very well

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[35] *See* Lemley at 147-48 (4/17/09) (observing that notice problems contribute to "leav[ing] a lot of transactional money on the table in the sense that transactions that should have occurred, that would benefit both the buyer and seller, don't occur"); Bessen at 50 (3/19/09) ("deals don't happen that could happen"); Wagner at 192 (4/17/09) ("every bit of uncertainty . . . undermines" the ability to engage in technology transfer). *See supra* Chapter 1.

[36] Phelps at 250 (5/4/09).

[37] Kappos at 131 (3/19/09); *see also* Lemley at 148 (4/17/09) (describing the patent market as a "market for lemons" in which patents are undervalued because "people are afraid of being taken").

[38] *See* Bessen at 49 (3/19/09) (explaining that in the presence of notice problems, buyers must account for dispute risk).

[39] Lee at 7 (5/5/09).

[40] Durie at 18 (5/5/09).

[41] Kahin at 61 (12/5/08); *see also* Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 21 (2008) ("[B]oth researchers and companies in component industries simply ignore patents. Virtually everyone does it.").

met."[42] Indeed, panelists viewed patent clearance as "mandatory" in those sectors, explaining that firms "very carefully [review] the patent landscape" when launching a product to ensure that their ability to commercialize the invention will not be compromised by other parties' patent rights.[43] While they indicated that clearance tasks were sometimes difficult and resource-intensive, they found them manageable.

To explore these issues more deeply, this section examines three challenges confronted by firms seeking to clear patents that might read on their planned activities. The first is interpreting claims in issued patents to obtain a clear understanding of their scope and whether they cover the firm's product or process. Perfection here is likely and practicably unobtainable; some ambiguity may remain despite best efforts to encapsulate an invention in words.[44] The second challenge is predicting what claims might emerge from pending patent applications. The third is finding mechanisms for identifying potentially relevant patents or applications that must be carefully reviewed for clearance purposes. We examine the hearing record for each topic in turn.

A. Difficulties in Interpreting the Boundaries of Issued Claims

To fulfill their notice function, patent claims must delineate the scope of patent rights with sufficient clarity that a person skilled in the relevant art can reliably determine whether planned activities would infringe. Many panelists declared that patents often provide little guidance as to their coverage because they lack "clarity," i.e., they are "vague," "ambiguous," or otherwise difficult to interpret.[45] Some of this testimony addressed patents across the board.[46]

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[42]Armitage at 120 (3/19/09) (arguing that this holds once claims that would be held invalid are set aside); *see also* Meurer at 210-11 (12/5/08).

[43]Singer at 244 (3/18/09); *see also* Jensen at 244 (3/18/09) (noting that venture capitalists require such searches for funding).

[44]*See* BESSEN & MEURER, *supra* note 16, at 10 ("While surveyors can plainly map the words in a deed to a physical boundary, it is much harder to map the words in a patent to technologies . . . .").

[45]*See e.g.*, Kappos at 122-23 (3/19/09) (expressing concern about issued claims "that are unclear, that are ambiguous"); Luftman at 220-21 (2/12/09) (expressing concern about patents that are "vague enough" that Palm is "sucked into" an infringement lawsuit).

[46]*See, e.g.*, Lemley at 148 (4/17/09) ("It is virtually impossible for anybody to know in most industries most of the time whether a patent that they're looking at is valid or invalid, what that patent covers and therefore whether or not it's likely to be infringed"); Wagner at 184 (4/17/09) (terming the "fact that we cannot figure out claim construction . . . deeply harmful to the patent system"); Sprigman at 34 (2/12/09) ("the boundaries of patent[s] are very indistinct . . . [and] require interpretation, interpretation that is costly and subject often to error"); Menell at 32 (5/5/09) (claim construction is "highly indeterminate – it's really risk management"); Meurer at 211 (12/5/09) ("fuzzy boundaries" are a problem); *see also* BESSEN & MEURER, *supra* note 16, at 54-62.

Most of it, however, addressed the specific context of IT and telecommunications industries.[47] One IT panelist explained that the "lack of clarity around patent rights" adversely affects R&D investment in that sector.[48] Others described how claims asserted in litigation are "stretch[ed]"[49] or "re-crafted"[50] in ways that could never have been anticipated.

Testimony revealed substantially less concern in chemical, pharmaceutical and biotech contexts. One panelist, in discussing chemical compounds and biotech products, asserted that with a "modest amount of effort and cost, you can look at a patent and know where you stand."[51] According to another, "[U]ncertainty around the scope of issued patent claims . . . [is] probably overblown" in biotech, because "there's enough case law out there to give us sufficient guidance."[52] Even so, a third panelist reported that interpreting biotech patent claims can be a "struggle," adding that at times "I can't even tell from the specification what they mean."[53] And a fourth acknowledged that even in biotech, "There's always some uncertainty that the court might not come to the same interpretation that you've come to, and that plays into risk . . . and how much am I willing to invest given this level of risk."[54]

Those who found claim construction manageable emphasized the importance of looking beyond the claims themselves and relying heavily on review of the patent's description of the invention to sort out claim meaning. "[E]ssentially you go back to the specification," one

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[47]*See, e.g.*, Crean at 97 (5/4/09) ("vague and amorphous patent claim and claim boundaries"); Gutierrez at 143 (5/4/09) ("lack of specificity"); Lee at 9 (5/5/09) ("lack of clarity and boundaries in software patents"); Verizon Communications Inc. Comment at 6 (3/20/09) ("the boundaries of patents are sometimes fuzzy").

[48]Kappos at 132 (3/19/09).

[49]Harris at 123 (3/18/09); *see also* Yen at 54 (12/5/08) (alleged infringers "would often never recognize most of the patents that ultimately are asserted").

[50]Luftman at 220-21 (2/12/09).

[51]Kushan at 248-50 (12/5/08).

[52]Myers at 237-38 (3/18/09).

[53]Shema at 71 (5/4/09). Similarly, a panelist from the oil and petrochemical industries noted that while "patents that cover a pure chemical are relatively easy to analyze," challenges arise with products composed of "many, many, many dozens of molecules." Phillips at 176 (3/18/09).

[54]Shafmaster at 238 (3/18/09).

panelist explained, continuing, "[I]n terms of notice . . . we look through the claims and we see what is actually supported by the specification."[55] Others testified similarly.[56]

For contexts where problems did emerge, panelists suggested several sources of ambiguity. These include the inherent imprecision of language, varying nomenclature, functional claiming, and faulty incentives. They also emphasized various institutional issues that may delay resolution of ambiguity.

Inherent imprecision of language. A central obstacle to clear patent claims identified by panelists is the "imprecision" inherent in using the English language to describe an invention, i.e., the "fundamentally poor fit between language . . . and what it is that we're trying to describe."[57] Sometimes the problem may be industry-specific. For example, software patents often cover "very abstract conceptual innovations" that can't be simply described given our current understanding of the area,[58] and can be claimed in "unique ways."[59] Moreover, the hearing record indicated, the convention of writing "one-sentence English-language claims" may fit poorly with "the symbolic rules and procedures adopted by the field of software engineers."[60] Although some panelists suggested that these clarity problems will improve as the software industry's experience with patents increases,[61] others noted that there had been little improvement over several decades of software patenting.[62]

Other language problems are general in nature. Thus, one panelist pointed out that "indeterminacy" resulting in litigation often arises even from "very common terms," such a

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[55]Kushan at 249 (12/5/08).

[56]*See, e.g.*, Shema at 60 (5/4/09) ("[T]he [Section]112 [disclosure] standards that have developed in our industry help us to analyze our competitor's patents.").

[57]Durie at 45-46 (5/5/09); *see also* Messinger at 184-85 (3/19/09).

[58]Menell at 29 (5/5/09); *see also* BESSEN & MEURER, *supra* note 16, at 200 (describing how software patents can "map onto an uncertain set of technologies" when not limited to distinct embodiments, and "might be particularly prone to strategic use of vague language." *But cf.* Wagner at 221-22 (4/17/09) (resisting excessive pessimism regarding software claiming and arguing that software can be discussed "in a very structured format").

[59]Sarboraria at 120 (3/18/09) (observing that "it is often unclear whether a given claim reads on software at all").

[60]Michael F. Martin Comment at 13 (5/15/09).

[61]Wagner at 222 (4/17/09); Valz at 239 (12/5/08).

[62]Kappos at 150 (3/19/09).

"'through,' . . . 'to', [or] 'beside.'"[63] Another panelist stressed the importance of the doctrine of equivalents – which may extend a claim's coverage beyond its literal terms – for "those relatively rare situations" where "there just wasn't plain a word or collection of words that was going to work" and denying infringement would be "manifestly unfair."[64]

Varying nomenclature. A major contributor to clarity is the existence of "a good, solid, consistent lexicon" for claiming in a technology area.[65] Thus, in biotech and chemistry there is a "relatively predictable set of terminology" or nomenclature for describing inventions[66] – most prominently chemistry's use of the periodic table and molecular structures.[67] Beyond this, the biotech community has invested considerable effort in developing a common nomenclature.[68] In contrast, panelists described how the IT industries, especially software, lack "clear"[69] and "uniform"[70] nomenclatures and "common vocabular[ies]."[71]

Functional claiming. Reliance on functional language (explaining "what the invention does") rather than structural language (explaining "what the invention is") was another source of vagueness identified by panelists.[72] Functional claims can be "abstract [or] conceptual,"[73]

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[63]Burk at 10 (5/5/09).

[64]Clarke at 203 (3/19/09) (suggesting that such limited use of the doctrine of equivalents appropriately accommodates notice goals but that more expansive and frequent use would pose problems). *But see* Petherbridge at 43 (5/5/09) (suggesting eliminating the doctrine of equivalents).

[65]Kappos at 149 (3/19/09) (i.e., "where there is a dictionary of some form"); *see also* Wagner at 198 (4/17/09) (claim construction works "where we have a fairly well understood set of nomenclature").

[66]Durie at 18 (5/5/09); *see also* Lemley at 195 (4/17/09) (describing the boundaries of the patent "doesn't work outside of a few industries like pharmaceuticals and DNA where we have a clear nomenclature that everybody understands").

[67]Menell at 29 (5/5/09); *see also* Horton at 174 (3/18/09); Hall at 264 (5/4/09); Vermont at 221 (4/17/09).

[68]Shema at 70-71 (5/4/09) (also noting the PTO's publication of Sequence Listing Rules to govern structural aspects of DNA inventions).

[69]Lemley at 195 (4/17/09).

[70]Kushan at 269 (5/5/09). Similarly, one panelist observed that IT terminology frequently uses words that are generic, such as "processing" or "storing," that can be construed broadly even if the context suggests a narrow meaning. Lutton at 162-63 (5/4/09).

[71]Lee at 7 (5/5/09).

[72]Kunin at 114 (3/19/09) (stating that when claims are "written in fairly abstract form, both as to pure functionality and . . . from the standpoint of what the invention does as opposed to what the invention is," it is "very difficult to know what the claims cover and what you may have to do to avoid infringement"); *see also* Kappos at 174 (3/19/09) (discussing claims that cover "the effect of what was done rather than

making it difficult to predict the various ways in which the claim might be construed.[74] Panelists found "results-based claiming" a "big problem in the IT arts," particularly software.[75] Some panelists warned that functional claiming also impacts biotech patenting,[76] but others explained that it raises fewer concerns in that industry because patentees in biotech must provide considerable information regarding the invention's structure in the specification or the claim.[77]

Faulty incentives. Some panelists argued that the system generally creates "an incentive to be as vague and ambiguous as you can with your claims"[78] and to "defer clarity at all costs."[79] According to one panelist, applicants try to be "as vague as possible, avoid any expression of meaning with the hope that when they get to litigation, they can broaden the meaning beyond what the Patent Office assumed it was."[80] The view was not unanimous, however, and other panelists asserted reasons why patentees would want their patents to be clear.[81] Indeed, one panelist explicitly acknowledged that incentives are in "tension."[82]

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what was actually created").

[73]Menell at 29 (5/5/09).

[74]*See* Meurer at 210 (12/5/08) ("The more functional the claiming is, the harder it is for anyone to understand what the property rights are."). *But cf*. Duffy at 263-64 (12/5/08) (suggesting that the true source of construction problems may be "excessive literalism," including failure to adequately draw upon the specification, rather than functional language in itself).

[75]Kappos at 174 (3/19/09); *see also* Lee at 8-9 (5/5/09) (functional claiming is leading to "a failure of notice" regarding the boundaries of software patents).

[76]Meurer at 209 (12/5/08).

[77]*See, e.g.*, Shema at 59-60 (5/4/09) (citing a need to "claim things structurally" and reference "representative samples"); Kushan at 249 (12/5/08) ("I don't think there's any major impediment about translating and interpreting functional language" in biotech "because essentially you go back to the specification.").

[78]Kappos at 123 (3/19/09); *see also* Petherbridge at 15 (5/5/09).

[79]Wagner at 181 (4/17/09).

[80]Wagner at 200-201 (4/17/09).

[81]*See* Messinger at 117 (3/19/09) (observing that clarity enables the patentee to rely on the resulting patent); Menell at 53 (5/5/09) (arguing that in biomedical fields applicants want a "strong[] claim . . . so that they can justify all of the clinical testing" and other expense).

[82]McNelis at 86 (5/5/09) (noting the "natural tension as a patent practitioner of trying to have a clear, concise patent, but also trying to have the broadest scope").

Institutional concerns/deferred resolution. Panelists further described how the patent system generally defers resolution of ambiguities. One noted that examination at the PTO typically focuses on issues of novelty and nonobviousness rather than clarity.[83] Moreover, as another panelist argued, there is "no good mechanism short of litigation, the courthouse door, for testing just what a patent really covers";[84] the PTO reexamination system is confined to questions of novelty and nonobviousness, and cannot be used directly for testing the scope of a claim.[85]

Finally, panelists pointed to the delay, expense, and uncertainty imposed by litigation over claim scope.[86] District court judges, they note, often hold claim-construction hearings after much litigation expense has been incurred.[87] Moreover, district court claim constructions are overturned by the Federal Circuit in approximately one-third of appeals,[88] leading panelists and commentators to argue that claim meaning is not known until the Federal Circuit has ruled.[89]

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[83]Messinger at 170 (3/19/09).

[84]Phillips at 177 (3/18/09) (describing this as "a fundamental failing . . . of the U.S. patent system"); *see also* Verizon Communications, Inc. Comment at 6 (3/20/09) ("Counsel's opinion as to the boundaries of the patent is both expensive and often unavoidably 'unreliable,' leaving commercializers with 'no reliable way of determining patent boundaries short of litigation.'") (*quoting* BESSEN & MEURER, *supra* note 16, at 10).

[85]*See* 35 U.S.C. § 303 (providing for reexamination "upon a finding that prior art cited under 35 U.S.C. § 302 presents "a substantial new question of patentability"); Van Pelt at 155 (5/4/09); *see also* IBM Comment at 8 (2/12/09) (arguing that permitting challengers to raise indefiniteness in any post-grant procedures would permit "timely clarification or invalidation of claims as necessary").

[86]*See, e.g.*, Durie at 69 (5/5/09) ("the cost of litigation is simply prohibitive" for "relatively small start-up companies"); IBM Comment at 2 (2/12/2009).

[87]Harris at 121 (3/18/09) ("the *Markman* [claim-construction] or any other dispositive motions are heard right before trial").

[88]Meurer at 211 (12/5/08) (citing work by Judge Kimberly Moore); *see* Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 233, 239 (2005) (reporting that the Federal Circuit, in reviewing district court claim construction decisions, found that 34.5% of the terms were wrongly construed, and reversed, vacated and/or remanded the judgment due to claim construction errors in 29.7% of cases); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 248-49 (2008) (reporting similar results).

[89]Watt at 69 (5/4/09) ("[I]n too many cases we don't know what the claims mean until the Federal Circuit speaks."); *see also* Bessen at 47 (3/19/09) ("effectively, the boundaries of a patent are not clear and predictable until essentially the Federal Circuit decides what they are"); Menell at 31-32 (5/5/09) (describing a study in which panels of district court judges in simulated *Markman* hearings split evenly in their claim-construction decisions, even when reporting high confidence in their results).

B. Difficulties in Foreseeing Evolving Claims

A second aspect of obtaining notice is acquiring information about claims that might issue after the search. As one panelist explained, due to pending applications, "your search is necessarily out of date as of the date you searched it."[90] Efforts to obtain notice can fail due to (i) unpublished patent applications and (ii) subsequent amendments to claims in published applications.

Patent examination takes an average of nearly three years from filing until the patent issues or the application is abandoned.[91] Applicants are able to add or amend claims during the examination process, and they may do so to better cover rival products that they see in the marketplace.[92] Moreover, applicants can, and frequently do, extend the examination process by filing for multiple, continued examinations, thereby increasing the time for amendments by years.[93] The sole constraint on the amendment process is that any new or amended claim must be sufficiently supported by the original specification.[94]

Partial, but very valuable, notice is afforded by PTO publication of patent applications 18 months after filing, excluding those for which no foreign filing entailing such publication has

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[90]Yen at 87 (12/5/08).

[91]USPTO, Performance and Accountability Report Fiscal Year 2010, 18 (2010) ("2010 PTO Annual Report"), *available at* http://www.uspto.gov/about/stratplan/ar/2010/USPTOFY2010PAR.pdf; Schwartz at 15 (3/19/09) ("pendency . . . is a serious problem").

[92]37 C.F.R. §1.121 (2008) (explaining the manner in which amendments must be filed); Kingsdown Med. Consultants, Ltd. v. Hollister, Inc., 863 F.2d 867, 874 (Fed. Cir. 1988) (declaring that it is not "in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application," provided that the amendment or insertion otherwise complies with all statutes and regulations).

[93]USPTO, Patent Public Advisory Committee, Annual Report 11 (2008) (explaining that "an increased number of applications are being re-filed, after a final office action or during appeal," and the continuing application "becomes assigned to an examiner and [is] re-examined again"); USPTO, *Changes to Practice for Continued Examination Filings,* 72 Fed. Reg. 46,716, 46,718 (Aug. 21, 2007) (reporting that continued examination filings (other than divisional applications) accounted for 29.4% of all filings in fiscal year 2006).

[94]*See, e.g.*, PIN/NIP, Inc. v. Platte Chemical Co., 304 F.3d 1235, 1247-48 (Fed. Cir. 2002) ("While it is legitimate to amend claims or add claims to a patent application purposefully to encompass devices or processes of others, there must be support for such amendments or additions in the originally filed application."); TurboCare Div. of Demag Delaval Turbomachinery Corp. v. General Elec. Co., 264 F.3d 1111, 1118 (Fed. Cir. 2001) ("When the applicant adds a claim or otherwise amends his specification after the original filing date . . . the new claims or other added material must find support in the original specification.").

been made.[95] Third parties can track patent applications, including amendments to claims, through the Patent Application Information Retrieval (PAIR) system. Panelists indicated that PAIR makes tracking the evolution of claims "very manageable" in some areas.[96] Even so, a number of panelists emphasized that notice is lacking as to applications without foreign filings or less than 18 months old,[97] and that surprises still occur when late amendments significantly shift the coverage of claims.[98]

Panelists warned that claims can be amended in ways that cannot readily be predicted by reading the specification.[99] Such "redraft[ed] claims . . . are in effect hidden from the public."[100] One panelist pointed to the "liberal amendment practice" that enables applicants to "misappropriat[e] by amendment," i.e., to wait until "somebody does something, and then you amend your claims to cover it."[101] IT industry panelists in particular reported that the problem is

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[95]*See* 35 U.S.C. § 122(b) (2000). For other exceptions to publication, *see* 37 C.F.R. §§ 1.211(a) and 1.211(b).

[96]McNelis at 120 (5/5/09); *see also* Watt at 61 (5/4/09) (due to the ability to "track applications in the Patent Office . . . . [T]here's very little surprise anymore . . . ."); Miller at 201 (3/18/09); Kappos at 259 (3/19/09) (PAIR works well for following a single application); Messinger at 259 (3/19/09) ("when [PAIR's] up, it works great").

[97]*See* Phillips at 202 (3/18/09) ("I do worry about those applications filed in the U.S. only . . . ."); Harris at 123-24 (3/18/09) (unpublished claims pose a problem); Yen at 87 (12/5/08).

[98]*See* Messinger at 234 (3/19/09) (noting difficulty when "all of a sudden . . . for some surprise turn of events, they go in a very different direction that is very broad compared to the original filing"). Laryngeal Mask Co. v. Ambu A/S, 618 F.3d 1367 (Fed. Cir. 2010), provides a recent example. The Federal Circuit reversed a finding that the patentee's competitor did not infringe because its laryngeal mask airway device lacked a "tube joint." Until "[j]ust prior to issuance," the claims had contained language requiring a tube joint, but the applicant deleted that language "during the final phase of prosecution." *Id*. at 1371-72. Although the specification was "replete with discussion of a tube joint," *id*. at 1371, the Federal Circuit found that the specification merely described a preferred embodiment and did not limit the claim.

[99]*See, e.g.*, Meurer at 211 (12/5/08) ("Hidden boundary information caused by continuation practice is a big problem."); Merges at 265-66 (5/4/009); *cf*. Kushan at 268 (12/5/08) (noting that many people outside biotech have experienced the problem that "claims morph over time, and eventually have no tie to what is actually invented").

[100]Bessen at 47 (3/19/09).

[101]Merges at 266 (5/4/09); *see also* Lee at 121 (5/5/09) (noting that non-practicing entities may acquire an application and then "file continuations and mine them" by amending claims to read on others' products); Schwartz at 13 (3/19/09) (describing this as the most "pernicious form" of continuation practice).

magnified when an applicant uses repeated continuations to greatly extend the examination process.[102]

On the other hand, panelists from the life sciences indicated that they are "very capable of reading a specification [in an application] and being able to tell what kind of claims might come out."[103] They attribute this in part to strict application of the written description and enablement requirements in that sector.[104] While acknowledging that there is no "risk-free path"[105] and noting the presence of the occasional "contrary example,"[106] they conveyed the overall message that "there really are no secrets out there anymore with everything being published."[107]

Panelists from other industries affirmed their ability to make "decent" predictions regarding the claims that would result from published patent applications.[108] In general, their message was that the task, while not necessarily easy, was manageable. One panelist explained that predicting the claims that will result from applications is "a very important part of our job," albeit "not real fun."[109] Another added the caveat that "you're being your own examiner" when predicting the course an application will take; "you have to figure it out," she continued, without "getting any predictability out of the Patent Office."[110]

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[102]*See, e.g.*, Slifer at 118-19 (3/18/09); Lee at 114 (5/5/09) (after repeated continuations, the issued claims may "look nothing like" the original claims); Massaroni at 192-93 (2/12/09).

[103]Shafmaster at 235 (3/18/09).

[104]*See* Shema at 26, 60-61 (5/4/09) (enforcement of the disclosure requirements "really helps us to analyze the scope of the claims that [other applications will] get out of the Patent Office and that will survive in a court challenge"); Kushan at 249 (12/5/08) (stating that there is "decent law now on written description [and] on enablement that we can draw upon to determine whether . . . there's actually a risk" from an application).

[105]Myers at 234 (3/18/09).

[106]Watt at 61-62 (5/4/09) (stating that "there's very little surprise anymore" but noting the "contrary example" where a competitor, "changed direction" after prosecuting more limited claims for "many years" and ultimately was able to obtain claims that arguably covered Amgen's product; Amgen, after previously investing a billion dollars, monitored the process through PAIR, saw the broader patent coming, and "fortunately . . . a license was available").

[107]Bright at 67 (5/4/09).

[108]Horton at 200 (3/18/09) (GE's ability to predict the claims that will evolve from an application is "decent," despite "some degree of uncertainty").

[109]Phillips at 202 (3/18/09); *see also* Miller at 201 (3/18/09) ("[W]e kind of know how things are happening . . . .").

[110]Stec at 200 (3/18/09).

C. Difficulties in Sifting Through a Multitude of Patents

Effective notice also requires that a firm be able to identify and review the patents and patent applications that might cover its products. A variety of online databases of patents and published applications can be searched for this purpose, e.g., using text terms or the PTO classification system.[111] Even with these automated mechanisms, however, efficient and effective searches in some industries are hampered by the sheer number of potentially relevant patents/applications, the inability of search criteria to reliably identify relevant patents, and the limited time available for search. Again, in other industries, clearance search may be quite manageable.

Hearing testimony described how, in the IT and telecommunications industries, it is "almost cost prohibitive" to perform clearance searches, and explained that searches are likely to produce "false positives and false negatives."[112] Panelists identified a virtual perfect storm of difficulties. IT and telecommunications products typically contain many different components or features that are themselves covered by patents.[113] Many representatives of firms from these industries viewed the "sheer numbers" of potentially applicable patents as a primary obstacle to reliable clearance.[114]

Adding to the challenge, many features are embodied in components supplied by other manufacturers. One panelist posed the issue starkly: "Nobody at Palm knows anything about the

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[111]Searches can be performed using the PTO's free full-text database, other free search services, or fee-based search services. *See* Pharmaceutical Research and Manufacturers of America Comment at 35 (2/10/09).

[112]Krall at 114 (3/18/09).

[113] *See, e.g.*, Doyle at 162 (5/5/09) (stating that a Palm product incorporates 800-1,000 components); Simon at 201-02 (2/11/09) (noting that at least 1,500 patents cover a single Intel microprocessor); Software & Information Industry Association Comment at 4 (2/5/09) (speaking in terms of "hundreds or even thousands of components" in a product).

[114]Thorne at 117 (3/18/09) (terming "sheer numbers" the "number one" problem); *see also* Sarboraria at 120 (3/18/09) (same); Phelps at 263 (5/4/09) (same); Luftman at 143, 213 (2/12/09); Yen at 53-54 (12/5/08) (noting that the "sheer quantity" of issued patents in IT contributes to making it "impossible to achieve any degree of certainty by . . . clearance searches"); Slifer at 118 (3/18/09) (stating that Micron has "literally thousands of potential patents to read"); Doyle 162 (5/5/09) (stating that Palm's product arguably implicates "hundreds if not thousands of patents, most of which would be very hard for us to identify from the start"); Computer and Communications Industry Association Comment at 12 (2/5/09); Software & Information Industry Association Comment at 5 (2/5/09) ("With this myriad of often-overlapping patents, no technology business can review every potentially relevant patent before designing and commercializing a new product.").

[purchased] chip other than what it ultimately will do . . . . We are not qualified to say whether or not Palm infringes or the supplier of that chip infringes."[115]

The lack of predictable vocabularies in IT arts also complicates efforts to efficiently sift through large numbers of patents. In areas such as software, a panelist lamented, "there's so many different ways to describe similar features."[116] Panelists explained that "it is impossible to achieve any degree of certainty by clearance searches with today's systems."[117] Vague or stretched claims might "never [be] found doing any type of searching."[118]

Finally, panelists observed that high tech product cycles are very short, leaving minimal time for conducting a search.[119] Indeed, one commenter pointed out that software innovations "evolve over a period of months," much more quickly than patent applications can be examined even in the best of circumstances.[120]

In stark contrast, patent clearance seemingly poses few problems in the chemical and pharmaceutical industries.[121] The number of relevant patents is much smaller, perhaps only "a couple dozen."[122] The ability to focus on so few patents is largely attributable to the clarity with which inventions involving small molecule chemicals can be described.[123] And, in

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[115]*See* Doyle at 225 (5/5/09). Testimony from other industries indicated that, for purchased components, firms often must rely on clearance performed by their suppliers. *See* Stec at 178 (3/18/09) (adding "it's almost impossible for [Ford] to go out and understand what the patent landscape is for all of the various intricate parts that end up in a vehicle").

[116]McNelis at 26 (5/5/09); *see also* Horton at 175 (3/18/09) (noting that in software, "[e]ach of us could describe it in almost a different way," complicating automated searching).

[117]Yen at 53-54 (12/5/08). One panelist opined that only "rough tools" are available to perform searches. Menell at 30 (5/5/09).

[118]Luftman at 221 (2/12/09); *see also* Sarboraria at 120 (3/18/09) (Oracle finds that "patents are asserted against us . . . that never came up through [a] very diligent [search] process").

[119]*See* Lee at 111 (5/5/09); *cf.* Horton at 196 (3/18/09) (noting the impact of variation in product cycles on patent search).

[120]Michael F. Martin Comment at 13 (5/15/09).

[121]Armitage at 120 (3/19/09) (stating that "the notice requirement, by and large, is very well met in the current system"); Phillips at 176 (3/18/09).

[122]Myers at 241-42 (3/18/09); *see also* Armitage at 210 (2/12/09) (indicating that there are vastly more patents in high tech than in pharmaceuticals, where some multi-billion dollar products are covered by just one or two patents).

[123]*See* Menell at 29 (5/5/09); Horton at 174 (3/18/09); Hall at 264 (5/4/09); Vermont at 221 (4/17/09); Durie at 17-18 (5/5/09).

pharmaceuticals, there is a very long product development period over which search can be staged, due mainly to the lengthy FDA testing process.[124]

In biotechnology, panelists reported that, although they face significant challenges, effective clearance searches are the norm.[125] While "potentially thousands of patents come up on our searches,"[126] testimony suggested that "it is generally reasonably easy to ascertain at least [what the] universe of potentially blocking patents for a particular technology might be."[127] Moreover, in "biotech . . . [there's] a very standardized vocabulary" that is "very easily searchable."[128] As in the case of pharmaceuticals, there is substantial development time, during which the search process can be staged.[129] Testimony regarding medical device industries portrayed a similar picture – effective clearance searches despite large numbers of potentially relevant patents where long life cycles afforded the opportunity for extensive clearance efforts.[130]

IV. POSSIBLE NOTICE ENHANCEMENTS

Notice is affected by a variety of patent doctrines and practices. This section looks in a number of directions for possible notice improvements while recognizing the trade-offs inherent in the analysis.

Cost is obviously important. Resource constraints compel a search for ways to elicit necessary information without imposing undue costs. Often, patent applicants are best-positioned to supply low-cost, but very valuable, enhancements.

Timing is another key consideration. To the extent feasible, earlier is better for notice purposes.[131] In particular, notice is more beneficial to third parties when they are still planning

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[124] *See* Myers at 221 (3/18/09) (it can take "ten years from discovery to approval" for a new drug, due largely to FDA safety and efficacy review).

[125] *See*, *e.g.*, Singer at 244 (3/18/09); Norviel at 13 (5/5/09) ("we can go through thousands of patents and we can figure out if there's a problem or not").

[126] Shafmaster at 241 (3/18/09).

[127] Durie at 17 (5/5/09).

[128] Cockburn at 219 (4/17/09).

[129] Shafmaster at 244-45 (3/18/09).

[130] *See* Jensen at 243-44 (3/18/09) (describing medical devices as "stickier" products, with longer life cycles that "give[] you the runway to do the clearance search" despite large numbers of potentially relevant patents).

[131] Many of the panelists emphasized the importance of receiving notice at an early date. *See, e.g.*, Lee at 43 (5/5/09) ("the earlier the better"); Kunin at 137 (3/19/09) ("a front-end solution makes the most

their R&D strategies and before they make sunk investments that may expose them to hold-up.[132] Several panelists emphasized the desirability of eliminating ambiguity during, or promptly after, examination.[133] Accordingly, many of the suggested improvements look to the examination process and the handling of applications within the PTO, rather than to litigation.[134]

Trade-offs between notice and scope pose particularly thorny issues. Insisting on very specific, explicit written descriptions, requiring great precision when evaluating claim definiteness, even confining applicants to original, published claims all might give third parties better notice but may not fully protect all that applicants have invented. This section highlights these trade-offs to afford a better understanding of their notice implications.

Divergence in the extent and nature of notice problems among industries also poses challenges. This section looks for ways to improve notice in problem areas without impairing the patent system elsewhere and without sacrificing the benefits of a unitary patent system, with doctrines applicable across all technologies and industries.

With these guideposts in mind, this section considers in sequence (1) possible steps for improving the ability of the public – in particular, third party competitors and potential users of the technology – to understand existing claims; (2) possible steps for improving the public's ability to foresee evolving claims; and (3) possible steps for improving the public's ability to sift through a multitude of patents and patent applications.

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sense"); Rea at 141 (3/19/09) ("as early as possible"); *id.* at 223 (3/19/09); Durie at 44-45 (5/5/09); Schultz at 70-71 (5/5/09); Schwartz at 15 (3/19/09) ("the longer you don't know what the claim is going to cover, the more trouble you are in"). *But cf.* Armitage at 186 (3/19/09) (cautioning that "you understand a claim in context"); Messinger at 222 (3/19/09) ("courts have recognized that it's very hard to do claim construction without an accused product").

[132] *See, e.g.*, Cotropia at 136 (3/19/09) (arguing that front-end solutions are needed if the concern is impact on R&D investment decisions); Lee at 44 (5/5/09) (contending that dealing with inadvertent infringement after businesses have invested a lot of money and a product has launched is "tremendously costly" and "a disservice to the public and to subsequent [independent] inventors").

[133] *See, e.g.*, Cotropia at 125-26 (3/19/09) (early resolution of ambiguity helps everyone, not just the litigants); Phillips at 177 (3/18/09) (terming absence of a mechanism short of litigation for testing "what a patent really covers" a "fundamental failing . . . of the U.S. patent system").

[134] A few panelists reasoned that because most patents never become economically significant, an efficient process would first sort out those that do. The few that prove significant could then receive special attention, ensuring their validity and clarifying their scope. *See* Burk at 41 (5/5/09) ("there needs to be some sorting process to figure which ones you want to fight about"); Badenoch at 112-13 (2/12/09); *see generally* Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. L. REV. 1495, 1497 (2001) (arguing that it is much cheaper to make detailed validity determinations in the few cases in which patents are asserted against competitors than to expend resources examining patents "that will never be heard from again"). The argument's strength may vary with the relevant costs: for notice improvements that require relatively little expense, it likely is less telling.

A. Improving the Ability to Understand Existing Claims: Indefiniteness

1. Background and Hearing Record

Section 112, second paragraph of the Patent Act, 35 U.S.C. § 112, states the role of patent claims:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.[135]

Claims that do not conform to this statutory requirement are invalid on grounds of "indefiniteness."

The Supreme Court has long recognized that prohibiting indefinite claims serves a vital notice function:

> The statute seeks to guard against unreasonable advantages to the patentee and disadvantages to others arising from uncertainty as to their rights. The inventor must inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not.[136]

The Court subsequently elaborated, "A zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field."[137]

The Court of Customs and Patent Appeals and the Federal Circuit, in its early decisions, frequently spoke in similar terms. Thus, a CCPA opinion found claims definite because they "do define the metes and bounds of the claimed invention with a reasonable degree of precision and particularity," so that "[o]ne skilled in the art would have no difficulty determining whether or not a particular collection of components infringed . . . ."[138] Likewise, many of the early Federal

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[135] Although the statute refers to claims as part of the specification, common, informal usage applies the term "specification" to the application's written description of the invention, as distinguished from the claims. *See In re* Dossel, 115 F.3d 942, 945 (Fed. Cir. 1997). This chapter adopts that convention.

[136] General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 369 (1938) (discussing a predecessor to the current indefiniteness statute) (footnotes and internal citation omitted).

[137] United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 236 (1942).

[138] *In re* Venezia, 530 F.2d 956, 958-59 (C.C.P.A. 1976).

Circuit opinions framed the indefiniteness discussion in terms of, or similar to, "whether a claim reasonably apprises those of skill in the art of its scope."[139]

While continuing to describe the ultimate issue using notice-oriented language regarding what those with skill in the art would understand,[140] the Federal Circuit shifted focus with its 2001 *Exxon Research* opinion. Observing that courts frequently deal with "close questions of claim construction," the Federal Circuit reasoned that a claim should not be indefinite merely because it poses such an issue. The test for indefiniteness, the court concluded, should not be whether claims are "plain on their face" but rather whether they are "amenable to construction, however difficult that task may be."[141] The Federal Circuit continued,

> If a claim is insolubly ambiguous, and no narrowing construction can properly be adopted, we have held the claim indefinite. If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.[142]

"By finding claims indefinite only if reasonable efforts at claim construction prove futile," the court explained, "we accord respect to the statutory presumption of patent validity, and we protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal."[143] Numerous subsequent Federal Circuit opinions have repeated the "insolubly ambiguous" language, applying it with varying degrees of rigor.[144]

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[139] *In re* Warmerdam, 33 F.3d 1354, 1361 (Fed. Cir. 1994); *see, e.g.,* Morton Int'l, Inc. v. Cardinal Chem. Co., 5 F.3d 1464, 1470 (Fed. Cir. 1993) (finding claims indefinite because they were "not sufficiently precise to permit a potential competitor to determine whether or not he is infringing"); Amgen v. Chugai Pharm. Co., 927 F.2d 1200, 1217 (Fed. Cir. 1991); Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 624 (Fed. Cir. 1985).

[140] *See* Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed. Cir. 2001) (stating, "If one skilled in the art would understand the bounds of the claim when read in light of the specification, then the claim satisfies section 112, paragraph 2.").

[141] *Id*.

[142] *Id*.

[143] *Id*. (citation omitted).

[144] *See, e.g.*, Hearing Components, Inc. v. Shure, Inc., 600 F.3d 1357 (Fed. Cir. 2010); Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp., 587 F.3d 1339, 1350-53 (Fed. Cir. 2009); Praxair, Inc., v. ATMI, Inc., 543 F.3d 1306, 1319-21 (Fed. Cir. 2008); Xerox Corp. v. 3Com Corp., 458 F.3d 1310, 1323 (Fed. Cir. 2006); Energizer Holdings, Inc. v. Int'l Trade Comm'n, 435 F.3d 1366 (Fed. Cir. 2006); Bancorp Servs., LLC v. Hartford Life Ins. Co., 359 F.3d 1367 (Fed. Cir. 2004) (all finding that claims were not indefinite). The court's recent decision in *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325 (Fed. Cir. 2010) (finding that claims were not indefinite), *petition for cert. filed*, 79 U.S.L.W. 3228 (U.S. Sept. 23,

Several of the panelists suggested that a more rigorous standard is needed in order to fulfill notice goals. One urged, "[An] easy thing for us to do is take the definiteness requirement seriously . . . 'insolubly ambiguous' is a disaster."[145] For another, tightening the indefiniteness standard was a "no-brainer."[146] A number of others concurred, at least with regard to consideration of claim definiteness by the PTO.[147]

In fact, both the PTO and the Federal Circuit recently have added teeth to enforcement of the indefiniteness standard. The PTO's Board of Patent Appeals and Interferences cut broadly in its decision in *Ex Parte Miyazaki*.[148] Stressing that the PTO had a "duty to guard the public against patents of ambiguous and vague scope," the Board determined that the PTO was justified in employing a "lower threshold of ambiguity when reviewing a pending claim for indefiniteness than those used by post-issuance reviewing courts."[149] During prosecution, the Board explained, applicants still had an opportunity to amend their claims to overcome concerns with indefiniteness. Consequently, the Board ruled,

> [R]ather than requiring that the claims are insolubly ambiguous, we hold that if a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite.[150]

2010) (No. 10-426), favorably referenced "insolubly ambiguous" principles in an aside, 599 F.3d at 1332 ("if a claim is indefinite, the claim by definition cannot be construed"), but analyzed the claims under a more exacting inquiry – "whether those skilled in the art would understand what is claimed." *Id.* Cases finding indefiniteness under the "insolubly ambiguous" standard include *Halliburton Energy Servs., Inc. v. M-I, LLC*, 514 F.3d 1244, 1256 (Fed. Cir. 2008) (finding the limitation "fragile gel" indefinite because, while the specification identified qualities necessary for fragility, a person of ordinary skill in the art would not be able to determine the degree to which those qualities would have to be present); *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1348-56 (Fed. Cir. 2005) (finding the phrase "aesthetically pleasing" indefinite); and *Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332 (Fed. Cir. 2003).

[145]Meurer at 262 (12/5/08).

[146]Vermont at 201 (4/17/09).

[147]*See, e.g.*, Shema at 71-72 (5/4/09); Wagner at 200 (4/17/09); Rea at 172-73 (3/19/09); Kappos at 173 (3/19/09) (suggesting that current doctrine is adequate, but we need to "apply it more").

[148]89 U.S.P.Q. 2d 1207, 2008 WL 5105055 (Bd. Pat. App. & Interf. 2008).

[149]2008 WL 5105055, at *5-6.

[150]*Id*. at *5. The Board's ruling followed shortly after the PTO's Deputy Commissioner for Patent Examination Policy had rendered similar advice to the PTO's examining corps. *See* Memorandum from John Love, Deputy Commissioner for Patent Examination Policy, USPTO, to Technology Center

Some of the panelists gave *Miyazaki* considerable praise. "I do like the Miyazaki case," one stated, adding, "[I]t actually was very, very good . . . ."[151] "[T]hat case, in my view, is exactly pointed in the right direction," added another.[152] Others spoke more generally in favor of enhanced indefiniteness enforcement at the PTO level.[153] One panelist voiced concern that indefiniteness rejections should not substitute for developing a record that shows what a claim means, but agreed, nonetheless, that indefiniteness rulings could be a useful backstop.[154]

The Federal Circuit's recent steps against indefiniteness have tended to focus more narrowly, via a series of rulings finding computer-implemented means-plus-function claims indefinite.[155] In each case the invalidated claims covered a function implemented by means of a computer or microprocessor, but the specification provided no details regarding the structure of the relevant program.[156] The court ruled that because the specification failed to provide some form of algorithm for performing the claimed function – not necessarily anything highly detailed

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Directors and Patent Examining Corps, Indefiniteness Rejections Under 35 U.S.C. § 112, Second Paragraph, at 2 (Sept. 2, 2008), *available at* http://www.uspto.gov/patents/law/exam/memoranda.jsp.

[151]Rea at 173, 183 (3/19/09).

[152]Kappos at 182 (3/19/09); *see also* IBM Comment at 6 (2/12/09) (terming the *Miyazaki* standard "appropriate").

[153]*See, e.g.*, Rai at 181 ((3/19/09) (indefiniteness rulings a useful backstop in case the give and take during examination does not produce the necessary information); Menell at 53-54 (5/5/09) (arguing that the PTO is the place to inculcate definiteness values). *But see* Messinger at 172 (3/19/09) (arguing that the PTO should only find indefiniteness "in extreme situations").

[154]Cotropia at 177-80, 181-82 (3/19/09).

[155]Means-plus-function claims – "expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof" – are specifically governed by Section 112, sixth paragraph, of the Patent Act. 35 U.S.C. § 112. Under that provision, means-plus-function claiming involving a combination of elements is allowed, and the claims are construed "to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." *Id*. Thus, the specification must describe at least one means of performing the claimed function.

[156]*See* Blackboard, Inc. v. Desire2Learn, Inc., 574 F.3d 1371, 1382-86 (Fed. Cir. 2009); Net Moneyin, Inc. v. Verisign, Inc., 545 F.3d 1359, 1365-68, 1382-86 (Fed. Cir. 2008); Finisar Corp. v. DirectTV Group, 523 F.3d 1323, 1339-41 (Fed. Cir. 2008); Aristocrat Techs. Austl. PTY, Ltd. v. Int'l Game Tech., 521 F.3d 1328 (Fed. Cir. 2008). A very recent Federal Circuit opinion distinguished between means-plus-function claims that involve "specific function[s] performed by a special purpose computer" and those that "simply recite[] . . . claimed functions . . . [that] can be achieved by any general purpose computer without special programming"; the court required that the specification disclose some form of algorithm only for the former. *See In re* Katz, Nos. 2009-1450-52, 2009-1468-69, & 2010-1017, 2011 WL 607381 at *5-8 (Fed. Cir. Feb. 18, 2011).

– the applicant had not disclosed sufficient structure to satisfy Section 112, paragraph 6, thereby rendering the claims indefinite under Section 112, paragraph 2.[157]

2. Analysis

Both the PTO's *Miyazaki* analysis and the Federal Circuit's recent handling of computer-implemented means-plus-function claims are important steps toward enhanced public notice.[158] We address each in turn.

Problems posed by multiple reasonable interpretations. Claims that clearly delineate a patent's scope are essential for meaningful third-party notice. An indefiniteness standard that weeds out claims reasonably susceptible to multiple interpretations could reduce ambiguity in a broad range of settings.[159] Allowing multiple potential constructions to persist adds a penumbra to a patent's scope, discouraging rivals from entering where, with clearer notice, they could safely operate. When implemented during PTO review, indefiniteness rulings promptly remove that penumbra, releasing business planning from being held hostage and requiring only a claim amendment from the party best able to add clarity.[160] When implemented in court, however, the costs may be higher and the benefits later and more attenuated.

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[157]In keeping with these rulings, the PTO recently highlighted to its examiners the requirement that the specification provide adequate structure to support such claims under both the indefiniteness and enablement requirements. *See* Memorandum from John Love, Deputy Commissioner for Patent Examination Policy, USPTO, to Technology Center Directors and Patent Examining Corps, Rejections under 35 U.S.C. 112, Second Paragraph, When Examining Means (or Step) Plus Function Claim Limitations under 35 U.S.C. 112, Sixth Paragraph, at 2-4 (Sept. 2, 2008), *available at* http://www.uspto.gov/patents/law/exam/memoranda.jsp.

[158]One commentator, after surveying these developments, as well as the *Datamize* and *Halliburton* cases in which the Federal Circuit found claims indefinite under the "insolubly ambiguous" standard, concludes that indefiniteness "has, in the course of the past few years, become both the courts' and the PTO's weapon of choice in the battle to guard the public against patents of ambiguous or vague scope." David A. Kelly, *Indefiniteness Invalidations Continue to Rise Sharply in 2008*, 77 PAT. TRADEMARK & COPYRIGHT J. 576 (2009) (finding that district court indefiniteness rejections rose 350% in the 42 months following the August 2005 *Datamize* opinion, compared to the preceding 42 months).

[159]*See* Rea at 172 (3/19/09) (urging that indefiniteness analysis "should apply to all forms of ambiguity affecting the breadth"); *Halliburton*, 514 F.3d at 1249 (noting application of the indefiniteness doctrine to settings involving means-plus-function elements lacking corresponding structure in the specification; numeric limitations that fail to disclose which of multiple methods of measurement should be used; terms wholly dependent on subjective opinion; and terms that lack a proper antecedent basis); *Bancorp Services*, 359 F.3d at 1371-76 (applying indefiniteness doctrine to undefined terms); Seattle Box Co. v. Indus. Crating & Packing, Inc., 731 F.2d 818 (Fed. Cir. 1984) (applying indefiniteness doctrine to words of degree).

[160]*See* Kappos at 163 (3/19/09) (describing the applicant as "the lowest cost-avoider of confusion and ambiguity").

Miyazaki approaches indefiniteness with a focus on notice: when multiple meanings are reasonably possible, the claim may be rejected as indefinite. In contrast, the "insolubly ambiguous" standard accepts substantial ambiguity and preserves claims that require a court to make hard choices among varying interpretations.[161] As variously elaborated by the Federal Circuit, definiteness depends on whether "reasonable efforts at claim construction prove futile"[162] or "[claim] terms can be given any reasonable meaning."[163] The first formulation tends to ascribe to the PHOSITA the full ability of the court of appeals to resolve issues of claim construction,[164] overstating what third parties making marketplace decisions are likely to understand; the second formulation provides little notice of scope when multiple "reasonable meaning[s]" are present.[165] To the extent our measure is the public's ability to plan rationally based on an understanding of the claims – to know "the limits of the monopoly asserted" and "which features may be safely used or manufactured without a license and which may not"[166] – the *Miyazaki* approach is preferable.

The fact that *Miyazaki*'s more stringent standard applies only for purposes of patent prosecution and PTO review pays heed to the Federal Circuit's *Exxon Research* rationale. Requiring "insoluble ambiguity," the court explained, "accord[s] respect to the statutory presumption of patent validity."[167] That presumption, however, applies only to issued patents; the PTO's more stringent standard for patents still subject to agency review adds assurance that issued patents are indeed worthy of the presumption. Moreover, the Federal Circuit designed its standard to "protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal."[168] The court spoke in a litigation setting, where a finding of

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[161]Some panelists portrayed such hard choices as the rule in litigated cases: "[I]t is the very rare case where there is not a potentially dispositive claim construction issue that absolutely could go either way . . . ." Durie at 45 (5/5/09).

[162]*Exxon Research*, 265 F.3d at 1375.

[163]*Datamize*, 417 F.3d at 1347.

[164]*See generally Exxon Research*, 265 F.3d at 1375 (refusing to find a claim indefinite "merely because it poses a difficult issue of claim construction" and noting that cases "frequently present close questions of claim construction on which expert witnesses, trial courts, and even the judges of this court may disagree").

[165]*See* Enzo Biochem, Inc. v. Applera Corp., 603 F.3d 1347, 1348 (Fed. Cir. 2010) (Plager, J., dissenting from denial of a petition for rehearing) (explaining that "it is not until three court of appeals judges . . . pick the 'right' interpretation that the public, not to mention the patentee and its competitors, know what the patent actually claims"), *petition for cert. filed*, 79 U.S.L.W. 3228 (U.S. Sept. 23, 2010) (No. 10-426).

[166]*General Electric,* 304 U.S. at 369.

[167]*Exxon Research*, 265 F.3d at 1375.

[168]*Id*.

indefiniteness invalidates the patent. But while an application is still under PTO review, indefiniteness can be rectified by a claim amendment. In other words, drafting can be perfected, and third parties notified, while still protecting "the inventive contribution of patentees."

Problems posed by functional claiming. The Federal Circuit's recent tightening of indefiniteness standards for computer-implemented means-plus-function claims begins to deal with one aspect of functional claiming and presents a much-needed opportunity to enhance notice regarding software patents, a goal consistently urged by panelists.[169] The degree to which the recent rulings will promote useful notice, however, will depend on still-unsettled details regarding the nature and extent of the necessary disclosure.[170] To this point, the Federal Circuit has required that a patent's specification contain an "algorithm" – some explanation of how the computer performs the claimed function – to support a means-plus-function element in a claim. But the court has indicated that that algorithm may be expressed "in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure" when viewed from the perspective of "one of ordinary skill in the art."[171] No source code or "highly detailed description" has been required.[172]

Notice objectives counsel that as the courts elaborate the law regarding required descriptions of means to perform a stated function, they seek ways to reduce the "zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement."[173] General statements that fail to explain how the computer performs the claimed functions may leave the outer boundaries of the claim difficult to decipher.[174] Adequate notice, in contrast, requires particular and distinct claiming of the subject matter that the applicant regards as the invention. To provide that notice, any "algorithm" relied upon as structure supporting a means-plus-function claim must identify the sequence of steps that the computer will perform in sufficient detail to disclose what is within and what is outside of the patent.

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[169] *See supra* Section III.

[170] The impact of this line of cases also will depend on the frequency with which claims continue to be framed in means-plus-function formats under Section 112, paragraph 6. *See* BESSEN & MEURER, *supra* note 16, at 211-12 (terming the recent line of cases requiring disclosure of an algorithm a "step in the right direction" but noting that "the broad and uncertain range of mathematical equivalents to algorithms" and the ability to avoid use of means-plus-function language may limit its practical value).

[171] *Finisar*, 523 F.3d at 1340 (internal citation omitted).

[172] *Aristocrat*, 521 F.3d at 1338.

[173] *United Carbon*, 317 U.S. at 236.

[174] *See* Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 12 (1946) (warning about the potential ambiguity of functional claims).

Of course, claims may be functionally stated without invoking the special means-plus-function rules.[175] By addressing means-plus-function claims, the Federal Circuit has confronted just a subset of the issues raised by functional claiming. As discussed above, hearing testimony repeatedly suggested that functional claiming generates uncertainty and impairs notice.[176] Problems may be especially severe with "results-based claiming," i.e., "claiming the effect of what was done rather than what was actually created."[177] Particularly in software contexts, the Federal Circuit has been criticized for allowing patents that "claim the function itself" with "little or no description of how to achieve this function," often covering later-developed technologies that "seem to bear only a passing resemblance to what the inventor originally built or described."[178] In contrast, panel testimony suggested that where functional claiming has been adequately supplemented with structural information, in the claim or the specification, notice is substantially improved.[179] The same concern for affording notice of claim boundaries that has encouraged the Federal Circuit to begin addressing computer-implemented means-plus-function claims, should similarly impel greater attention and lend greater weight to the patent system's notice function when evaluating the definiteness of other functional claims.[180]

Recommendations. The Commission applauds the recent use of the indefiniteness standard by the PTO and Federal Circuit to enhance patent notice. In assessing indefiniteness, the PTO should adhere to the principle articulated in *Miyazaki*, that "if a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite." The Commission further recommends that courts pay close heed to notice objectives as they further explicate the

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[175] *See, e.g.*, ROBERT P. MERGES & JOHN F. DUFFY, PATENT LAW AND POLICY: CASES AND MATERIALS 334 (3d ed. 2002) (discussing "functional language" that is "outside § 112, ¶ 6); MPEP § 2181.

[176] *See supra* notes 72-77 and accompanying text.

[177] Kappos at 174 (3/19/09) (terming such claiming "a big problem in the IT arts").

[178] *See* DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 61-62 (2009).

[179] *See* Shema at 60-61 (5/4/09) (the fact that in biotech "you can't just claim things functionally, you've got to claim things structurally . . . really helps us to analyze the scope of the claims that [competitors] will get").

[180] *Cf.* Mark D. Janis, *Who's Afraid of Functional Claims? Reforming the Patent Law's § 112, ¶ 6 Jurisprudence*, 15 SANTA CLARA COMPUTER & HIGH TECH. L. J. 231, 297 (1999) (urging that a "fine tuned" application of the general (viz., Section 112, Paragraph 2) indefiniteness doctrine, coupled with adequate disclosure, could deal with any clarity concerns by requiring linkages between functional claims and corresponding disclosure in the specification, without need for special treatment of means-plus-function claims). The detailed discussion of functional claims in the PTO's newly issued Supplementary Examination Guidelines, 76 Fed. Reg. at 7164-65, 7170-72, may already herald increased attention to such claims at the administrative level.

circumstances in which a patent's specification sufficiently supports means-plus-function claims. Notice objectives require sufficiently detailed structure to inform the public of the specific means that are and are not encompassed in the applicant's invention. Similar concerns apply more broadly, and the Commission urges that courts extend their recent focus on indefiniteness to address functional claiming in general, in order to ensure disclosure of what is within and what is outside of the patent.

B. Improving the Ability to Understand Existing Claims: Claim Construction

Claim construction raises a second, closely related set of issues with profound notice implications. Even with more vigorous application of definiteness principles, claims often will not be undebatably clear on their face. To resolve such issues and assign meaning to a patent's claims, courts have looked to two broad sources of evidence. Intrinsic evidence relies on the claim language, the written description in the specification, and the prosecution history. Extrinsic evidence takes account of external information, such as testimony of expert witnesses and information in external, written texts.

From a notice perspective, intrinsic evidence works best. A third party seeking to understand a claim's meaning can view the intrinsic evidence by reading the patent and consulting the file wrapper (containing the prosecution history). The material is easily identifiable by, and accessible to, third parties. In contrast, litigation and a *Markman* hearing (where expert testimony is taken and external documents are presented for the record) may be required to conclusively identify the most relevant extrinsic evidence. A third party therefore cannot know in advance what external evidence will be utilized.[181]

The Federal Circuit's 2005 en banc *Phillips* decision,[182] which confirmed the primary role of intrinsic evidence, marks a beneficial step from the perspective of public notice. Identifying the specification as "the single best guide to the meaning of a disputed term,"[183] the court found it "entirely appropriate" to "rely heavily on the written description for guidance as to the meaning of the claims."[184] Moreover, the court explained, "[P]rosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution . . . ."[185] Finally, although extrinsic evidence is "less significant than the intrinsic record" for claim construction

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[181]As one panelist put it, "if you start to look at external records, even in biotech, there you can probably find five different people to say five different things." Norviel at 64 (5/5/09). "It's very important," he added, "for it to be all right there [in the prosecution history]." *Id.*

[182]Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

[183]*Id*. at 1315 (internal quotation omitted).

[184]*Id*. at 1317.

[185]*Id*.

purposes,[186] "unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence,"[187] and poses a risk of "undermining the public notice function of patents,"[188] the Federal Circuit found it "permissible for the district court in its sound discretion to admit the use of such evidence" for appropriate purposes.[189]

The hearings explored possibilities for enhancing the value of intrinsic evidence for claim construction purposes. Much of the discussion focused on written description and enablement issues, with the thought that more rigorous enforcement of these doctrines could add to the specification's value as a claim-construction tool. Other discussion looked at the examination process, seeking ways to raise the likelihood that the prosecution history would answer claim construction questions. Because these intrinsic sources are accessible to third parties, increasing their utility would simultaneously improve public notice.

1. Enhancing the Value of the Specification for Notice Purposes

a. Background and Hearing Record

Two principal legal requirements govern the patent specification for notice purposes. Section 112, first paragraph, provides:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same . . . .[190]

This requires that the specification (i) describe the invention sufficiently to convey to a person having skill in the art that the patentee/applicant was in possession of the claimed invention at the time the application was filed and (ii) enable third parties to make or use the invention without undue experimentation.[191] The first of these formulations is referred to as the written

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[186] *Id*. (*quoting* C.R. Bard, Inc. v. U.S. Surgical Corp., 388 F.3d 858, 862 (Fed. Cir. 2004)).

[187] *Id*. at 1319.

[188] *Id*.

[189] *Id*.; *see also id*. at 1317-19.

[190] 35 U.S.C. § 112. The paragraph concludes with an additional requirement – the specification must "set forth the best mode contemplated by the inventor of carrying out his invention." While identification of this "best mode" sometimes may help to distinguish the claimed invention from what is not contemplated, the requirement generally is of secondary importance for present purposes.

[191] *See, e.g.*, Lizard Tech., Inc. v. Earth Res. Mapping, Inc., 424 F.3d 1336 (Fed. Cir. 2005); Vas-Cath, Inc., v. Mahurkar, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

description requirement; the second, as the enablement requirement. Some have questioned whether the first paragraph of Section 112 actually contains a written-description requirement separate from the enablement requirement. The Federal Circuit, sitting en banc, recently ruled that it does.[192]

Panelists stressed the importance of calibrating claim scope to the specification through enforcement of Section 112 for predictable claim construction and hence, for public notice. Thus, one panelist suggested that seeking "a meaningful fit between the claim's scope and what actually was described as being the invention, would go a long way towards reconciling what I do think is otherwise just an inherent ambiguity in the English language."[193] Another emphasized that orienting claim construction to link the claims with the specification through the enablement and written description requirements gives both better substantive determinations and better notice.[194] Still another advocated strict enforcement of Section 112 as a means for interpreting and cabining claims because the patent applicant, as "the low-cost avoider of ambiguity" should be held responsible for providing the necessary information.[195] And a representative from the biotechnology field offered a blunt, business-based perspective: "[W]ritten description helped us in order to interpret our competitors' patents . . . ."[196]

There was considerable testimony, however, that the written description and enablement requirements have been much less stringently enforced in IT industries than in other sectors, leading to claims of ambiguous scope. Several panelists found present application of these doctrines inadequate for notice purposes in IT fields and called for more rigorous enforcement in those industries.[197] One found that "property rights in areas like software are untethered to

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[192]*See* Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336 (Fed. Cir. 2010) (en banc) (holding that, for both original and amended claims, Section 112, first paragraph, states a written description requirement separate from the enablement requirement).

[193]Durie at 77 (5/5/09); *see also* Lee at 43 (5/5/09) (stressing the importance of "enough support in the specification to describe it in enough detail so that people reading it know what it covers").

[194]*See* Cotropia at 190-91 (3/19/09); *see also* Christopher A. Cotropia, *Patent Claim Interpretation and Information Costs*, 9 LEWIS & CLARK L. REV. 57, 83 (2005) (explaining that information in the specification is "tailored to the invention at issue, thereby providing contextual information for use during claim interpretation," and arguing that reliance on the specification "can help lower the costs associated with understanding the invention defined in the claims").

[195]Kieff at 73 (3/19/09); *see also* Menell at 65 (5/5/09) ("[W]e want people filing applications to really put as much effort as they can into writing a spec that will provide the answer down the road.").

[196]Shema at 72 (5/4/09); *see also* Kiani at 49 (3/18/09) (explaining how in doing clearance "[W]e have to do our homework . . . . We look at the specification" and stay away from areas that are covered by the specification and not within the prior art).

[197]*See, e.g.*, Lutton at 165-66 (5/4/09) (terming "disconnectedness" between written description and scope a "big problem"); Guttierez at 164-65 (5/4/09); Lee at 114 (5/5/09) (stating that Google is "routinely

possession."[198] Another observed, "[W]e've gotten a long way away from a very kind of rigorous requirement that the claims be really proportionate to or commensurate with what you've disclosed."[199] A third concluded, "[W]e still have a ways to go with respect to written description . . . in terms of the notice function in the IT field."[200] In contrast, there was essentially no indication of need for enhanced Section 112 enforcement in the pharmaceutical and biological arts; indeed, several panelists suggested (or have written) that current enforcement practices are too stringent.[201]

b. Analysis

The written description requirement is an important notice tool. Its focus – describing the actual invention at issue[202] – is precisely that needed for enhancing the public's ability to identify the boundaries of a patent's claims,[203] which are interpreted in light of that description.[204] It tethers the claim to what the applicant possessed and what others need to license or avoid; as claims extend farther beyond the invention expressly described, their boundaries become more

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surprised with what we read in the written description and what the patent owner claims the coverage is"); Cotropia at 159-60 (3/19/09); *see also* BURK & LEMLEY, *supra* note 178, at 59 ("The Federal Circuit has essentially excused software inventions from compliance with the enablement and best mode requirements . . . ."); Dan. L. Burk and Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1160-66, 1185 (2002) (discussing enablement, best mode, and written description requirements in software cases, and concluding that "little specific detail is needed to satisfy the requirements of disclosure").

[198]Meurer at 211-12 (12/5/08) (adding, "We really need to get serious about disclosure requirements when it comes to software patents . . . .").

[199]Merges at 266 (5/4/09).

[200]Kunin at 153 (3/19/09).

[201]*See, e.g.*, Durie at 116-17 (5/5/09) (suggesting that in the biological arts, there is too much focus on specific examples and insufficient willingness to find support for a broader genus); Cotropia 157-58 (3/19/09); BURK & LEMLEY, *supra* note 178, at 149 ("By requiring disclosure of the particular structure or sequence in order to claim biological macromolecules, the Federal Circuit effectively limits the scope of a patent on those molecules to the structure or sequence disclosed . . . . Under this standard, no one is likely to receive a patent broad enough to support the further costs of development.").

[202]*See, e.g.*, *Ariad*, 598 F.3d at 1345 (describing the written description requirement as "a separate requirement to describe one's invention").

[203]*See id*. (recognizing that a description of the claimed invention in the specification "allows . . . the public to understand and improve upon the invention and to avoid the claimed boundaries of the patentee's exclusive rights").

[204]*Phillips*, 415 F.3d at 1313-17.

ambiguous. Enablement provides less direct information.[205] It looks to what others have been enabled to do, not what the applicant/patentee has invented. Moreover, disclosing enough to enable others to make and use the invention after it is known may not disclose enough for others to understand the scope of the invention before it has been clearly delineated.[206]

While the importance of the written description and enablement doctrines to public notice and the widely held concern that their current application has not provided sufficient notice in IT fields suggest an area for legal development, we note an important trade-off and need for balance: claim construction rules and disclosure doctrines that maximize notice might limit claim scope.[207] Confining claim scope to the explicit description of the invention would give clear notice but may not fully protect all that applicants have invented.[208] If the enablement doctrine yields appropriate scope, applying written description as a second screen on validity may unduly narrow the patent.[209] Yet, if enablement is insufficient to yield clear notice, written description may serve a valuable notice function.

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[205]This is not to denigrate enablement's contribution to notice. Clearly it notifies the public as to how to make and use the claimed invention. *See* Kunin at 151 (3/19/09) (explaining that enablement is "intended to put the public on notice on how to make and use the claimed invention so that when it becomes publicly available, they'll have the notice of how to practice the invention"). The concern, however, is that that information may not be precisely the type of information needed for effective clearance.

[206]One of the panelists framed this contrast lucidly. Enablement, he explained, asks, "[F]rom what you gave me, can you get to what you claimed," whereas written description asks, "What did you actually make and do and describe, and how does that relate to your claims[?]" Kushan at 270 (12/5/08). "That second variable," he added, "I see as being very powerful in addressing some of the claim scope and transparency issues you see with the software claiming issue." *Id. See also* Durie at 46 (5/5/09) (urging that patent law "focus much more on the written description as a guide to claim construction" because "to the extent that the scope of the claims is truly constrained by the invention that's described, you have a lot more predictability"); Cotropia at 142 (3/19/09) (explaining how written description has an impact on notice through the claim construction process). *But cf.* Kunin at 151 (3/19/09) (arguing that under "the narrow view of written description," the doctrine has "basically nothing to do with putting the public on notice").

[207]*See* Rai at 145 (3/19/09) ("a lot of the doctrines we have actually in the context of claim construction are intended to perhaps detract a little bit from notice, but give adequate scope"); Cotropia at 124-25 (3/19/09) (finding "a real linkage between substantive rights and notice solutions").

[208]*See* Rai at 143-44 (3/19/09) (observing that written description requirements – as some Federal Circuit opinions have interpreted them – play a notice function but end up creating a much narrower patent and urging that we balance notice objectives with adequate patent protection); Cotropia at 157 (3/19/09) (noting the notice and substantive implications of written description requirements); BURK & LEMLEY, *supra* note 178, at 62 ("[A] claim that covers only the thing invented is a weak claim indeed.").

[209]*See* Rai at 144 (3/19/09) (noting this "substantive impact [on patent scope] of using written description").

This report does not attempt to make these trade-offs. Judgments regarding the appropriate scope of patent rights generally would go beyond the range of the Commission's hearings. Rather, the report stresses the notice implications of these choices, so that administrative, judicial, and legislative decision makers will be better able to achieve the appropriate balance. Moreover, it looks for ways to enhance notice without invoking significant trade-offs with scope.[210] With these considerations in mind, specific suggestions follow.

Level of skill attributable to the PHOSITA. The hypothetical person having ordinary skill in the art – the PHOSITA – is a key element in the enablement,[211] written description,[212] and indefiniteness[213] inquiries. Because what the PHOSITA is able to make, use, find demonstrated, or understand is a reasonable proxy for what third parties are likely to be able to do, the PHOSITA construct serves as a bridge between substantive patentability standards and public notice.[214]

For that bridge to be effective, however, the PHOSITA's abilities must be clearly and accurately defined. This may not always be the case.[215] Despite the importance of the PHOSITA to proper application of Section 112, the Federal Circuit has provided surprisingly little guidance

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[210] *See* Meurer at 261 (12/5/08) (acknowledging that there are trade-offs between notice and scope in many cases but arguing that there are also "many opportunities to avoid that trade-off completely").

[211] *See* 35 U.S.C. § 112 (requiring that the specification "enable any person skilled in the art to which [the invention] pertains, or with which it is most nearly connected, to make and use the same").

[212] *See Ariad*, 598 F.3d at 1351 ("the [written description] test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [T]he specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed"); Vas-Cath, Inc., v. Mahurkar, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991) (explaining that under the written description requirement an applicant must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention") (emphasis deleted).

[213] *See supra* notes 138-40 and accompanying text.

[214] *See* Kappos at 243 (3/19/09) (defending doctrine premised on demonstrating that applicant was in possession of the invention as ensuring adequate notice to protect the public "[b]ecause if the standard really is the skilled artisan, right, the person having ordinary skill in the art . . . you inherently wind up with enough disclosure that it winds up not being a problem for third parties to read and understand and be able to make the invention").

[215] *See, e.g.*, IBM Comment at 3 (2/12/09) (observing that while examiners frequently allow claims containing undefined terms so long as their meaning is discernible to a PHOSITA, "exactly what level of skill constitutes 'ordinary' is itself open to interpretation and inconsistently applied, so the discernability requirement is neither clear nor as predictable as it should be").

regarding applicable skill levels.[216] Some analysts have argued that, at least for Section 112 purposes, the level of skill attributable to the PHOSITA has been set too high in IT and business-method contexts and too low in biotech settings, respectively understating or overstating the amount of description needed to enable the PHOSITA to practice the invention or to convey to the PHOSITA that the applicant possessed the full breadth of the invention.[217]

Attributing too high a skill level to the IT PHOSITA could unduly reduce disclosure requirements and raise serious notice concerns. Judicial attention and guidance focused on honing the assessment of PHOSITA skill levels relative to the problems posed by the art are needed.[218] In particular, to ensure adequate notice, the PHOSITA standard must be applied in ways that reflect facts and avoid inappropriate rules of thumb. While full-scale inquiry in every individual case may be unnecessarily burdensome, courts should ensure that application of the PHOSITA standard (i) remains current (that is, up-to-date as of the appropriate reference point

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[216] *See* Burk & Lemley, *supra* note 197, at 1202 (noting that many opinions deal with the PHOSITA "only perfunctorily"). The Federal Circuit repeatedly has listed six factors to consider. *See, e.g.*, Environmental Designs, Ltd. v. Union Oil Co. of Cal., 713 F.2d 693, 696 (Fed. Cir. 1983) ("Factors that may be considered in determining level of ordinary skill in the art include: (1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field."); Daiichi Sankyo v. Apotex, 501 F.3d 1254, 1256 (Fed. Cir. 2007) (same); Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 449-50 (Fed. Cir. 1986) (same). The court, however, has provided little accompanying discussion. *See* Joseph P. Meara, *Just Who is the Person Having Ordinary Skill in the Art? Patent Law's Mysterious Personage*, 77 WASH. L. REV. 267, 277-78 (2002) (noting that "the Federal Circuit has had little to say about how to use" the factors it has identified).

[217] *See* Burk & Lemley, *supra* note 197, at 1191-94 (suggesting that the courts have attributed too high a level of skill to the PHOSITA (while ascribing too low a level of difficulty to the art) in software and too low a level of skill in biotech); BURK & LEMLEY, *supra* note 178, at 149, 163 (urging, for Section 112 purposes, attributing a lower level of skill to the PHOSITA in semiconductors and a higher level of skill in biotechnology); Marian Underweiser, *Time to Reconsider the PHOSITA*, *in* 184 MANAGING INTELLECTUAL PROPERTY 28 (Nov. 2008) (discussing the PHOSITA's skill level in software, business methods, and biotechnology); *cf.* Cotropia at 245 (3/19/09) (citing the need for examining Section 112 issues on a case-by-case basis rather than merely assuming that issues in electrical industries are predictable and issues in biotech industries are unpredictable). For a summary of previous testimony focused on this topic *see* 2003 FTC IP Report, ch. 4, at 24-26.

[218] The PHOSITA's skill level and the difficulty of the relevant art in many respects are flip sides of the same inquiry. For example, the ability to write software programs could be overstated either by ascribing too much skill to the PHOSITA or too little difficulty to the task.

for assessment) as technologies evolve[219] and (ii) accurately reflects the facts pertinent to the particular technology at hand, which may differ among technologies within an industry.[220]

Enablement and product life cycles. Application of the PHOSITA construct to the enablement inquiry compels attention to timing. Section 112 has been understood to require a disclosure that enables a PHOSITA to make and use the invention without "undue experimentation."[221] From the perspective of competitive impact, time-consuming experimentation is more likely to be undue in a setting where product life-cycles are measured in months than in a context where they are measured by decades.[222] However, the factors traditionally considered in evaluating the "undue experimentation" issue omit this commercial perspective on timing.[223] Recognition of this timing element would tend to increase the amount or detail of written description needed for enablement purposes in an industry such as software, where product life cycles are notoriously short.[224]

Designated/default dictionaries. Other changes could sharpen both the specification and claims as notice devices. One step would be a PTO requirement that applicants either designate a

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[219]The Federal Circuit in principle has recognized the need for updating the companion inquiry into the predictability of relevant technologies, *see* Enzo Biochem, Inc. v. Calgene, Inc., 188 F.3d 1362, 1375 n.10 (Fed. Cir. 1999) ("[i]n view of the rapid advances in science . . . what may be unpredictable at one point in time may become predictable at a later time"). But it has been criticized for failing to apply similar thinking when assessing the PHOSITA's skill level relative to the problems posed by the art. *See* BURK & LEMLEY, *supra* note 178, at 116 (arguing that in applying the PHOSITA standard, courts are "substituting constructs for detailed analysis" and "failing to update those constructs as knowledge in the industry changes").

[220]*See* R. Polk Wagner, *Of Patents and Path Dependency: A Comment on Burk & Lemley*, 18 BERKELEY TECH. L. J. 1341, 1347 (2003) (urging that the PHOSITA's level of skill be examined through a fact-specific, innovation-by-innovation lens grounded in "the technological facts in any given case").

[221]*See In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

[222]*See* Underweiser, *supra* note 217 (arguing that when product life cycles are brief "a sparse disclosure does not have the teaching needed to reflect the rapid pace of advancement in the field"). A lag from lengthy experimentation may not often affect use of the patented invention itself – the patent life may well be much longer. A need for lengthy experimentation, however, may delay use of the disclosed information for unprotected purposes, and if that delay renders the information stale, it may undermine the public benefit of the disclosure.

[223]*See Wands*, 858 F.2d at 737 (listing as factors "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims").

[224]*See* Underweiser, *supra* note 217 ("Where development is accelerated relative to other technical fields, as is frequently the case in software, it is not appropriate to omit detailed information which is needed to teach the PHOSITA how to practise the invention in a practical time frame.").

dictionary or accept the use of a PTO-designated default dictionary[225] for assigning meaning to terms not defined in the patent application.[226] Identifying a particular dictionary would avoid disputes over which dictionary applies, providing significant "clarity up front."[227] And it would do so in a way that third parties could apply to reach the same results. In essence, the fact that the designation would appear in the patent application would convert the dictionary definition into intrinsic evidence.[228]

Definitions or contextual references. One concern raised repeatedly during the hearings was that claims frequently use terms with no apparent definition or explanation in the specification.[229] Clarity would be added, and notice improved, if applicants were pressed to include definitions or contextual explanations of key terms.[230] One possibility would be requiring a glossary defining any key terms that are not covered by a designated or default dictionary or that the applicant chooses to define differently than in such a dictionary.[231]

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[225]The PTO-designated default dictionary could vary by art unit.

[226]The continued ability to define terms in the application would preserve the applicant's traditional entitlement to act as his or her own lexicographer, as reflected, *e.g.*, in MPEP § 2173.01. Moreover, the identification of a dictionary is not intended to change relative reliance on dictionaries as opposed to intrinsic evidence, *see Phillips*, 415 F.3d at 1313-24, but rather to specify which dictionary is to be used when dictionaries are consulted.

[227]Kappos at 193-94 (3/19/09); *see also* Wagner at 200-01 (4/17/09) (explaining that designating a default dictionary would force patentees "to either accept the default meaning or say something that would indicate to the public that they're not using the default meaning"); IBM Comment at 5, 8 (2/12/09); *cf.* BESSEN & MEURER, *supra* note 16, at 239-40 (suggesting that when applicants have not provided their own definitions, "The Patent Office, or the various art units within the Patent Office, could establish glossaries of commonly used claim terms, or specify certain references as authoritative sources of definitions."). Others noted complexities that might have to be resolved. *See* Kunin at 194 (3/19/09) (noting the problem of foreign-language applications); Armitage at 196 (3/19/09) (noting that dictionary definitions sometimes change from year to year).

[228]*See* Rai at 195-96 (3/19/09).

[229]*See* Van Pelt at 154-55 (5/4/09) (discussing "ink blot claims," where words are used only in the claim); Krall at 114 (3/18/09); IBM Comment at 2-3 (2/12/09); *cf.* Kappos at 148 (3/19/09) (flagging the problem of claim terms added during prosecution that do not appear in the written description); Norviel at 63 (5/5/09) (contrasting IT patents, where there are no definition sections "in most or any of them," with biotech patents, where definition sections are "almost routine").

[230]Indeed, the PTO's just-issued Supplementary Examination Guidelines take a substantial step in this direction. *See* 76 Fed. Reg. at 7,166 (stating, "[A]pplicants are encouraged to use glossaries as a best practice in patent application preparation.").

[231]*See* Rivette at 54 (5/5/09) (suggesting that a definitional page be required in applications); Wagner at 199 (4/17/09); IBM Comment at 5 (2/12/09) (urging that an applicant who wants to apply a specific meaning should be required to provide a glossary defining the relevant term); *cf.* Vermont at 202

Inclusion of such a glossary in a patent application (i) would facilitate the public's understanding of a patent by placing any internal definitions in a central, readily located place and (ii) could force the applicant to think about and articulate the meaning that he or she intends for key patent terms.[232] Another possibility would be a requirement that key claim terms appear in the specification "in order to provide context and meaning," coupled with a ready means for identifying where in the specification the terms appear.[233]

Nomenclature or methods of description. A further step would be for the PTO to convene a government/industry task force or hold a workshop to explore ways of moving toward a common nomenclature or otherwise improving the description of software inventions. The hearings received substantial testimony that varying usages and nomenclature were impediments to effective notice in areas like software.[234] In contrast, other testimony praised PTO's Sequence Listing Rules for certain biotech disclosures for bringing uniformity to descriptions of the structural aspect of inventions.[235] Although opportunities for uniformity comparable to rules specifying the order and grouping of nucleotide and amino acids are unlikely to be common, helpful steps toward uniformity might still be identified with a concentrated effort and substantial industry assistance.[236] Consequently, the PTO may wish to consider holding a workshop or designating a task force to discuss with software industry representatives whether guidelines might be devised to achieve greater uniformity of methodology or language used for describing and claiming inventions, with the objective of enhancing public understanding of software patents.

Recommendations: enhancing the specification. (1) The Commission urges the courts to direct heightened attention and provide additional guidance regarding the assessment of PHOSITA skill levels relative to the problems posed by the art. To serve notice goals application of the PHOSITA standard should be fact-based, up-to-date, and appropriately tailored to the

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(4/17/09) (urging that an applicant who adopts "an idiosyncratic meaning" be required "to say so explicitly [in the] specification"); Lee at 57 (5/5/09) (stating that a definitional page "in some sense would help tremendously").

[232] *Cf.* Lee at 58 (5/5/09) (asking whether requiring a glossary would make examiners and applicants "really define the terms . . . being used" and supporting the requirement "if the answer is yes").

[233] *See* IBM Comment at 3-4 (2/12/09); Lee at 90 (5/5/09); Schultz at 88 (5/5/09) (suggesting that charts linking claims to the specification would be low-cost means of enhancing notice).

[234] *See supra* notes 69-71 and accompanying text.

[235] *See* Shema at 70-71 (5/4/09) (referring to rules at 37 C.F.R. §§ 1.821-1.825).

[236] Testimony indicated that considerable effort had been made by the biotechnology community to develop common nomenclature. *See* Shema at 70-71 (5/4/09). The Sequence Listing Rules also were able to incorporate by reference a pre-existing World Intellectual Property Organization standard that established codes for nucleotide sequence bases and amino acids and nomenclature for nucleotide sequence features. *See* MPEP § 2422.

specific technology at hand. (2) Determinations regarding whether a disclosure requires undue experimentation should give recognition to the competitive significance of the time required for experimentation; when product life-cycles are short, greater disclosures may be needed in order to be competitively meaningful. (3) The Commission recommends that patent applicants be required either (i) to designate a dictionary for use in assigning meaning to terms not defined in the application or (ii) to acknowledge acceptance of a PTO-designated default dictionary for that purpose. The PTO-designated default dictionary could vary by art unit. (4) The Commission urges the PTO to continue to look for ways to press patent applicants to include definitions or contextual explanations of key terms. Mechanisms that could accomplish this include (i) requiring applicants to provide a glossary defining any key terms that are not covered by a designated or default dictionary or that the applicant chooses to define differently than in such a dictionary or (ii) requiring that applicants include key claim terms in the specification and provide a ready means for identifying where they appear. (5) The Commission urges that the PTO convene a government/industry task force or hold a workshop to explore ways of fostering greater uniformity in the methodology or language used for describing and claiming software inventions.

2. Enhancing the Prosecution History for Notice Purposes

In addition to the language of the patent itself, intrinsic evidence relevant to a claim's meaning may appear in the prosecution history. Information exchanged between applicants and examiners is potentially a fertile source of information regarding the intended scope of the claims.[237] A simple statement on the record may cut through considerable ambiguity.

Panelists testified to the potential power of the prosecution history. One panelist explained how "you can look at the file history" and "figure out where things are," even if the claim itself is ambiguous.[238] Another described the file history as "an opportunity to help define, essentially through what was said during the course of the prosecution."[239] A third panelist has written that a core "measure of [PTO] success should be how effectively the Office creates a record that permits the Office as well as ex post actors to better understand the boundaries of patented property."[240]

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[237]*See, e.g.*, Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc) (stating that "[t]o ascertain the meaning of claims, we consider three sources: The claims, the specification, and the prosecution history," while noting that extrinsic evidence may also be used) (internal quotation omitted), *aff'd*, 517 U.S. 370 (1996).

[238]Norviel at 64 (5/5/09).

[239]Kunin at 138 (3/19/09) (highlighting the possibility of disclaimers of claim scope).

[240]Lee Petherbridge, *Positive Examination*, 46 IDEA 173, 219 (2006).

Several steps could be taken. The panelists registered considerable support for increasing and recording examiner/applicant exchanges pertinent to patent scope.[241] Exchanges discussing what a claim means, why a term is or is not clear, or how a claim might be amended to remove ambiguity are all especially useful.[242] New wording introduced by claim amendments may prove particularly fertile ground for such examiner/applicant discussions. The examiner may proceed formally – through indefiniteness rejections that pinpoint the source of uncertainty in ways that invite clarification from the applicant[243] – or informally, through interviews.[244] Meaningful recording of the exchanges regarding patent scope is essential: as one panelist emphasized, "[P]utting it down on paper produces an information product that then feeds into claim interpretation later down the road."[245]

Fully developing this approach, however, may require a continued shift in focus within the PTO, particularly at the examiner level. Many of the PTO's core validity inquiries – such as determining the obviousness of an invention – can be pursued using an ambiguous claim's broadest reasonable interpretation.[246] Consequently, examiners may need to be reminded of the patent system's notice function and encouraged to build a record that improves claim scope

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[241] *See, e.g.*, Armitage at 121-22 (3/19/09) (projecting "enormous downstream benefit in analyzing . . . valid claims" from having patentees explain why their invention is patentable); Kappos at 162-63, 174 (3/19/09) (suggesting that examiners request removal of parts of claims that are not intended to be limitations, thereby encouraging applicants to respond on the record); Cotropia at 178 (3/19/09) (suggesting that examiners should be "forcing the applicant to engage in [a] discussion" of claim interpretation questions and explaining that this would "basically [be] making explicit what is implicitly happening"); Lee at 89 (5/5/09) (stating that "anything in terms of a conversation between the applicant and the examiner that gets to the issue of what is old and what is new" is "critical" and "getting that on the record is even more critical"); McNelis at 92 (5/5/09) (if an examiner "forced the issue," useful information could be obtained regarding the purposes of amendments). *But cf*. Messinger at 222-23 (3/19/09) (expressing doubt that statements of purpose of claim amendments in the absence of an accused product would be useful).

[242] *See generally* Petherbridge, *supra* note 240, at 173 (explaining that engaging the patent applicant – "the party best positioned to most cheaply provide" information about the patent's intended boundaries – in ways that building a prosecution history record enables all participants in the patent system "to form a more certain understanding of the boundaries of the property at issue and more usefully compare it to prior art and commercial goods and services").

[243] *See* Kunin at 215-16 (3/19/09); Cotropia at 217 (3/19/09).

[244] *See*, *e.g.*, Schultz at 71 (5/5/09); Menell at 91 (5/5/09).

[245] Cotropia at 179 (3/19/09); *see* MPEP § 713.04 (requiring records of interviews).

[246] *Compare id*. (warning that "we don't want to sidestep interpretation during examination") *with* MPEP § 2111 ("During patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification.") (internal quotation omitted).

clarity.[247] With its just-issued Supplementary Examination Guidelines, the PTO has provided just such a reminder;[248] if vigorously implemented in examination practices, this could substantially elevate attention to notice objectives.

The Commission's 2003 IP Report recommended "a concentrated effort to use examiner inquiries [under PTO Rule 105] more often and more extensively."[249] We here reiterate that recommendation as a means for enhancing the prosecution history regarding claim scope. Such inquiries can be used to gather a broad range of information regarding the meaning of claims.[250] For example, a topic that drew attention at the hearings was the recurring issue of whether embodiments in the specification are meant to be "illustrative or limitative."[251] Examiner inquiries and applicants' responses on that and other topics could improve the public's ability to understand the meaning and scope of many patent claims.

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[247] *See, e.g.,* Cotropia at 217 (3/19/09). Of course, increased emphasis during prosecution on the Section 112 patentability standards, including indefiniteness and the written description requirement, as urged above, likely will carry with it an enhancement of prosecution history, as applicants are forced to add clarity in order to avoid rejection of claims. *See* Kappos at 163 (3/19/09).

[248] *See, e.g.*, 76 Fed. Reg. at 7,169 (flagging the fashioning of clear and unambiguous claims as "[a]n essential purpose of patent examination") (internal quotation omitted). Indeed, the new guidelines encourage examiners to make greater use of rejections and interviews to pinpoint and record indefiniteness concerns, as discussed above, as well as to provide, in appropriate cases, reasons for allowance and for withdrawing rejections, as discussed below. *Id*. at 7,169-70.

[249] FTC 2003 IP Report, ch. 5, at 13-14. Rule 105 permits examiners to request "such information as may be reasonably necessary to properly examine or treat the matter . . . ." 37 C.F.R. § 1.105.

[250] *See* 37 C.F.R. § 1.105(a)(1)(viii) (including among examples of information that might be sought under Rule 105, "Technical information known to the applicant concerning . . . the disclosure, the claimed subject matter . . . or concerning the accuracy of the examiner's stated interpretation of such items."); Kappos at 162-63 (3/19/09) (stating that Rule 105, though "very much unused," is a "great way . . . to reach out to applicants" and urging that examiners "use inquiry techniques . . . without necessarily interposing an objection or rejection" to build "better file histories" on topics such as the location of term definitions, whether means-plus-function claiming was intended, and the location in the specification of structure corresponding to a claim).

[251] Menell at 91 (5/5/09) (explaining that this "tends to be the critical issue when you get to claim construction"); *id.* at 66 (5/5/09) (identifying uncertainty regarding this issue as a frequent problem in IT and explaining that applicants sometimes "play . . . game[s]" by trying "to have it both ways"); *cf.* Rai at 191 (3/19/09) (agreeing that determining whether a claim is limited to specific embodiments is a recurring issue requiring further thought); Burk at 11-12 (5/5/09) (identifying issues raised by multiple embodiments, some of which may not even have been thought of when the claims were drafted, as posing inherent notice problems). *See generally* Schultz at 71-72 (5/5/09) (asserting that "people change their story when they get into litigation" and describing the value of achieving greater consistency by inducing the applicant to commit to certain positions).

A further step would be to encourage examiners to make greater, and more informative, use of statements of reasons for allowance. Under current practice, "If the examiner believes that the record of the prosecution as a whole does not make clear his or her reasons for allowing a claim or claims, the examiner may set forth such reasoning."[252] Several hearing participants indicated that expanded use of reasons for allowance that go beyond pro forma recitations and "actually delineate[] what the basis for allowance was"[253] would contribute to better public notice.[254] The PTO has highlighted the need for care in formulating these statements,[255] but judicious application of this procedure when needed to make clear the claim interpretation applied by the examiner could yield substantial benefit from a notice perspective. Similarly, examiners could contribute to better notice by providing specific statements of reasons for withdrawing indefiniteness rejections.

To make these last measures effective, examiners' statements must receive due weight as interpretive guides to the meaning of claims. Examiner views, however, have not always received much traction in court.[256] Panelists urged that greater weight be accorded examiner views, one arguing that "what the examiner thought and the reason that the examiner allowed the claims" should be "the touchstone of what we care about."[257] Such statements are properly

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[252]37 C.F.R. § 1.104(e).

[253]Durie at 100-01 (5/5/09).

[254]*See* Rea at 141 (3/19/09); Kappos at 224-25 (3/19/09); Lee at 89-90 (5/5/09); Schultz at 95-96 (5/5/09); Rivette at 103 (5/5/09).

[255]*See MPEP* § 1302.14 (cautioning that "care must be taken to ensure that statements of reasons for allowance . . . are accurate, precise, and do not place unwarranted interpretations, whether broad or narrow, upon the claims" and that an examiner "should keep in mind the possible misinterpretations of his or her statement that may be made and its possible effects"); *see also* Petherbridge at 97 (5/5/09) (warning that reasons for allowance currently are "not well thought out" and explaining the need for quality control if the practice is expanded). The applicant's right to respond to the examiner would likely be a significant safeguard. *See* 37 C.F.R. § 1.104(e).

[256]*See* Durie at 101 (5/5/09) (noting that many courts "view the prosecution history through the lens of [applicant] disclaimer" and consequently "consider statements by the examiner to be much less relevant"); *cf.* Salazar v. Procter & Gamble Co., 414 F.3d 1342, 1345, 1347 (Fed. Cir. 2005) (refusing to apply prosecution history estoppel based on "the unilateral statements of an examiner in stating reasons for allowance," while recognizing that an examiner's statements about a claim term "may be evidence of how one of skill in the art understood the term at the time the application was filed").

[257]Durie at 101 (5/5/09) (observing that the examiner's rulings are a foundation of the presumption of validity accorded the issued patent); *see also* Menell at 103 (5/5/09) (urging that courts give "some degree of consideration" to examiners' commentary, although "maybe not deference in a *Chevron* sense"); Lutton at 163 (5/4/09) (arguing that "doing more examination on the record and documenting the assumptions of where there is support for the claim elements" would enable courts to determine what the PTO thought was the support for the claim and "tether" the application "back to the assumptions that

considered part of the prosecution history,[258] and, particularly in light of the applicant's right to respond when in disagreement, should be more broadly recognized as a source of interpretive information.

Recommendations: enhancing the prosecution history. (1) The Commission urges that examiners be further encouraged to build a record that improves claim scope clarity. In part, this may be achieved through greater focus on Section 112 standards, including the prohibition of indefiniteness and the requirement for written description. Additional notice may be derived via indefiniteness rejections or interviews tailored to elicit information from applicants regarding the meaning of their claims. Beyond this, the Commission reiterates the recommendation in its 2003 IP Report for "a concentrated effort to use examiner inquiries [under PTO Rule 105] more often and more extensively," as a means, for present purposes, of increasing and recording examiner/applicant exchanges pertinent to patent scope. (2) The Commission recommends that the PTO continue to encourage examiners to make greater, and more informative, use of statements of reasons for allowance and for withdrawing indefiniteness rejections and that the courts accord such statements due weight as prosecution history relevant to interpreting the meaning of claims.

C. Improving the Ability to Foresee Evolving Claims

To this point the discussion has focused on improving the ability to understand existing claims. A different notice issue involves the ability to foresee evolving claims. Claims may be amended during the prosecution process. Existing claims may be broadened and new claims may be added. As long as the original specification adequately supports the amended or new claims under Section 112, the patentee retains the advantage of the original application filing date.[259] In essence, the original specification and the requirements of Section 112 set the limits on claim evolution. The ability of third parties to foresee evolving claims is shaped by whether and when the specification is published and by the extent to which the specification provides effective notice of the range of claims that ultimately might issue.

As discussed in Section III.B above, numerous panelists, particularly in the IT industries, voiced concern that they were unable to adequately predict what claims might emerge from an initial application. They worried about exposure to unpublished applications and to unanticipated claim amendments. They stressed that third parties must make research, design, and production decisions while waiting for patent applications to be published and for claims to take their final, issued form, and face exposure if their products ultimately infringe a previously unpublished or amended patent application. Section II explained some of the competitive

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gave rise to its grant").

[258] *See* Rai at 223 (3/19/09) (predicting that courts would look at examiner statements about the meaning of claim terms as prosecution history, rather than as findings entitled to deference).

[259] 35 U.S.C. §§ 120, 132.

problems that this may pose. This section explores possibilities for limiting or avoiding those problems by increasing the foreseeability of evolving claims.

A predicate for this discussion is an ongoing examination process. Unfortunately, the PTO currently suffers under a huge application backlog, which delays even the onset of examination. At the end of fiscal year 2010, the PTO had a backlog of more than 726,000 applications awaiting action by examiners.[260] On average, 25.7 months passed between filing and the first office action, and total pendency averaged 35.3 months.[261] To the extent that notice problems are otherwise present, delay in commencing the examination procedures that begin to add clarity only adds to the period of uncertainty.[262] Updating a recommendation in the 2003 FTC IP Report,[263] we urge that the PTO receive the funding and information systems needed to promptly and properly examine the flood of applications that it faces.[264]

1. Publication of Applications

Publication of patent applications is a prerequisite for foreseeing evolving claims. Until the application is available to public view, third parties have no opportunity to determine whether they have freedom to operate in an area. Under current laws, most U.S. patent applications must be published 18 months after filing.[265] If an application is filed only domestically, however, the applicant may "opt out" of the publication requirements, keeping the application secret until the patent issues.[266]

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[260]2010 PTO Annual Report, *supra* note 91, at 18. The PTO received approximately 509,000 patent applications in fiscal year 2010, including 479,000 for utility patents. *Id*. at 126, tbl. 2.

[261]*Id.* at 18.

[262]See Arti Rai, Stuart Graham, & Mark Doms, *Patent Reform: Unleashing Innovation, Promoting Economic Growth & Producing High-Paying Jobs – A White Paper from the U.S. Department of Commerce* at 5 (Apr. 13, 2010) (describing the impact on R&D efforts of patent applicants' competitors posed by uncertainty associated with patent delay).

[263]FTC 2003 IP Report, ch. 6, at 18-19 (calling on Congress to allocate "sufficient funds to allow the PTO to ensure quality patent review").

[264]The PTO has affirmed that reducing pendency periods and providing timely examination of patent applications are among its highest priorities. USPTO, FY 2010-2015 Strategic Plan, 6-7 (2010), *available at* http://www.uspto.gov/about/stratplan/USPTO_2010-15_Strategic_Plan.pdf ("PTO Strategic Plan").

[265]35 U.S.C. § 122(b)(1)(A). *See Issues Relating to the Patenting of Tax Advice: Hearing Before the Subcomm. on Select Revenue Measures of the H. Comm. on Ways & Means*, 109th Cong. (2006) (statement of James A. Toupin) (estimating that approximately 90% of applications are published).

[266]*See* 35 U.S.C. § 122(b)(2)(B).

Noting the "benefits of publication to business certainty and the potential competitive harms and hold-up opportunities that flow from unanticipated 'submarine' patents," the 2003 FTC IP Report recommended legislation "requiring publication of patent applications 18 months after filing, whether or not the applicant also has sought patent protection abroad."[267] Prompt publication won almost universal praise at the 2008-09 hearings, with testimony describing unpublished applications as "a real threat to expensive R&D."[268] Several panelists urged that the publication requirement be extended to all applications.[269] We agree and consequently reiterate our 2003 recommendation.[270]

A few panelists would go farther. They urged that, particularly in short-cycle industries, notice might be improved with publication immediately upon filing.[271] The record on this was

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[267]2003 FTC IP Report, ch. 5, at 15. Prestigious study groups over several decades have made similar recommendations. *See, e.g.*, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., A PATENT SYSTEM FOR THE 21ST CENTURY 128 (Stephen A. Merrill, Richard C. Levin & Mark B. Myers eds., 2004) ("NAS REPORT") (recommending publication of all applications after 18 months); REPORT OF THE PRESIDENT'S COMMISSION ON THE PATENT SYSTEM at 16 (1966), *reprinted in* TO PROMOTE THE PROGRESS OF THE USEFUL ARTS, SUBCOMM. ON PATENTS, TRADEMARKS AND COPYRIGHTS OF THE SENATE COMM. ON THE JUDICIARY, 90TH CONG., 1ST SESS. (1967) ("Early publication could prevent needless duplication of the disclosed work, promote additional technological advances based on the information disclosed, and apprise entrepreneurs of their potential liability.").

[268]Phillips at 201-02 (3/18/09) (terming 18-month publication "truly critical"); *see also* Harris at 123 (3/18/09) (describing unpublished applications as undermining effective search); Brian Kahin, *The Patent Ecosystem in IT: Business Practice and Arbitrage*, slide 8, presented at FTC Hearing: The Evolving IP Marketplace (Dec. 5, 2008), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/dec5/docs/bkahin.pdf (identifying "secrecy about contemplated and filed applications before publication" as a "source[] of information failure/opacity").

[269]*See* Schwartz at 10-11 (3/19/09); Rea at 256-57 (3/19/09); Kunin at 257-58 (3/19/09); Cotropia at 258 (3/19/09); Rivette at 112 (5/5/09); AIPLA Comment at 8 (5/15/09) ("AIPLA endorses efforts that would require the PTO to publish all pending patent applications at 18 months after initial filing").

[270]As in 2003, the one possible qualification might be a mechanism for according "any necessary protection to independent inventors." 2003 FTC Report, ch. 5, at 15. *See* McNelis at 113 (5/5/09) (urging that all applications should be published at 18 months, apart from "potentially . . . a carveout" for "solo inventors," who fear that publication would allow infringers to "steal" their inventions because they would find it too expensive to sue); *cf.* Katznelson at 34-35 (3/18/09) (expressing concern that disclosing claims allows others to copy them and invoke interference procedures). Moreover, our recommendation is confined to applications exempt from publication because of the absence of filing and required publication abroad; it is not meant to disturb other exceptions to the publication requirement (such as the exception for applications subject to a secrecy order), referenced *supra* at note 95.

[271]*See* Menell at 34-35 (5/5/09); Lee at 110-11 (5/5/09) (noting that software products may move from concept to launch in three months, so that an 18-month delay can render clearance searches "out of date"); Martin Comment at 13 (5/15/09); *cf.* Horton at 196 (3/18/09) (stressing the importance of prompt publication when business cycles are compressed).

quite thin, however, and the full implications have not been explored.[272] The idea warrants additional study but is not the subject of a recommendation.

2. Written Description and the Problem of Expanding Claims

a. Background and Hearing Record

The disclosure requirements in Section 112, first paragraph – enablement and written description – provide important protections against undue broadening of a patent application's scope through claim additions or amendments. If the original disclosure does not provide adequate support, the added or broadened claims are invalid.[273] Moreover, when an applicant extends the prosecution process through a series of related applications, new or broadened claims in a subsequent application must be supported by the original application's disclosure if they are to receive priority based on the parent application.[274] Panelists described the written description requirement in particular as "the bulwark" against claims that "evolve and morph" inappropriately,[275] a context where that doctrine has been long, and widely, applied.[276]

Reviews are mixed as to how well these protections actually work in practice, with particular concerns expressed in IT contexts.[277] Hearing testimony suggested that one problem is that the law of written description is not particularly well-developed. "[U]ntil there is a coherent set of factors for making [the written description] determination," one panelist explained, "it is

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[272] *See* Norviel at 48 (5/5/09) (stating that he is not opposed to immediate publication but expressing the need to protect "small inventors"); Lee at 110-11 (5/5/09) (noting possibilities for gamesmanship with immediate publication); Rearden, LLC Comment at 6 (2/5/09) (arguing that immediate publication could leave inventors unprotected).

[273] *See, e.g.*, PIN/NIP, Inc. v. Platte Chem. Co., 304 F.3d 1235, 1247-48 (Fed. Cir. 2002) (invalidating an added claim that lacked support in the application as originally filed).

[274] Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 909 n.2 (Fed. Cir. 2004); Reiffen v. Microsoft Corp., 214 F.3d 1342, 1346 (Fed. Cir. 2000). *See infra* Section IV.C.3 (discussing continuation practice).

[275] *See* Van Pelt at 159 (5/4/09); *see also* Rai at 237-38 (3/19/09) (arguing that the claim-amendment context – rather than that of originally-filed claims – was where the written description requirement "was supposed to really play a role").

[276] *See Vas-Cath*, 935 F.2d at 1560; MERGES & DUFFY, *supra* note 175, at 262.

[277] *See supra* Section III.B; Kappos at 243 (3/19/09) (suggesting that the written description requirement isn't "being policed well enough" and that "112 enablement in the IT area is, most certainly, not being tightly examined"); *cf.* Rai at 238 (3/19/09) (suggesting that written description may be inadequately enforced with regard to later-filed claims and too strictly enforced with regard to original claims).

going to be difficult to have the public have adequate notice on the written description requirement."[278]

The potential competitive consequences of any breakdown of notice of evolving claims are highlighted by a Federal Circuit doctrine. In its 1988 *Kingsdown* decision,[279] the court overturned a holding of inequitable conduct based in part on an amendment of claims to cover a competitor's product. The Federal Circuit declared that it is not

> in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application. Any such amendment or insertion must comply with all statutes and regulations, of course, but, if it does, its genesis in the marketplace is simply irrelevant and cannot of itself evidence deceitful intent.[280]

Kingsdown's progeny make it clear that priority or validity of such amendments depends on support in the specification of the originally filed application.[281]

b Analysis

The traditional answer to these concerns is that so long as a patent application's specification presents sufficient information to convey to a PHOSITA that the applicant was in possession of the claimed invention at the time the application was filed and to enable the PHOSITA to make and use that invention, the public receives adequate notice of potential evolving claims.[282] Certainly, those requirements provide some notice. But, they do not focus on precisely the right question. There is potentially a subtle, but extremely important, distinction between possession and predictability. Possession uses the claim to define an inquiry about the past – what the inventor had achieved at the time of the application. Predictability relies on the

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[278]Kunin at 239, 241-42 (3/19/09) (explaining that the lack of a coherent body of case law on written description impairs the utility of the doctrine for informing the public about the potential for evolving claims).

[279]Kingsdown Med. Consultants, Ltd. v. Hollister, Inc., 863 F.2d 867 (Fed. Cir. 1988).

[280]*Id*. at 874.

[281]*See Liebel-Flarsheim*, 358 F.3d at 909 n.2 (finding no impropriety in amending claims to encompass a competitor's product "as long as the disclosure supports the broadened claims"); *PIN/NIP*, 304 F.3d at 1247 ("there must be support for such amendments or additions in the originally filed application").

[282]*See* Kappos at 242-43 (3/19/09) (finding no "necessary tension between the doctrine that is keyed to the applicant demonstrating that she or he was in possession of the invention, and that requirement then being what we depend on to protect the public," so long as the requirement is adequately policed). "[I]f the standard really is the [PHOSITA,] you inherently wind up with enough disclosure that it winds up not being a problem for third parties to read and understand and be able to make the invention." *Id*. at 243.

specification to project the future – what the applicant could later think to claim through amendments. Similarly, traditional enablement inquiries ask whether the disclosure enables a PHOSITA to make and use a given, claimed invention, not whether it enables the PHOSITA to predict what might be claimed in the future. Demonstrating possession and enablement, as those disclosure obligations are currently understood, may not ensure predictability.

Indeed, the traditional formulation for the inquiry – "most often phrased as whether the application provides 'adequate support' for the claim(s) at issue"[283] – highlights the distinction. The test is directional in nature. *Starting from the claims*, it works back to ask whether the PHOSITA would understand from the specification that the applicant was in possession of the claimed invention at the time of filing or whether the PHOSITA could make and use the claimed invention based on the information disclosed. But a true predictability inquiry would move in the opposite direction – *starting with the specification*, it would look forward to ask whether a PHOSITA would predict that these claims would emerge.[284] To the extent that current application of disclosure doctrines does not adequately ensure a third party's ability to foresee the claims that may evolve,[285] the public is exposed to unnecessary risk of unexpected infringement.

Current doctrine does not acknowledge this gap in notice – it assumes that when Section 112 disclosure requirements are met, there is no problem with broadening claims to cover the fruits of a rival's subsequent R&D. But unless the rival – endowed with the skill of the PHOSITA – could have predicted at the time of investing in R&D that the outcome would be a product that the patentee would later claim and demonstrate, after-the-fact, to be supported by the specification – the broadened claims reach beyond the application's effective notice. When that

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[283] *Vas-Cath*, 935 F.2d at 1560.

[284] This point recalls the courts' frequent caution against declaring inventions obvious on the basis of hindsight. *See, e.g.*, KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 421 (2007); Graham v. John Deere Co., 383 U.S. 1, 36 (1966). A hindsight-dominated evaluation of public notice of evolving claims is infected with similar infirmities as a hindsight-driven assessment of obviousness.

[285] For commentary suggesting that current disclosure doctrines do not provide that assurance, *see, e.g.*, Herbert Hovenkamp, *Patents, Property, and Competition Policy*, 34 J. CORP. L. 1243, 1252-53 (2009) (explaining how claim amendments might cover the subsequent invention of a rival who would have "no reasonable way of knowing that its patent invention was subject to an 'earlier' patent"), 1253 n.56 (concluding that the Section 112 disclosure requirements would not prevent an applicant from later "obtain[ing] legal rights over ideas that (at least in that form) never occurred to her until she saw what others were already doing"); Robert P. Merges, *Software and Patent Scope: A Report from the Middle Innings*, 85 TEX. L. REV. 1627, 1654 (2007) ("Traditional enablement law thus presents a deficiency: it cannot deal with cases . . . where a general set of teachings enables a host of embodiments but does not specifically mention or suggest particular variants that later come to light through the efforts of others."); Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63, 92 (2004) (stating that the Federal Circuit has "cut back on the broad reading of the written description requirement as applied to claim changes"); Tun-Jen Chiang, *Fixing Patent Boundaries*, 108 MICH. L. REV. 523, 544 (2010) (asserting that "the written description requirement allows this initial disclosure to be vague, cursory, and buried within a laundry list").

happens, enforcement of such claims takes the benefits of a rivals' subsequent innovation from the public domain, confers them on the patentee, and subjects the later innovator to unexpected infringement liability. That result impairs the competitive efforts of rivals[286] and undermines the patent system's goal of fostering innovation.[287]

One way to address the problem would be to more fully incorporate into the written description requirement consideration of the PHOSITA's ability to foresee future evolution of the claims. Stated simply, the applicant would not be understood to have been in possession of the subject matter of a new or amended claim of scope broader than what the PHOSITA, on the filing date, could reasonably be expected to foresee from the specification.[288] A step of this nature would more firmly and effectively plant in the written description requirement the protection necessary to ensure adequate public notice of the likely scope of evolving claims.[289]

3. Continuation Practice and the Broadening of Claims

Examination procedures include several mechanisms for an applicant to extend the prosecution period – potentially for many years – while maintaining the benefit of the initial

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[286] *See* Merges, *supra* note 285, at 1653-54 (arguing that these amendments cover embodiments that "are more properly attributed to the labor of others" and terming the applicant's conduct "misappropriation by amendment"); Lemley & Moore, *supra* note 285, at 111 (terming use of continuations "to obtain claims to read on a competitor's product where the patentee had not contemplated the embodiment prior to seeing the competitor's device" a "particularly offensive practice"); Chiang, *supra* note 285, at 526, 545, and 561 (arguing that allowing patent amendments to capture unforeseen developments merely confers a windfall, contributing little to the patentee's innovation incentives while "creat[ing] monopoly cost").

[287] *See* Hovenkamp, *supra* note 285, at 1253 (asserting that to the extent that patentees can amend claims to cover "the existing inventions of other inventors who did not have adequate prior notice of them, the policy reduces rather than increases the incentive to innovate"); Lemley & Moore, *supra* note 285, at 78-79 ("Strategic claim changes may hold-up legitimate improvers or independent inventors, reducing their ability and incentive to innovate.").

[288] Indeed, in one context, the Federal Circuit already has taken a step in this direction. In *In re Curtis*, 354 F.3d 1347 (Fed. Cir. 2004), the court refused to find adequate support in a description of dental floss coated with microcrystalline wax for subsequent claims covering dental floss using "friction enhancing coatings." The court asked whether "the later-claimed genus" would "'naturally occur' to a person of ordinary skill upon reading the disclosure." *Id*. at 1356. It reasoned that "unpredictability in performance" of friction-enhancing coatings made it inappropriate to conclude that the written description would put a PHOSITA in possession of the full range of later-claimed coatings. *Id*. at 1355, 1358. The focus on what a PHOSITA could reasonably predict from the written description represents the kind of analysis we are urging.

[289] Other suggestions for addressing these issues have included reforming the traditional enablement inquiry or barring the applicant from amending claims to cover features copied from a rival's product. *See* Merges, *supra* note 285, at 1654-56; *see also infra* Section IV.C.3. (discussing possible intervening or prior-use protections from claims broadened through continuations).

filing date. So long as the original application's specification contains adequate support for any claim additions or amendments, these "continuation practices"[290] provide a means for broadening the coverage of its claims. But late-claiming through continuations can be used opportunistically and "[t]he potential for anticompetitive hold-up increases the longer it takes for the broader claims to emerge."[291] This section addresses steps to alleviate these concerns through limitations on the consequences of continuation practice.

Continuations are not the source of the notice problem regarding evolving claims, but they serve to extend the period of new-claim gestation and thereby raise third-party exposure based on intervening market commitments. None of the panelists at the March 19, 2009 notice panel disagreed with the proposition that there is tension between continuation practice and notice.

Continuations, of course, may serve legitimate needs. Hearing testimony provided ample evidence that in fields like biotechnology, the prolonged conversation between applicant and examiner that continuations facilitate is sometimes necessary to adequately educate, and come to an understanding with, the examiner.[292] Testimony also indicated that continuations may be useful for refining the language of claims to provide coverage that the applicant had sought from the start[293] or for efficiently allocating scarce prosecution resources.[294] Other justifications for

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[290]The procedure may take various forms. It may involve a new application, which might be a "continuation application," retaining the original written description and the original filing date; a "continuation-in-part," which adds some new matter to the disclosures and loses the original filing date insofar as its claims rely on the new matter; or a "divisional," which separates independent and distinct inventions covered by the initial application while retaining the original filing date. *See* 35 U.S.C. §§ 120-21; 37 C.F.R. § 1.53(b). Alternatively the applicant may file a "request for continued examination" ("RCE"), which works to extend the examination of the original application. *See* 35 U.S.C. § 132(b); 37 C.F.R. § 1.114. For ease of exposition, this discussion refers to all of these variants, including those portions of continuations-in-part that maintain the original filing date, as "continuations," "continuing applications," or "continuation practice."

[291]2003 FTC IP Report, ch. 4, at 27-28.

[292]*See* Rea at 228 (3/19/09) ("[I]n the area of biotechnology, in particular, it takes a number of continuing applications typically to arrive at allowable subject matter with the examiner."); Shema at 59 (5/4/09) ("[I]t takes a while to educate the examiner. . . . [F]rankly, the examiner often doesn't read the whole application the first time through."); Norviel at 119 (5/5/09); *cf*. Kunin at 240-41 (3/19/09) (stating that RCEs in the electrical arts have largely been a result of examiners "not really understanding").

[293]*See* Watt at 61 (5/4/09) (arguing that rather than an effort to enlarge claim scope, continuations are "more an effort to come to an agreement with the patent examiners, what's the right language, what are the right words to use to describe your invention in the claims").

[294]*See* Katznelson at 46-47 (3/18/09) (suggesting that to limit expense, applicants may focus first on claims that they know they will need within two or three years, while putting aside the others); Watt at 66 (5/4/09) (explaining that "you can't appeal everything, so you need other avenues in order to continue to

prolonged continuation practice – contentions that an applicant acquires a better understanding of his or her own product over time or that the product for which coverage is sought changes over time[295] – seem more debatable. Such contentions could be used to justify a wide range of conduct, from narrowing the claim to more clearly cover the applicant's ultimate product niche to strategically broadening claim language to cover rivals' subsequent development of products that the applicant never envisioned when filing the initial application. A "better understanding" of the latter type is contrary to notice goals and hardly a justification for continuations.[296] However, an important middle ground – ensuring protection of an early-filing inventor's eventual, commercial product[297] – invokes difficult trade-offs between providing desirable public notice and offering patent protection of appropriate scope.[298]

Given the benefits of continuations, the FTC has not urged their prohibition. Rather, the 2003 FTC IP Report focused on ways to limit the potential competitive harm from continuation practice.[299] It recommended the enactment of legislation to protect from infringement actions

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pursue your rights in the Patent Office").

[295]*See* Katznelson at 47-48 (3/18/09) (justifying continuations on the basis that "there comes a time when you find other features of the invention that turn out to be important and worthy of protection, and then at that point, you want to file additional claims"); Shema at 59-60 (5/4/09) (citing "situations where you learn more about the particular variations of your invention as data are developed" and wish to claim one of the disclosed structures more "specifically"); Watt at 66 (5/4/09) (describing continuations as "a very useful tool in order to pursue [the] full scope of inventions that you disclose in your patent application"); *cf*. Kiani at 49 (3/18/09) ("[T]here's no way the initial patent you filed with the claims you filed will end up protecting the invention disclosed.").

[296]*See* Hovenkamp, *supra* note 285, at 1253 ("The possibility of such abuses reveals one of the more deficient aspects of the patent system's failure to provide adequate notice to inventors."); *see also supra* Section IV.C.2.b.

[297]*See* Shafmaster at 234-35 (3/18/09) (explaining that applications are filed based on "work that's being done at the bench" and that as clinical trials progress, "all that time you're learning more about the drug and how it works and how to formulate it and how to dose it, and the continuation practice allows us to ultimately come out with stronger patents that are more specifically directed toward the final product").

[298]*See* Cotropia at 246 (3/19/09) (urging that in considering notice, we also consider the substantive effects on situations where "people are filing continuations not to try to capture other people, but to change as their development changes, as they go along"). Of course a key question is whether an applicant who was still developing an invention was truly in possession of the later developments at the time the application was filed. *See supra* Section IV.C.2.b.

[299]2003 FTC IP Report, ch. 4, at 26-31. In 2006 the FTC filed comments supporting a proposed PTO rule that would have allowed one continuation as of right and subsequent continuations when the amendment, argument, or evidence contained in the filing could not have been submitted earlier. The proposed rule was the subject of litigation, *see* Tafas v. Doll, 559 F.3d 1345 (Fed. Cir. 2009), *vacatur denied*, 586 F.3d 1369 (Fed. Cir. 2009), and the PTO has now dropped its proposal. The Commission's current recommendations would not limit the number of allowable continuations or the circumstances under

third parties who (i) infringe patents only because of claim amendments (or new claims) following a continuation and (ii) developed, used, or made substantial preparation for using, the relevant product or process before the amended (or newly added) claims were published.[300] As the Commission explained:

> Creating intervening or prior user rights would most directly cure potential competitive problems without interfering with legitimate needs for continuations, reducing business uncertainty without increasing costs of error. . . . This would protect third parties from hold-ups derived from any extended period of secrecy made possible by continuations, while allowing the patent to be enforced against those who would have infringed a properly described pre-continuation claim or who had timely opportunity to gain knowledge of the amendments.[301]

We reiterate the 2003 recommendation here.

Some panelists urged going beyond this by providing broader protection for prior users or independent invention.[302] Typically, their proposals reflected a concern that the sheer number of patents sometimes makes clearance extraordinarily difficult. These proposals are discussed in the next section.

Recommendations: evolving and pending claims. (1) The Commission recommends legislation requiring publication of patent applications 18 months after filing, whether or not the applicant also has sought patent protection abroad (subject to possible adjustments to provide any necessary protection to independent inventors). (2) The Commission recommends that consideration of the PHOSITA's ability to foresee future evolution of the claims be more fully incorporated into application of the written description requirement; the applicant should not be understood to have been in possession of the subject matter of a new or amended claim of scope broader than what the PHOSITA, on the filing date, could reasonably be expected to foresee from the specification. (3) The Commission recommends enactment of legislation to protect from infringement actions third parties who (i) infringe properly described claims only because of claim amendments (or new claims) following a continuation and (ii) developed, used, or made substantial preparation for using, the relevant product or process before the amended (or newly added) claims were published. (4) The Commission recommends that the PTO receive the funding and information systems needed to promptly and properly examine the many applications that it faces.

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which continuations may be filed.

[300] 2003 FTC IP Report, ch. 4, at 31.

[301] *Id.*, ch. 4, at 29-30.

[302] *See infra* Section IV.D.3.

D. Improving the Ability to Sift Through a Multitude of Patents

Searching through a mass of patents and applications to identify and review those that are potentially relevant to a new product can be a daunting undertaking. Although in some industries reliable searches apparently are regularly performed,[303] panelists reported that in IT and related industries a thorough clearance search is often infeasible or cost prohibitive.[304] In addition to the sheer number of patents, testimony emphasized that unclear claim language and the diverse ways in which claims might be expressed make search less effective.[305]

This section addresses policies that could improve the efficiency of clearance searches, concentrating on areas in which the PTO might improve the data available to searchers.[306] These include augmenting and/or modifying the PTO's classification system, improving the likelihood that text-based searches will identify relevant patents, and taking steps to ensure that patent assignments are promptly recorded with the Patent Office. The section concludes by reviewing certain suggestions for departing from strict liability norms due to concerns arising from lack of notice or related considerations.

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[303] *See, e.g.*, McNelis at 24-26 (5/5/09) (explaining that in life sciences you can be "confident that you're finding those patents that are right on top of what you are doing").

[304] *See, e.g.*, Yen at 53-54 (12/05/08) ("It is impossible to achieve any degree of certainty by such clearance searches with today's systems."); Bessen at 47 (3/19/09) (opining that it has become very difficult or impossible to perform an efficient clearance search in these industries); *see also supra* Section III.C.

[305] *See, e.g.*, Sprigman at 34 (2/12/09); Vermont at 164 (4/17/09); Horton at 175 (3/18/09); McNelis at 26-27 (5/5/09).

[306] By improving the efficiency of patent review, earlier recommendations to promote clearer boundaries can also expedite the search process.

1. Improving the Ability to Search for Relevant Patents

a. Background

Firms conducting a clearance search can avail themselves of a wide variety of resources.[307] Of principal importance are issued patents and documents created during the prosecution. These documents are publicly accessible and generally are organized using the PTO's Patent Classification System of about 400 classes and 120,000 subclasses.[308] The classes are based on analyses of patent disclosures,[309] and the system groups inventions based on their "proximate function," i.e., use of "similar processes or structures that achieve similar results."[310] Examiners employ this system to identify prior art and also to assign primary and secondary classifications to each patent granted (and each published application).[311] The PTO and the European Patent Office (EPO) recently have begun to work toward development of a cooperative patent classification system.[312]

Due to the advent of computerized databases, patent searching is now generally performed electronically.[313] The PTO offers full text search of a database, including the full text of all patents and some associated information, such as classification and issue date. The system permits search using simple Boolean operators, but does not rank the results, merely reporting

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[307] *See generally* DAVID HUNT, LONG NGUYEN & MATTHEW RODGERS, PATENT SEARCHING: TOOLS & TECHNIQUES (2007).

[308] *See* Bronwyn H. Hall, Adam B. Jaffe & Manuel Trajtenberg, *The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools* (Nat'l Bureau of Econ. Research, Working Paper No. 8498, 2001), *available at* http://www.nber.org/papers/w8498.

[309] *See* USPTO, Examiner Handbook to the U.S. Patent Classification System, ch.1, § B ("A fundamental principle of the USPC system is that each class, or part thereof, was created by: 1. analyzing the claimed disclosures of the U.S. patents [and] 2. creating various divisions and subdivisions on the basis of that analysis rather than by making a theoretical arrangement or ordering . . . ."), *available at* http://www.uspto.gov/patents/resources/classification/handbook/index.jsp.

[310] *Id.* at ch.1, § A.2.

[311] *Id.* at ch.1, § B.

[312] *See* USPTO, Press Release, 11-09, USPTO and EPO Reach Agreement on Principles of Cooperative Patent Classification System (Feb. 4, 2011), *available at* http://www.uspto.gov/news/pr/2011/11_09.jsp.; USPTO, Press Release, 10-51, USPTO and EPO Work Toward Joint Patent Classification System (Oct. 25, 2010), *available at* http://www.uspto.gov/news/pr/2010/10_51.jsp. Their efforts will seek alignment with the International Patent Classification system while achieving a greater level of detail. *Id.*

[313] *See, e.g.*, Andrew Chin, *Search for Tomorrow: Some Side Effects of Patent Office Automation*, 87 N.C. L. REV. 1617 (2009) (discussing the impact of electronic search methods on patent searches).

them in reverse chronological order.[314] Commercial services also permit searches of patent documents. They frequently permit enhanced searches (e.g., complex algorithms and search operators), while scoring results so that the potentially more relevant results can be presented first.[315]

b. Analysis

U.S. patent classification system. The current classification system, derived from the PTO's experience with patents, often differs from industry-based classifications.[316] Testimony suggested that it could significantly aid search if the PTO added industry-based classifications to its system.[317] To implement this proposal, the PTO could instruct examiners to classify patents not only using the U.S. Patent Classification System, but also under industry classification systems, so that a search could be conducted using either or both. In addition, the PTO and EPO might consult industry classification systems in developing their new, cooperative system.

Predictable terminology for searching. The lack of a common, predictable terminology, already identified as a concern affecting patent clarity, particularly in IT, also undermines effective patent searching. Panelists noted that variation in the terms used to describe inventions can limit the effectiveness of electronic database searches[318] and called for "taxonomical advances" to better represent the "intellectual space" to be searched, "ideally . . . the equivalent of periodic tables in the IT fields."[319]

Improvement might come from the applicants. If vocabularies for claiming were more standardized, researchers could use search terms with greater confidence of finding relevant

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[314] *See* Shigeyuki Sakurai & Alfonso F. Cardenas, *An Analysis of Patent Search Systems*, 90 J. PAT. & TRADEMARK OFF. SOC'Y 448, 449 & tbl. 1 (2008). The PTO also makes the file history available online through PAIR. *See supra* Section III.B.

[315] *See id.* at 449 & tbl. 1 (describing search capabilities of the USPTO, Google Patent Search, Delphion, PatentCafe and LexisNexis, among others).

[316] *See* Kunin at 262 (3/19/09).

[317] *Id*. (maintaining that such a step would be "a great addition for industry"); Rai at 262 (3/19/09) (concurring "very strongly" and reporting "that examiners have been wanting a change in th[e] classification system for a while").

[318] *See* Horton at 174-75 (03/18/09) (explaining that a software invention may be described in different ways, making "the automated portion of finding the right prior art [] a little more . . . challenging"); *cf.* Martin Comment at 13 (5/15/2009) (explaining that patent claims "do not follow the symbolic rules and procedures adopted by the field of software engineers as their domain").

[319] Menell at 30-31 (5/5/09).

patents.[320] In discussing ways to enhance patent clarity, a prior recommendation urged the PTO to "convene a government/industry task force or hold a workshop to explore ways of fostering greater uniformity in the methodology or language used for describing and claiming software inventions."[321] The same inquiry could simultaneously explore ways to develop and promote greater uniformity for purposes of enhancing search capabilities.

Improvement might also come from the examiners. In addition to implementing the industry-based classification system, discussed above, examiners could also provide search-friendly lists of descriptive terms for applications under review and patents ready for issuance.

Full-text searching on PAIR. As discussed above in Section III.B., the PTO makes file history information available through PAIR. While PAIR is an effective tool for following a particular application, it does not provide full-text search capabilities.[322] Ability to quickly search the prosecution history would likely enhance clearance efforts in the face of large numbers of potentially relevant patents.[323] Recently, one subscription service has announced the availability of full-text search of file histories.[324] Developments of this type could prove very helpful for notice purposes.[325]

2. Identifying Patent Assignees

a. Background

A patentee is free to assign (i.e., sell) his or her patent to another party, thereby transferring the right to exclude conferred by the patent. At their option, parties can record assignments with the PTO by paying a fee and filing a form that lists for public review the assignee's name, a contact person, and an address.[326] Neither the Patent Act nor PTO regulations

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[320]Similarly, requiring that terms be defined might also improve the reliability of using electronic search mechanisms because definitions might include terms used in a search query.

[321]*Supra* Section IV.B.1.b.

[322]*See* Kunin at 260 (3/19/09); Private PAIR Quick Start Guide, *available at* http://www.uspto.gov/patents/process/status/private_pair/PrivPairOverview_Oct09.pdf.

[323]*See* Kunin at 260 (3/19/09) (urging that "having a full text searchable file history will provide a much better notice function"); NAS REPORT, *supra* note 267, at 105 (recommending that an electronic version of the prosecution history be made available upon publication of the patent application).

[324]*See* Westlaw Database Directory, US-PAT-HISTORY summary, *available at* http://directory.westlaw.com/scope/default.asp?db=US-PAT-HISTORY&RS=W...&VR=2.0.

[325]Making PTO data easily accessible to industry and the public and expanding access through the worldwide web are objectives cited in the PTO Strategic Plan, *supra* note 264, at 40.

[326]*See* MPEP §§ 301-24.

require such recordation, although an assignment not recorded with the PTO is "void as against any subsequent purchaser" who lacks notice of the assignment.[327] As a result, while the records are open to the public,[328] they do not include all assignments.

Panelists reported that under this voluntary system, PTO records provide poor notice regarding current ownership of patents.[329] Testimony suggested that parties often fail to report assignments to the PTO[330] or list "shell companies" as assignees, "making it as difficult as possible, apparently, to trace back to the true assignee of the patent."[331] Moreover, testimony indicated, the information is difficult to locate: it is "buried somewhere on the website" rather than included with the patent record.[332]

b. Analysis

Assignment records play an important role in clearing patent rights. One strategy for navigating an environment with many potentially relevant patents is to concentrate clearance efforts on patents held by competitors or others who are likely to sue.[333] This strategy falters if the public lacks notice of assignments. Moreover, if the clearance search determines that a patent

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[327] 35 U.S.C. § 261. The PTO does require proof of assignment to permit an assignee to take certain actions as owner of the patent or application in PTO proceedings. *See* 37 C.F.R. § 3.73.

[328] *See* 37 C.F.R. 1.12.

[329] *See, e.g.*, Graham at 236 (4/17/09) (describing the PTO's patent reassignment data as "notoriously just not good"); McNelis at 27 (5/5/09) ("[T]he assignments are not always in order."); Slifer at 112 (3/18/09) (indicating that patent ownership is "difficult to ascertain").

[330] *See* Wagner at 236 (4/17/09) (explaining that "the vast majority of people just don't" file reports, or if they do "it's late"); Rai at 263 (3/19/09) (noting concerns that reporting of assignments "doesn't happen very often"); Harris at 113 (3/18/09).

[331] Kappos at 265 (3/19/09); *see also* Slifer at 113 (3/18/09) (reporting evidence that companies list "shell corporations" as part of "some intentional hiding of . . . who's the true party in interest"); McNelis at 27 (5/5/09) (asserting that search is more difficult and costly because "some companies like to play games with the assignments").

[332] Hall at 287 (5/4/09).

[333] *See* McNelis at 27 (5/5/09) ("one of the strategies we employed" when there are many potentially relevant patents, "was to take a look at their major competitors"); Phelps at 262 (5/4/09) (describing search efforts focused on the portfolios of specific companies); Durie at 18 (5/5/09) (discussing a clearance search focused on the portfolio of a single company); DeVore at 43 (5/4/09) (explaining that freedom to operate analyses have grown "more savvy" by distinguishing between patents held by parties likely to grant nonexclusive licenses and patents held by close competitors); *cf*. Durie at 19 (5/5/09) (litigation risk is "a function . . . [of] underlying business considerations" that depend on knowing: "Who's holding the patent?").

is a problem, knowing the owner is essential to seeking a license. Indeed, information on the owner can be essential for a firm to determine if it already has rights to the patent via a cross-license.[334] Recordation of assignments would help with these notice problems.[335]

In light of these considerations, the filing and public recordation of assignments of patents and published patent applications, including identification of the real party in interest, should be required by a statutory change. A patent confers a right to exclude, and it is important to clearance efforts that the public faced with that right have a ready means of identifying the owner. Arguably, public notice of a transfer may reveal some information about the parties' business efforts and strategies,[336] but similar information must be provided when filing any patent application, and the inventor and any assignees are identified when a patent issues. In each case, the public benefits from knowing the identity of current applicants/patent holders. Recording assignments of government-conferred rights to exclude is necessary to ensure public notice and will not unduly burden patent transfers.

3. Modifying Liability for Inadvertent Infringement

Consistent with the notice problems described in this chapter, recent studies show that patent infringement litigation very often seeks to recover from inadvertent infringers, i.e., those who used a patented technology not knowing that it was covered by a patent.[337] Scholars have recognized that the current system imposes information costs on technology users, a form of "notice externality,"[338] and have addressed the possibility of modifying the rule of strict liability

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[334] *See* Kappos at 265 (3/19/09).

[335] *See* Kappos at 265 (3/19/09) (urging identification of assignees of published applications); Rivette, at 37-38 (5/5/09) ("the assignment database . . . has to be something that we fix"); Rai at 263 (3/19/09) (suggesting that it would aid freedom to operate assessments to know who the "actual assignees" of the patent are).

[336] *See* Hoffman at 103 (4/17/09) (explaining that such information can indicate the technology areas that a firm is pursuing or abandoning); Malackowski at 102 (4/17/09) (arguing that firms ought to be able to keep their strategies secret).

[337] *See, e.g.*, Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1462 (2009) ("The overwhelming majority of defendants are independent developers who were unaware of the existence of the patent when they made their product design decisions."); BESSEN & MEURER, *supra* note 16, at ch. 3 (describing the extent and causes of inadvertent infringement); *see also* Meurer at 207 (12/5/09) (stating that only "in about 4 percent of the cases is the defendant ever shown to be a copyist"); Durie at 124-25 (5/5/09) (describing how many infringers "did not and could not plausibly have received actual notice of the patent at the time they [were] making design choices relating to their products").

[338] Menell at 29 (5/5/09); *see also* Clarisa Long, *Information Costs in Patent and Copyright,* 90 VA. L. REV. 465 (2004); *cf.* Blair & Cotter, *supra* note 12, at 800-08 (observing that in light of marking requirements, 35 U.S.C. § 287, patent law is not a pure strict liability system).

or the allocation of burdens for supplying and seeking information to accommodate concerns regarding inadvertent infringement.[339] Several panelists expressed similar ideas.[340]

Arguments supporting such proposals include the fact that strict liability may have little deterrent effect on inadvertent infringement[341] and may promote inefficiently high levels of search effort,[342] while burdening beneficial innovative activities.[343] On the other hand, some question whether inadvertent infringement is really innocent in many cases.[344] Other testimony argued that such a defense would create strong incentives to remain ignorant of patents[345] and scholars have warned that the difficulty of proving intentional infringement may enable actual

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[339] *See, e.g.*, Blair & Cotter, *supra* note 12, at 840-41 (suggesting adoption of an "'actual knowledge' standard" in "a few discrete situations"); BESSEN & MEURER, *supra* note 16, at 249 (2008) (suggesting that "[i]t might be desirable to reform patent law by simply excusing good-faith infringe[ment]"); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1818 (2007) (recognizing concerns about "inadvertent infringement" and noting the possibility that limiting remedies to damages rather than injunctive relief may be appropriate in some circumstances); John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 554 (2010) ("[I]f lack of timely and effective notice of patent rights helps to cause much infringement, a patentee might be the cheapest cost avoider for the social costs of poor notice. Under such circumstances, reduced remedies for inadvertent infringement might optimally spur patentees to improve patent notice.").

[340] *See, e.g.*, Menell at 36 (5/5/09) (suggesting that an independent invention defense or limitation of remedies could reduce notice problems); McCurdy at 69-70 (12/5/08) (arguing that an independent invention defense works well for technologies like software, where invention is ubiquitous and the information costs of determining who invented what are high); Schultz at 131-32 (5/5/09) (suggesting that damages might be reduced when patents are relatively ambiguous or notice is poor); Durie at 124-25 (5/5/09) (arguing that damages paid by inadvertent infringers should reflect the fact that lack of notice undermined their opportunity to evaluate alternative technology); *cf.* Squires at 192 (12/5/08) ("Where there are fuzzy boundaries and non-existent or imperfect notice," strict liability is "a big weight to bring down."). *But cf.* Cotter at 193 (12/5/08) ("I don't think anybody wants to abandon strict liability for patent infringement as a general principle.").

[341] *See, e.g.*, Cotropia & Lemley, *supra* note 337, at 1463 (criticizing damage awards based on deterrence goals because deterrence has "no place in a patent regime where virtually all infringement is unintentional").

[342] *See, e.g.*, Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1308-11 (2008).

[343] *See supra* Section II.

[344] *See, e.g.*, Dickinson at 191 (12/5/08) (suggesting that independent inventors may be "willful infringers . . . that haven't studied the art"); Rhodes at 217-18 (2/12/09).

[345] *See, e.g.*, Rhodes at 218 (2/12/09) ("[W]e would be encouraging firms not to read patents so they can try to avail themselves of the inadvertent defense."); Golden at 95 (2/12/09) (noting the importance of considering whether an infringer used "proper diligence").

copyists to avoid liability.[346] Moreover, some argue that notice problems are concentrated in certain industries, so that it would be an error to tamper with remedies across the board.[347]

Recently, attention has focused on a defense protecting inadvertent infringement resulting from "independent invention." While this defense can be defined broadly to cover most inadvertent infringement, leading proponents have concentrated on modifying liability in situations involving nearly simultaneous invention.[348] Even this narrow defense has drawn considerable criticism.[349] Broader formulations, more consistent with the inadvertent infringement concept, would permit the defense to be raised even if the patent has been published,[350] but raise serious problems proving that the inventor invented independently.[351]

An alternative would be "prior user rights," which protect those who use the patented technology (e.g., as a trade secret) before the patentee seeks or obtains the patent, enabling the prior users to continue practicing the technology without a licence. Virtually all EU jurisdictions recognize this defense, although it is seldom invoked in courts.[352] U.S. law currently recognizes a very narrow prior user defense in the business methods context.[353] Some scholars have

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[346]*See* Blair & Cotter, *supra* note 12, at 814.

[347]*See* Rhodes at 216-17 (2/12/09).

[348]*See* Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475, 484-89 (2006) (proposing a defense limited to situations in which a firm independently invented after the patentee invented, but before the firm was on constructive notice through publication of the patent (or application)); Vermont at 163-64 (4/17/09); Carl Shapiro, *Prior User Rights*, 96 AM. ECON. REV. 92 (2006) (analyzing the effects of a similar system and finding that it has "very attractive properties," specifically, "competition is enhanced, innovation is rewarded").

[349]*See* Lemley, *supra* note 13; Wagner 228 (4/17/09); Verizon Communications Inc. Comment at 6 (5/5/09). Some analysts have agreed that the circumstance of near-simultaneous invention is significant, but suggest that it be applied mainly in assessing whether the invention was obvious. *See* Lemley, *supra* note 13, at 1534-35; Hall at 210-11 (5/4/09); *see generally* Vermont at 171-72 (4/17/09) (discussing the role of independent invention as an objective indicator of obviousness).

[350]*See* Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defense in Intellectual Property*, 69 ECONOMICA 535 (2002) (arguing in favor of such a defense).

[351]*See* Vermont, *supra* note 348, at 475.

[352]P. Van Eecke, J. Kelly, P. Bolger & M. Truyens, *Monitoring and analysis of technology transfer and intellectual property regimes and their use*, Results of a study carried out on behalf of the European Commission (DG Research), ch. 2 (August 2009) (describing the contours of the defense in various EU jurisdictions), *available at* http://www.eutechnologytransfer.eu/files3/report.pdf.

[353]35 U.S.C. 273; *see also* Cockburn at 227-28 (4/17/09) (observing that prior user rights have had little impact in the business method patent area).

proposed broadening the existing provision,[354] and pending legislation calls for the PTO to study the impact of such rights in other countries.[355]

In sum, considerable evidence suggests that notice problems have contributed to widespread inadvertent infringement in some industries.[356] If efforts to improve notice do not succeed, consideration of modifications to strict liability may be appropriate. But a substantial change along these lines could result in a "dramatically different" patent system,[357] and legal and economic knowledge in this area is too limited to adequately assess specific reform proposals.[358] Under these circumstances, research designed to better understand how modifications to strict liability for patent infringement would affect incentives to invent and innovate would be desirable.

Recommendations: sifting through a multiplicity of patents. (1) The Commission recommends that the PTO instruct examiners to classify patents using an industry-based classification system, as well as the PTO classification system, in art units where the additional classifications would significantly improve public notice. The Commission further recommends that the PTO explore mechanisms for encouraging examiners to compile search-friendly lists of descriptive terms for applications under review and patents ready for issuance. (2) The Commission urges that the PTO explore with the software industry whether ways might be devised to foster greater uniformity in the methodology or language used for describing and claiming inventions, as a means of enhancing search capabilities. (3) The Commission recommends the enactment of legislation requiring the public recordation of assignments of patents and published patent applications. To ensure that such listings provide maximum benefit to public notice, they should identify both the formal assignee and the real party in interest.

V. CONCLUSION

Patent notice is a vital aid to competition and innovation. Effective notice fosters efficient innovation investment by enabling firms to select technologies with knowledge of applicable patent rights. It removes uncertainty, which causes some firms to shy away from procompetitive innovation for fear of the penumbra that surrounds a patent's actual reach, and which induces others to engage unnecessarily in costly design-around efforts. It shelters firms that move ahead with product introduction from the risk of expensive and disruptive litigation over unexpected patent assertions and the need to pay higher royalties than they would have negotiated before launch. It fosters the shared understanding and accurate valuation of IP rights

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[354] *See, e.g.*, BESSEN & MEURER, *supra* note 16, at 249-51.

[355] *See* Patent Reform Act of 2011, S. 23, 112th Cong., 1st Sess. § 2(n) (2011).

[356] *See supra* Section III.

[357] *See* Cotropia & Lemley, *supra* note 337, at 1460.

[358] *See* Blair & Cotter, *supra* note 12, at 840 (noting the absence of relevant empirical evidence).

that supports collaboration among firms with complementary expertise and promotes competition among inventions in efficient technology markets.

Patent notice concerns derive from a variety of sources, including difficulties in interpreting the boundaries of issued claims, difficulties in foreseeing evolving claims, and difficulties in sifting though a multitude of patents. The presence and severity of these challenges vary greatly among industries. At the Commission's hearings, by far the most serious concerns were identified in the IT sector, where some panelists declared it "virtually impossible" to conduct meaningful patent clearance. In contrast, panelists from the pharmaceutical and biotech sectors generally found the patent system's notice function well, or at least adequately, served.

Solutions require care and balance. We have looked for mechanisms that provide notice early, avoid unnecessary burdens, and assign responsibilities to the least-cost providers. We have tried to avoid recommendations that might unnecessarily burden industries where notice problems are manageable. We recognize that some mechanisms for enhancing notice raise trade-offs between notice objectives and patent scope. In most instances, we have highlighted the need for notice considerations to weigh heavily, while leaving it to the patent system to balance those considerations against any impact on the scope of patent protection. And we have looked for solutions that enhance notice without significantly affecting scope.

With these considerations in mind, this chapter seeks ways to improve notice by addressing each of the basic sources of potential problems. With regard to the boundaries of existing claims, it stresses vigorous PTO application of the indefiniteness standard as a way of removing ambiguity and suggests ways to improve the utility of the specification and prosecution history to make claim construction more predictable for third parties. With regard to evolving claims, after stressing the need for adequate PTO funding, it urges broader publication of applications, application of the written description requirement with notice concerns in mind, and some protection for prior users first covered by claims broadened through continuations. To address the difficulties posed in some industries by the sheer number of claims, it suggests ways to improve the search for relevant patents and to identify patent assignees.

Plainly, notice problems are substantial, varied in source, and often highly challenging. Yet with the challenges comes an opportunity to remove impediments to, and strengthen the infrastructure for, competition and innovation. Because the potential benefits are large, the concerns raised by this chapter require prompt attention, and the suggested improvements warrant thorough consideration.

CHAPTER 4
THE ECONOMIC AND LEGAL FOUNDATIONS OF PATENT REMEDIES

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CHAPTER 4
THE ECONOMIC AND LEGAL FOUNDATIONS OF PATENT REMEDIES

I. INTRODUCTION

Patent owners can offer their patented inventions in the marketplace. They can sell a patented product or transfer their technology for development and commercialization by others. In either case, the market reward earned by a patentee will depend upon the invention's contribution – the extent to which consumers prefer it over alternatives and prior technology. Patent remedies play an important role in protecting the ability of patent holders to earn returns in the marketplace by deterring infringement and compensating patentees when infringement occurs. Patent remedies also play a central role in ex post patent transactions by establishing the legal shadow in which negotiations occur.

For remedies to protect the patent system's incentives to innovate and avoid distorting competition among technologies, they must replicate the reward the patentee would have earned in the market absent infringement. The Patent Act incorporates this fundamental goal of fully compensating patentees for infringement by requiring that a court award a successful patentee damages "adequate to compensate for the infringement." Courts have defined damages "adequate to compensate" as those that make the patent owner whole by placing it in the position it would have been but for the infringement. This standard, when accurately implemented, aligns patent law and competition policy by supporting the patent system's incentives to innovate while allowing consumers to benefit from competition among technologies.

The ability of current patent remedies law to carry out this role successfully is unclear. The patent community vigorously debates whether reasonable royalty damages law appropriately compensates patentees. It also struggles to understand the full implications of the Supreme Court's *eBay* decision, which overturned assumptions that every patentee who proved infringement in court would receive a permanent injunction. Gauging the accuracy of remedies rules in replicating the market reward that patentees would have earned absent infringement may not be possible. But as one commentator explains, "much of the law on patent damages obscures the effort to match damage awards to the economic values of inventions."[1] To address this criticism, this report seeks to derive an economically grounded approach for analyzing patent remedies and to test the current legal rules for calculating damages and awarding injunctions against that approach.

II. THE MARKET ALIGNS REWARD AND CONTRIBUTION THROUGH COMPETITION

An important benefit of the patent system, in contrast to other methods of encouraging innovation, like direct prizes, is that it allows each invention to be valued directly through a

[1]Schlicher Comment at 4, 38 (5/15/09).

market mechanism.[2] A patentee can obtain a financial reward for its patent by producing a product that incorporates the invention or by transferring the technology through a patent license or sale to a manufacturer who develops and produces a product. The market reward[3] earned by the patentee in either case will depend upon the extent to which consumers prefer the patented invention over alternatives and prior technology, which helps determine the invention's economic value.

A patented invention may present a small improvement over known technology or a radical departure that displaces what came before. In some cases, patents will protect a "disruptive" technology – a technology that creates "competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives."[4] A patent covering such a technology can confer market power on the patentee and generate the possibility of monopoly profits and significant market rewards.

Many patented inventions, however, compete with a range of acceptable alternatives, which limit the patent owner's ability to obtain a monopoly profit.[5] A patent can protect a new product from competition with other products incorporating the same invention, but it cannot protect a new product from those similar products that adopt alternative, noninfringing technologies. Products incorporating patented technology often compete in product markets. Patented technologies can also compete in technology markets to be chosen for development and incorporation into new products. Through this competition, product developers can reject technologies whose cost is more or whose value is less than that of available alternatives.

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[2]Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 248-49 (1994); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents and Hold-Up*, 74 ANTITRUST L. J. 603 (2007).

[3]The "market reward" defined here is the amount the patentee could have earned by either selling a patented product or licensing the patented technology in the absence of infringement.

[4]JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 1942 (1976).

[5]The principle that patents do not necessarily confer market power for these reasons is widely accepted. Ill. Tool Works, Inc. v. Indep. Ink, Inc., 547 U.S. 28, 45-46 (2006) ("Congress, the antitrust enforcement agencies, and most economists have all reached the conclusion that a patent does not necessarily confer market power upon the patentee. Today, we reach the same conclusion . . . ."); U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (2007), ch. 1, at 22 ("Although a patent gives the patent owner the right to exclude others from making, using, or selling a particular product or process, the existence of close substitutes for the product or process may prevent the patent owner from exercising market power.").

Consumers benefit from the competition among patented products and technologies, which lowers prices, increases quality and encourages innovation.[6]

In a well-functioning market, the more advantageous the patented invention compared to alternatives, the more consumers will prefer it , the greater its economic value, and the greater the market reward to the patent owner. "These exclusive [patent] rights are worthless if the invention turns out to be a dud, but ultimately the market decides what is valuable and what is not."[7] Judge Giles Rich captured this important aspect of the patent system in an often quoted statement: "[I]t is one of the legal beauties of the system that what is given by the people through their government – the patent right – is valued automatically by what is given by the patentee. His patent has value directly related to the value of his invention, as determined by the marketplace."[8] Competition aligns the economic value of the invention and the value of the patent. To support this alignment, the patent legal rules must not distort that competition.

The alignment of the patent system and competition affects not only the operation of product and technology markets. It also can affect the allocation of research and development resources. Under the patent system, society "funds" the often expensive process of invention, research, development and innovation by conferring exclusive rights on patentees. By aligning the patentee's reward with the invention's value compared to alternatives and prior technology, a well-functioning market incentivizes inventors to pursue those inventions that are more likely to be valued by consumers.[9] In this way, market forces help to allocate research and development resources to those areas most valued by consumers. Distortions in how the market rewards patented inventions can have consequences for R&D decisions.

III. PATENT REMEDIES SEEK TO REPLICATE AND PROTECT THE MARKET REWARD FOR INVENTIONS

Remedies for patent infringement are crucial to the ability of the patent system to promote innovation by protecting innovators' ability to reap benefits from their investments in research, development and commercialization of new products. The market can fully reward a patentee, and align that reward with the invention's economic value over alternatives, only where there is no infringement to dilute the reward. To successfully support the patent system's incentives to

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[6] *See* FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 2, at 8-16 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf (discussing how competition promotes innovation); *see also* Slifer at 77 (3/18/09) ("As detailed in the Commission's 2003 report, Micron continues to believe that the primary drive for innovation at least in our industry is competition.").

[7] ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 17-19 (2005).

[8] *In re* Kirk, 376 F.2d 936, 964 (C.C.P.A. 1967).

[9] BLAIR & COTTER, *supra* note 7, at 16-17.

innovate, remedies must compensate for past infringement, prohibit future infringement, and deter infringement in the first instance.

Patent remedies provide three types of redress to accomplish these tasks: compensatory damages, enhanced damages, and injunctive relief. Each plays a different but overlapping role. Compensatory damages preserve the patentee's incentive to innovate by making it whole in spite of infringement.[10] Enhanced damages deter willful infringement.[11] Permanent injunctions preserve the patentee's exclusivity going forward and deter infringement in the first instance.[12] Enhanced damages are unique among the three remedies because they are meant to punish the infringer and so they award the patentee more than the market would have. Compensatory damages and permanent injunctions, on the other hand, are meant to serve the utilitarian goals of the patent system by allowing the patentee to reap the reward the market would have conferred, absent infringement.

To align the patent system and competition policy, it is important that compensatory damages and injunctions be assessed in a manner that aligns the patentee's compensation with the invention's economic value. Remedies do so when they either replicate the market reward in the case of compensatory damages, or protect the exclusive market position that allows the patentee to earn that reward directly, in the case of injunctions. Assessing damages or injunctions in a manner that undercompensates patentees compared to the market reward will undermine the patent systems's power to promote innovation. Overcompensation compared to the market reward can distort competition among technologies, which raises multiple problems discussed in Section C of this chapter.

A. Compensatory Damages

To compensate a patentee as the market would have, damages should be designed to return the patentee to the financial condition it would have been in but for the infringement.

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[10]Following a finding of infringement, a court shall award damages "adequate to compensate for the infringement." 35 U.S.C. § 284.

[11]Establishing willful infringement requires clear and convincing evidence that "the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent" and that "this objectively-defined risk . . . was either known or so obvious that it should have been known to the accused infringer." *In re* Seagate Tech., LLC, 497 F.3d 1360, 1371 (Fed Cir. 2007). *See also* Roderick R. McKelvie, Simon J. Frankel & Deanna L. Kwong, *Nine Unanswered Questions After In re Seagate Technology LLC*, 20 INTELL. PROP. TECH. L. J. 1, 1 (2008).

[12]Section 283 of the Patent Act grants district courts the discretion to issue injunctions in patent infringement cases following the principles of equity. 35 U.S.C. § 283. In its decision in *eBay*, the Supreme Court set out four factors that courts must consider in exercising that discretion. eBay, Inc. v. MercExchange, LLC, 547 U.S. 388, 391 (2006).

Patent damage awards should reflect the economic realities of the market by rendering the patentee no worse off, but also no better off, than it would have been absent the infringement.[13]

The law of patent damages incorporates this fundamental economic principle. The Patent Act requires that a court award a successful patentee damages "adequate to compensate for the infringement." Damages are meant to be compensatory and not punitive.[14] Courts have defined damages "adequate to compensate" as damages that make the patent owner whole by placing it in the position it would have been but for the infringement.[15] The Supreme Court frames the question as "had the Infringer not infringed, what would the Patent Holder-Licensee have made?"[16] As explained by a leading treatise, "[t]his is the critical starting point for any review of the various patent damages theories or even for a damages analysis in an actual case, regardless of how the damages award is computed or what that damages award is called."[17]

Over the years, courts have developed an extensive jurisprudence on how to calculate compensatory damages. Current law identifies two categories, lost profits and reasonable royalties, and provides legal rules for determining which category applies and how damages should be calculated. One important method for placing the patentee in the position it would have been but for the infringement is to award it the profits that it lost due to the infringement. This approach most readily applies when the patent holder seeks to earn its return by selling a product in the marketplace. Infringing competition can reduce a patentee's profits in a number of ways, including by diverting sales from the patentee's product, eroding the patentee's sales price, and causing the patentee to lose collateral sales of nonpatented products.[18] As discussed in Chapter 5, in measuring lost profits damages, it is important that the legal rules allow the patentee flexibility in creating the world but for infringement. But the legal rules must also recognize how alternatives to the patented invention would have affected profits in order to align patent law and competition policy.

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[13]Cotter at 138 (12/5/09); Squires at 168 (12/5/09); NERA Economic Consulting Comment at 11 (3/9/09); BLAIR & COTTER, *supra* note 7, at 47.

[14]Riles v. Shell Exploration and Prod. Co., 298 F.3d 1302, 1311-12 (Fed. Cir. 2002) ("Compensatory damages, by definition, make the patentee whole, as opposed to punishing the infringer. ").

[15]*See, e.g.*, Brooktree Corp. v. Advanced Micro-Devices, Inc., 977 F.2d 1555, 1579 (Fed. Cir. 1992).

[16]Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 507 (1964) (*quoting* Livesay Window Co. v. Livesay Indust., Inc., 251 F.2d 469, 471 (5th Cir. 1958)).

[17]JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, PATENT DAMAGES LAW AND PRACTICE §§ 1.1, 1-3, 1-4 (2008). The treatise continues, "it is probably the failure to recognize this basic premise that has resulted in many of the large damages awards for the patentee – awards that otherwise might have been substantially limited." *Id.*

[18]*See, e.g.*, Ericsson, Inc. v. Harris Corp., 352 F.3d 1369, 1377-79 (Fed. Cir. 2003) (upholding a lost profits award that included compensation for sales lost to the infringer and price erosion attributable to the infringing activity).

Lost profits damages will not be appropriate when the patentee does not manufacture a product. Rather, the patentee would likely seek to license its patent for the maximum amount that it could extract from the infringer in the technology licensing market. In that situation, putting a patentee in the position it would have been but for the infringement and compensating the patentee as the market would have requires replicating the bargain the parties themselves would have struck prior to infringement. This requires calculating reasonable royalty damages based on a hypothetical negotiation between a willing licensor (the patentee) and a willing licensee (the infringer).[19] Properly implemented, the hypothetical negotiation can align patent damages law and competition policy. The law adopts the hypothetical negotiation approach,[20] but sometimes gives the willing licensor/willing licensee model short shrift, as discussed in Chapter 6. Moreover, implementing that model raises many difficult conceptual and evidentiary issues, as discussed in Chapter 7.

B. Permanent Injunctions

The Patent Act requires that following a finding of infringement a district court consider the "principles of equity" in deciding whether to grant a permanent injunction against infringement.[21] In *eBay v. MercExchange*, the Supreme Court rejected a "general rule" favoring the grant of injunctions and listed four equitable factors that a patentee must satisfy to obtain an injunction:

> 1) that it has suffered an irreparable injury; 2) that remedies at law[, such as monetary damages,] are inadequate to compensate for that injury; 3) that, considering the balance of hardships between the [parties], a remedy in equity is warranted; and 4) that the public interest would not be disserved by a permanent injunction.[22]

Permanent injunctions play a critical role in protecting the exclusivity that allows a patentee to reap the market reward for its invention following a finding of infringement. By maintaining control of the invention, a patentee can maximize its returns. For example, a manufacturing patentee can maximize profits by controlling the quantity of its innovative product offered in the marketplace. Similarly, a research firm patentee might obtain the highest royalty by negotiating an exclusive license with the company best-suited to commercialize the invention.

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[19]Many panelists and commentators agreed that the hypothetical negotiation construct is the correct approach for determining reasonable royalty damages. *E.g.,* Cotter at 138 (12/5/09); NERA Economic Consulting Comment at 11 (3/9/09).

[20]Unisplay, S.A. v. American Elec. Sign Co., 69 F.3d 512, 517 (Fed. Cir. 1995) ("The statute contemplates that when a patentee is unable to prove entitlement to lost profits or an established royalty rate, it is entitled to "reasonable royalty" damages based upon a hypothetical negotiation between the patentee and the infringer when the infringement began.").

[21]35 U.S.C. § 283.

[22]eBay, Inc. v. MercExchange, LLC, 547 U.S. 388, 391 (2006).

The threat of an injunction also creates a significant deterrent to infringement that allows patentees to earn the full market reward supported by an exclusive position without litigation. An injunction has consequences reaching beyond a possible damages award. If an adjudged infringer has sunk costs into research and development or a plant and equipment to produce the infringing product, it risks losing that investment if it cannot obtain a license.[23] The injunction may render the infringer's inventory valueless, making it impossible to recoup those sunk costs. For that reason, many firms attempt to ensure freedom to operate or "patent clearance" before embarking on a research and development track, either to avoid an area already covered by patents or to seek a license to the patented technology.[24]

Under some circumstances, however, the threat of an injunction can lead an infringer to pay higher royalties than a competitive market would award for a minor invention having several alternatives. Where a patentee asserts a patent seeking an ex post licensing agreement, and the infringer has sunk costs in product design and production using the patented technology, switching to an alternative technology may be very costly. In that case, the patentee can use the threat of an injunction to obtain royalties covering not only the value of its invention compared to alternatives, 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. In this situation, the patentee's compensation is no longer aligned with the value of its technology compared to alternatives. In some situations, this outcome can lead to the problems of overcompensation described below. Chapter 8 discusses how injunction analysis can balance the competing concerns of protecting incentives to innovate while avoiding overcompensation.

C. The Problems of Under and Overcompensation

Patent remedies that either under or overcompensate patentees compared to the market reward absent infringement harm consumers in multiple ways. The size of damage awards determines the amount that the infringer must pay the patent holder as compensation for past infringement. The effects of damages, however, extend beyond cases in which they are awarded. Damage awards have a "ripple effect" on the far larger number of cases in which royalties are negotiated to avert or settle litigation as part of an ex post patent transaction.[25]

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[23] *See, e.g.*, Mark A. Lemley & Carl Shapiro, *Patent Hold-Up and Royalty Stacking,* 85 TEX. L. REV. 1991 (2007); Vincenzo Denicolò, Damien Geradin, Anne Layne-Farrar, and A. Jorge Padilla, *Revisiting Injunctive Relief: Interpreting eBay in High-Tech Industries with Non-Practicing Patent Holders*, 4 J. COMPETITION L. & ECON. 571, 573-4 (2008); Vincent E. O'Brien, *Economics and Key Patent Damages Cases*, 9 U. BALT. INTELL. PROP. L.J. 1, 19 (2000); BLAIR & COTTER, *supra* note 7, at 231. The deterrent effect of injunctions following the *eBay* decision is discussed in Chapter 8, Section IV.A, *infra*.

[24] *See* Chapter 8, Section IV.A; Chapter 3, Section II.

[25] Marian Underweiser, *Towards an Efficient Market for Innovation* 1, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009) ("Court awarded reasonable royalty determinations provide the backdrop against which all patent settlements and patent licensing activities are measured."). The size of damage awards will have less influence over ex ante patent transactions, where the cost and value of

Remedies that systematically undercompensate patentees reduce incentives to innovate below levels intended by the patent laws. Denials of injunctions can undermine the ability of patentees to obtain the full market reward by commercializing their inventions. Damage awards that do not make the patentee whole make investment in the creation and development of new technologies less likely. Under these circumstances, inventors would also be more likely to rely on trade secrets rather than patents to protect intellectual property, thus undermining the patent system's benefit of public disclosure.[26]

Panelists warned that reducing available remedies, by either lowering damages or restricting injunctions, would impair investment in innovation. Without a credible threat of injunction and damages, start-up companies could not attract the capital they need to develop an invention into an innovative product. Design firms that create new technology and license it to others for manufacture could not adequately protect that technology from misappropriation. Large companies could not deter copying of the features that differentiate their products.[27]

On the other hand, remedies that overcompensate patentees beyond the market reward are not benign. When market conditions allow excessive royalties from damages or the threat of high damages to be passed on to consumers, prices increase.[28] Consumers are deprived of the benefits of competition among technologies if the size of damage awards and royalties do not reflect that competition. Moreover, it is a false logic to argue that higher damage awards will simply create greater incentives to innovate, lead to more innovation, and increase consumer welfare. Inflated awards, just like inadequate awards, can have the perverse effect of retarding

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alternative technologies will likely have a bigger effect on royalty rates.

[26]NERA Economic Consulting Comment at 2 (3/9/09); OSKR Comment at 1, n.1 (5/5/09); O'Brien, *supra* note 23, at 3.

[27]Lasersohn at 183 (2/11/09) ("If you do not allow inventors to capture the full economic value of their invention . . . . the amount of [projects] that will qualify for venture capital financing will decrease."); *id.* at 184 (patent "damages, injunctive relief and other things are simply absolutely critical" to promoting investment in new technologies); Maghame at 172-73 (2/11/09) (explaining that where infringers force them to litigate to obtain appropriate compensation, "having the flexibility to determine the amount of damages is absolutely necessary"); Rhodes at 165 (2/11/09) (describing how, in other jurisdictions, "where there aren't effective remedies for infringement . . . . infringement becomes a cost of doing business. It's cheaper to free ride on someone else's R&D and pay the slap on the wrist penalty than it is to do your own R&D.").

[28]Some have recognized a degree of circularity in the effect of damages on licensing rates. Because parties negotiate a license in the shadow of litigation, the potential damage award will influence the negotiated rate. However, the law looks to the royalty the market would award to establish damages. *See* SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 211-12 (2004). This circularity is attenuated in an ex ante licensing negotiation by the licensee's ability to use an alternative technology and his unwillingness to pay more than the incremental value the invention adds to the infringing product, regardless of the size of any potential damage award.

innovation.[29] When infringers are also innovators, the inflated damage awards they pay will reduce returns from their own R&D efforts, which can decrease innovation. Inflated awards can also drive higher licensing fees that increase costs and decrease innovation.

Patent damages that overcompensate patentees compared to the market reward incentivize speculation through the purchase and assertion of patents in litigation. If patent holders can obtain more in patent damages through litigation than they could by ex ante licensing in the marketplace where their inventions compete with alternatives, the result will be excessive litigation[30] that diverts funds from innovative and productive activities.[31] Overcompensation through damages encourages ex post transactions at the expense of ex ante transactions with technology transfer.[32]

Overcompensation can deter socially beneficial challenges to invalid or narrow patents, which also raises the cost of innovation. As the risk of paying an inflated award increases, would-be innovators will tend to enter into licenses rather than challenge claims that may be weak, perhaps paying unnecessary royalties.[33] Alternatively, manufacturers may incur higher costs by using a different technology to avoid even a weak threat of infringement. Inflated damage awards also discourage innovative activity when companies minimize their exposure by stopping research and development in technology for which patent coverage is uncertain. As patent awards increase relative to harm from infringement, innovation that is distinct from, but at the fringes of, patented technology may be abandoned.[34]

Inflated damage awards can also have broader effects on an industry. Overcompensating a category of patents disrupts the ability of the market to allocate R&D resources to those areas most likely to generate the products most valued by consumers. Overcompensation of certain patented technologies over-incentivizes invention in that area, to the detriment of more productive innovative activity. It also over-incentivizes the pursuit of patents for their own sake,

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[29]Carl Shapiro, *Patent Reform: Aligning Reward and Contribution*, 8 NAT'L BUREAU OF ECONOMIC RES. 111, 113, *in* INNOVATION AND THE ECONOMY (2007) ; *see also* Business Software Alliance Comment at 6 (2/5/09).

[30]This scenario assumes that manufacturers cannot identify all relevant patents and arrange licenses prior to commercialization, as is the case when the notice function of patents fails. *See* Chapter 3, Section II.

[31]Software & Information Industry Association Comment at 4 (2/5/09); OSKR Comment at 1 (5/5/09); Marian Underweiser, *Towards an Efficient Market for Innovation* 3, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009), *available at* http://ftc.gov/bc/workshops/ipmarketplace/feb11/docs/munderweiser.pdf.

[32]Chapter 2, Section III.B.

[33]O'Brien, *supra* note 23, at 20, Thomas at 145 (12/5/08).

[34]Shapiro, *supra* note 29, at 112; BLAIR & COTTER, *supra* note 7, at 60.

unnecessarily increasing the number of patents in a given field beyond what is necessary to encourage productive innovation. Large numbers of patents can create "patent thickets"[35] and increase transaction costs for manufacturers that seek to clear the rights needed to produce a product.[36]

Some panelists asserted that concerns about overcompensation of patentees through damages were exaggerated because damages are unable to put a patentee in the position it would have been but for the infringement, given the high cost of litigation and consumption of company resources.[37] Panelists representing independent inventors described large manufacturers that would use inventions with impunity, knowing that the high cost of patent enforcement meant they would rarely be stopped.[38] On the other hand, panelists representing manufacturing companies that were defendants in patent litigation described settling weak infringement suits to avoid litigation costs and settlement negotiations that focused more on the cost of litigation than the value of the invention.[39]

The high cost of patent litigation is undoubtedly a significant issue for both producers and users of technology,[40] but it does not justify unmooring damages calculations from an economic foundation rooted in the creation of a world but for infringement. Doing so makes damages unpredictable and risks distorting market-based incentives in the ways described above. The problem of high litigation costs should be addressed directly, although that issue is outside the scope of this report.

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[35]2003 FTC IP Report, ch. 3, at 34-35. Defensive patenting also contributes to patent thickets, especially in the IT industries. *Id.*; Chapter 2, Section III.A.

[36]BLAIR & COTTER, *supra* note 7, at 17-19.

[37]Rhodes at 195-96 (2/11/09); Johnson at 188 (2/11/09); Maghame at 203 (2/11/09); Cassidy at 183-84 (2/12/09).

[38]Ryan at 32-33 (4/17/09); *see also Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988) (suggesting that under the hypothetical negotiation approach to damages, "a cold, 'bottom line' logic would dictate to some a total disregard of the individual inventor's patent").

[39]IBM Comment at 2 (2/12/09) (citing "costly settlement in advance of litigation" as one consequence of patents "lack[ing] clear boundaries"); Yen at 52-53 (12/5/10) (describing how high litigation costs even for "baseless assertions," difficulty in establishing invalidity and uncertainty regarding damage determinations can lead to "unmeritorious settlements").

[40]NAT'L RES. COUNCIL, A PATENT SYSTEM FOR THE 21ST CENTURY 38 (Stephen A. Merrill, Richard C. Levin & Mark B. Myers eds., 2004) (discussing potential negative effect of high cost of patent litigation on innovation).

IV. CONCLUSION

Patent damages that either under or overcompensate patentees for infringement compared to the market can have detrimental effects on innovation and competition. Undercompensation undermines the patent system's incentives to innovate. Overcompensation raises costs to other innovators through multiple mechanisms and can deter innovation. As discussed in Chapter 2, overcompensation through damages also risks encouraging patent speculation, ex post licensing and "being infringed" as a business model rather than more productive efforts at technology transfer. Damage awards that do not track the value of a patented invention compared to alternatives can deprive consumers of the benefits of competition among technologies.

To align patent damages law and competition policy, it is, therefore, important that damage awards attempt to accurately replicate the market reward an invention could have earned absent infringement. Calculating accurate damages is a difficult task, however. The following chapters attempt to provide insights on how to structure an economically grounded damages analysis to help accomplish this task.

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CHAPTER 5
LOST PROFITS DAMAGES

I. INTRODUCTION

To promote the patent system's incentives to innovate, patent law sets the goal of calibrating compensatory damages to replicate the market reward that would have been earned absent infringement. As Chapter 4 discusses, damages that undercompensate patentees according to that standard undermine the patent system's incentives to innovate. Damages that overcompensate patentees can distort competition and decrease innovation.

One way a patentee can innovate is to develop and commercialize the invention itself. For a patentee producing a patented product, the primary importance of the patent is often the right it confers to exclude competitors from making and selling a competing product incorporating the patented technology. Often the most effective way to remedy infringement in this context is by awarding the patentee its profits on sales of the patented product that it lost due to the infringement.

To accurately replicate the market reward that the patentee would have earned by practicing its invention, the lost profits damages calculation must account for competition that the patentee's product would have faced if the infringer had sold a noninfringing alternative that did not incorporate the patented technology. Denying a patentee lost profits damages based on the availability of any acceptable alternative, as the seminal *Panduit* case seems to suggest, can undercompensate the patent holder.[1] But ignoring competition from alternatives that would have occurred in the absence of infringement, and awarding lost profits based on all infringing sales, can overcompensate it. Both outcomes can harm innovation and consumers.[2]

Determining how the market would have rewarded the invention absent infringement can be done by assessing consumer preference for the patented technology and the degree of substitutability between the patented technology and noninfringing alternatives.[3] That assessment can identify the number of consumers that would have purchased the patented product in the face of competition and the price they would have paid. The analysis and economic tools are similar to those used in antitrust cases to reconstruct a market and measure the effects of a proposed merger. The case law governing lost profits damages has moved toward this more economically grounded analysis since the *Panduit* case in 1978. However, additional

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[1] Panduit Corp. v. Stahlin Bros. Fibre Works, Inc., 575 F.2d 1152, 1156 (6th Cir. 1978) (requiring an absence of suitable noninfringing alternatives).

[2] *See* Chapter 4, Section III.

[3] For a comprehensive discussion applying economic analysis to the calculation of patent damages, *see* ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 214–228 (2005); Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1 (2001).

improvements, including rejection of rigid rules such as the "entire market value rule" and the requirement for dual awards of lost profits and reasonable royalty damages, would increase the accuracy of damage awards. Such a result would better align patent damages law and competition policy, to the benefit of consumers.

II. NONINFRINGING ALTERNATIVES IN A LOST PROFITS CALCULATION

A. The *Panduit* Test

To receive lost profits damages, a patentee must prove that, but for the infringement, it would have earned the lost profits it seeks, and that this loss was a foreseeable consequence of infringement. Infringing competition can reduce the patentee's profits in several ways, including by diverting sales from the patentee's product, eroding the patentee's sales price, and causing the patentee to lose sales of related, non-patented products.[4] The *"Panduit* test" provides a commonly-used framework with which patentees can establish entitlement to lost profits damages. It requires the patentee to prove:

(1) there was demand for the patented product in the relevant market during the period at issue;
(2) there were no suitable noninfringing alternatives to the patented product;
(3) the patentee had the manufacturing and marketing capacity to meet the demand claimed; and
(4) the amount of profit it would have made.[5]

Panduit appears to create an all-or-nothing test: in the absence of noninfringing alternatives, and assuming the patentee satisfies the other criteria, the patentee receives lost profits on *all* the infringer's sales. When noninfringing alternatives are available, the patentee receives *no* lost profits.[6] Later cases, however, have adopted a more flexible approach that allows a patentee to recover lost profits on some, but not all, of the infringer's sales. For instance, in *State Industries v. Mor-Flo Industries*, the court awarded lost profits damages on the portion of infringing sales that corresponded to the patentee's market share.[7] The analysis

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[4] *See* Rite-Hite Corp. v. Kelly Co., 56 F.3d 1538, 1546 (Fed. Cir. 1995); TWM Mfg. Co. v. Dura Corp., 789 F.2d 895, 902 (Fed. Cir. 1986) (price erosion).

[5] *Panduit Corp.*, 575 F.2d at 1156.

[6] *Id.*

[7] 883 F.2d 1573, 1578 (Fed. Cir. 1989); *see also* Micro Motion, Inc. v. Kane Steel Co.. 894 F.2d 1318 (Fed. Cir. 1990).

assumed that the remainder of the infringer's customers likely would have chosen alternative products. The court described this market share calculation as an alternative to the *Panduit* test.[8]

Panelists and commentators have criticized the *Panduit* test because the "factors [are] stated as . . . necessary conditions" for a lost profits award, when in fact "you can have lost profits, even if one or more of them aren't satisfied."[9] One commentator argues that courts have at times imposed unrealistic evidentiary burdens on patentees to establish the precise extent of their lost profits, thereby relegating them to reasonable royalty recoveries that are not designed to remedy their losses.[10] Panelists proposed an approach for calculating lost profits focused on "[i]dentify[ing] the defendant's next best alternative to infringing" and then determining "the market outcome in the 'but for' world where it pursued [that] alternative instead of infringing."[11] Further development in the case law along these lines, toward an economically grounded calculation of lost profits and away from rigid rules like the *Panduit* test, would increase the accuracy of lost profit damage awards and help fully compensate patentees. Moreover, courts should recognize that a lost profits determination is "not an exact science"[12] and permit plaintiffs to "approximate, if necessary, the amount to which the patent owner is entitled."[13]

> ***Recommendation***. In assessing how the market would have rewarded the invention absent infringement, courts should allow a patentee flexibility in creating the "but for" world to address different losses and avoid

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[8]Bic Leisure Prods., Inc. v. Windsurfing Int'l, Inc., 1 F.3d 1214, 1219 (Fed. Cir. 1993) (allowing "a patentee to recover lost profits, despite the presence of acceptable, noninfringing substitutes, because it nevertheless can prove with reasonable probability sales it would have made 'but for' the infringement"); *see also* Grain Processing Corp. v. American Maize-Prods., 185 F.3d 1341, 1349-50 (Fed. Cir. 1999) (recognizing that but for infringement, the defendant would have participated in the market by using an available, noninfringing alternative); *In re* Mahurkar Double Lumen Hemodialysis Catheter Patent Litig., 831 F. Supp. 1354, 1390 (N.D. Ill. 1993) (Easterbrook, J., sitting by designation) (recognizing that absent infringement, the patentee may have made additional sales at a higher prices).

[9]Leonard at 48 (2/11/09); Comment of John W. Schlicher at 53 (5/15/09) ("efforts to apply [the *Panduit* test] have largely been unfruitful").

[10]Mark A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 657-61 (2009). The same article argues that courts have inflated reasonable royalty damages in an attempt to compensate patentees for denied lost profit claims. *Id.* at 661-69. Chapter 6 discusses the detrimental effects of inflating reasonable royalty damages for this reason.

[11]Comment of Greg Leonard at 7-8 (3/9/09); Blair & Cotter *supra*, note 3 at 15; Vincent E. O'Brien, *Economics and Key Patent Damages Cases*, 9 U. BALT. INTELL. PROP. L.J. 1, 6 (2000); *see also* Levko at 59 (2/11/09) (noting that the "but for" world should broadly look at market definition).

[12]King Instrument Corp. v. Otari Corp., 767 F.2d 853, 863 (Fed. Cir. 1985).

[13]Del Mar Avionics, Inc. v. Quinton Instrument Co., 836 F.2d 1320, 1327 (Fed. Cir. 1987).

undercompensation. Patentees should not be denied an opportunity to establish lost profits through application of rigid rules that do not reflect sound economic principles or imposition of evidentiary requirements beyond what is required for the court to make a reasonable approximation of the patentee's loss.

An economically grounded approach to calculating lost profits damages focuses on the market for the patentee's product. It generally requires considering the sales and prices that the patentee actually made and comparing them to the sales it would have made in the "but for" world where the infringer sold a noninfringing alternative, if one is available. That comparison involves quantifying the number of sales the patentee lost due to infringement and estimating the extent of any price erosion.[14] This analysis must consider the extent of consumer preferences for the patented feature over alternatives, and not simply treat alternatives as falling on either side of a bright line dividing the acceptable from the unacceptable. Instead, the analysis recognizes that the "degree of substitutability" between the patented product and the noninfringing substitute will affect the extent of the loss caused by infringement, as opposed to competition generally.[15]

At one end of the spectrum, consumers freely substitute alternatives for the patented product. The infringer could have made nearly as many sales by offering the alternative. In such a case, the patentee lost few sales due to infringement and should receive little lost profits damages.[16] The patentee's recovery is limited because its invention contributes relatively little value over alternatives, and the damages should reflect this fact. At the other end of the spectrum, consumers strongly prefer the patented product over alternatives and will pay higher

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[14]*See, e.g.,* Gregory J. Werden, Luke M. Froeb & Lucian Wayne Beavers, *Economic Analysis Lost Profits from Patent Infringement With and Without Noninfringing Substitutes*, 27 AIPLA Q.J. 305, 307-08 (1999); Gregory K. Leonard, *Applying Merger Simulation Techniques to Estimate Lost Profit Damages in Intellectual Property Litigation, in* ECONOMIC APPROACHES TO INTELLECTUAL PROPERTY, POLICY, LITIGATION, AND MANAGEMENT 112-13 (Gregory K. Leonard & Lauren J. Stiroh eds., 2005). The analysis should also recognize that at lower prices, the patentee may sell more products, which will affect the amount of profits lost by infringement. Gregory J. Werden, Lucian Wayne Beavers & Luke M. Froeb, *Quantity Accretion: Mirror Image of Price Erosion from Patent Infringement*, 81 J. PAT. & TRADEMARK OFF. SOC'Y 479 (1999); *see also* Comment of John W. Schlicher at 54 (5/1/09).

[15]*In re Mahurkar Double Lumen Hemodialysis Catheter Patent Litig.*, 831 F. Supp. at 1390 ("Competition is not an all-or-nothing proposition. There are degrees of substituability."); Werden et al., *supra* note 14, at 310 (noting that "[i]n some sense, there are always substitutes for the patented product").

[16]*See* Grain Processing Corp. v. American Maize-Prods. Co., 893 F. Supp. 1386, 1392 (N.D. Ind. 1995) (Easterbrook, J., sitting by designation), *aff'd in part, vacated in part*, 108 F.3d 1392 (Fed. Cir. 1997) (awarding no lost profits damages due to availability of alternative); *but see* Jerry A. Hausman, Gregory K. Leonard & J. Gregory Sidak, *Patent Damages and Real Options: How Judicial Characterization of Noninfringing Alternatives Reduces Incentives to Innovate*, 22 BERKELEY TECH. L.J. 825, 852-53 (2007) (arguing that "the district court's conclusion in *Grain Processing* that no lost profits existed if the infringer were assumed to have adopted the noninfringing technology is at odds with standard economic theory").

prices for it. In the world without infringement, the patentee likely would have made most of the infringer's sales at a higher price, earning a large return on its invention. It should receive substantial lost profits damages adequate to compensate for the market reward it would have earned absent infringement. In both cases, the remedy reflects the value of the invention, providing proper incentives for invention and innovation. Many patented products and their alternatives fall between these two extremes, but these also are entitled to lost profits damages when proven.[17]

Economic analysis of the type used in antitrust merger review can help determine where alternatives fall along this spectrum, the number of sales lost to the infringing product, and the price erosion caused by infringement.[18] Measuring the cross-elasticity of demand between an infringing product and noninfringing alternatives can determine their "degrees of substitutability."[19] Economists have explained that "[s]imulating damages from patent infringement is quite similar to simulating the effects of a merger. Rather than extrapolating from the lower-price, pre-merger equilibrium to the higher-price, post-merger equilibrium, one extrapolates from the lower-price, with infringement equilibrium to the higher-price, but-for-infringement equilibrium."[20]

B. The Entire Market Value Rule

The law of lost profits damages recognizes that a patented invention may be only one component of a complex product. In that case, not all of the infringer's profit, or the patentee's lost profits, is necessarily attributable to the patented invention. The case law traditionally addresses this issue by "apportioning" the potential damages according to the value the invention, such as a mop head, contributes to the product, such as a mop.[21] Modern case law applies the "entire market value rule" to determine when to award lost profits damages based on the entire

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[17]*See* O'Brien, *supra* note 11, at 6. *C.f.*, Lemley, *supra* note 10, at 671-72 (arguing that a patentee's difficulty in proving precise amount of lost profits damages, as opposed to entitlement to them, should not disqualify it from receiving them).

[18]Blair & Cotter, *supra* note 3, at 15-16 ("modern economic analysis does provide some techniques for estimating losses" based on construction of a market absent infringement); *see also* Marion B. Stewart, *Calculating Economic Damages in Inellectual Property Disputes: The Role of Market Definition*, 77 J. PAT. & TRADEMARK OFF. SOC'Y 321 (1995).

[19]Blair & Cotter, *supra* note 3, at 13-14, n.34 (explaining relationship of cross-elasticity of demand to lost profits).

[20]Werden et al., *supra* note 14, at 307-08.

[21]Seymour v. McCormick, 57 U.S. 480, 489-91 (1853) (explaining that damages based on an entire machine when the patent covers only a component could subject the infringer to duplicative and excessive damages); *see also* Garretson v. Clark, 111 U.S. 120, 121 (1884) (requiring apportionment of damages from sales of a mop based on infringement of patent covering improved mop head).

value of the patented product. The entire market value rule applies when (1) the patented feature is "the basis for customer demand"[22] of the infringing product and (2) the patented and unpatented components together "constitute a functional unit."[23] For instance, in *Golden Blount, Inc. v. Robert H. Peterson Co*., the Federal Circuit allowed lost profits damages based on the entire market value of an artificial fireplace where only the gas burner was patented. The court upheld a finding that the burner, logs and grate worked together as a functional unit and that the ember burner was the basis for customer demand.[24]

The entire market value rule is not needed in an economic assessment of lost profits. Indeed, it distracts fact-finders from a careful reconstruction of a market lacking infringement. Courts should reject it. The rule's focus on whether a feature is the "basis for customer demand," and allowing only a "yes" or "no" answer to that question, prevents courts and juries from giving adequate consideration to the "degrees of substitutability" that may exist with respect to noninfringing alternatives.[25] In doing so, it inhibits an appreciation of the differences among consumers and their preferences for different alternatives. The "functional unit" prong of the

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[22]*State Indus., Inc.*, 883 F.2d at 1580. This "basis of customer demand" standard as sometimes applied is arguably more lenient than statements of earlier cases requiring that "the entire value of the whole machine, as a marketable article, is properly and legally attributable to the patented feature" for damages to be based on the whole product. *Garretson*, 111 U.S. at 121 (*quoting* Garretson v. Clark, 10 F. Cas. 40, 44 (C.C.N.Y. 1878). *Compare State Indus., Inc.*, 883 F.2d at 1580 (allowing lost profits damages based on entire water heater where invention related to foam insulation) *with* Marconi Wireless Tele. Co. v. United States, 99 Ct. Cl. 1, 21 (Ct. Cl. 1942), *aff'd in part, vacated in part*, 320 U.S. 1 (1943) (holding that patentee can recover damages based on an entire product if patented feature "was of such paramount importance that it substantially created the value of the component parts").

[23]*Rite-Hite Corp.*, 56 F.3d at 1550 (lost profits damages may be based on the entire market value of a product only where "the patented and unpatented components were analogous to a single functioning unit" and may not be extended to include unpatented items "that have essentially no functional relationship to the patented invention and that may have been sold with an infringing device only as a matter of convenience or business advantage.").

[24]438 F.3d 1354, 1371-72 (Fed. Cir. 2006). *See also* Tec Air, Inc. v. Denso Mfg. Michigan, Inc., 192 F.3d 1353, 1361 (Fed. Cir. 1999) (damages based on entire assembly where infringing fans were sold with noninfringing radiator and condenser).

[25]The "basis for consumer demand" standard is not a good proxy for those instances in which no alternatives for the patented invention exist such that the patentee would have made all infringing sales. The standard has been liberally applied in some cases, and it fails to focus on the operative economic question of noninfringing competition. *See Golden Blount, Inc.*, 438 F.3d at 1371 (allowing damages based on entire artificial fireplace when only gas burner was patented, without examining noninfringing competition in artificial fireplace market); *Tec Air, Inc.*, 192 F.3d at 1361 (damages based on entire assembly where infringing fans were sold with noninfringing radiator and condenser because consumer demand was based on performance of entire assembly).

rule makes the determination of damages hinge on a distinction that is irrelevant to reconstruction of a market lacking infringement.[26]

The all or nothing aspect of the entire market value rule detracts from the ability of patent damages to provide compensation to patentees that reflects the value of their inventions, and thereby align with competition policy. A more nuanced economic analysis can help identify the extent to which infringement causes a patentee to lose profits whether the patent at issue claims the entire infringing product or one component of that product. When consumers view a patented component as a valuable feature of a larger product, they are less likely to be satisfied with similar products containing noninfringing alternative components. The more valuable the patented feature is to consumers, the larger the portion of the infringer's sales that can be attributed to infringement. However, when consumers view a patented component as a minor feature that they would forgo at higher prices or substitute with noninfringing alternatives, infringement causes the patentee to lose fewer sales.[27]

Under this economic analysis, the infringer's sales are effectively "apportioned" according to the value of the invention. This approach provides a more direct and accurate measure of a patentee's harm from infringement when one component of a product is patented than does an attempt to measure that component's relative contribution to a product or to apply the entire market value rule.

> ***Recommendation.*** Courts should reject the entire market value rule as a basis for awarding a patentee lost profits damages based on all infringing sales, and instead require proof of the degree of consumer preference for the patented invention over alternatives.

C. Dual Awards of Lost Profits and Reasonable Royalties

When courts have awarded lost profits damages based on a portion of the infringing sales, they also have sometimes awarded reasonable royalty damages on the remaining portion of infringing sales.[28] Those cases refer to Section 284 of the Patent Act in reasoning that a patentee

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[26] *See* Juicy Whip, Inc. v. Orange Bang, Inc., 382 F.3d 1367, 1371-73 (Fed. Cir. 2004) (remanding for consideration of whether patentee was entitled to damages based on sales of unpatented syrup and because syrup and patented juice dispenser functioned together "to produce the visual appearance that was central to Juicy Whip's '405 patent"). If a patentee can prove that it would have made sales of an unpatented product along with a patented product but for the infringement, examining whether they function as a unit may be useful in determining whether lost sales of the unpatented product were "foreseeable" and compensable. *See* Blair & Cotter, *supra* note 3, at 89 (proposing this limited use of the functional unit test); *Rite-Hite Corp*., 56 F.3d at 1546 (requiring that lost profits be foreseeable to be compensable).

[27] *See* Blair & Cotter, *supra* note 3, at 17, 26-28; Leonard Comment at 8-9 (3/9/09).

[28] *State Indus., Inc.*, 883 F.2d at 1580; *Rite-Hite Corp.*, 56 F.3d at 1554-55 (awarding lost profits damages on all but 502 sales and awarding reasonable royalties on those).

is entitled to "no less than a reasonable royalty" on all of an infringer's sales, even when it has received its profits lost due to infringement.[29] In many instances, dual awards of lost profits and reasonable royalty damages are inappropriate and courts should not award them.[30]

When a patentee receives lost profits damages on lost sales amounting to only a portion of the infringer's sales, the award recognizes that, but for infringement, the infringer would have sold an alternative to the patented invention. Putting the patentee in the position it would have been but for the infringement does not require compensating it for sales the infringer would have made of noninfringing alternatives. Awarding the patentee reasonable royalty damages on those sales in addition to lost profits overcompensates it compared to the market reward for the invention, because it ignores competition that the patented invention faced from noninfringing alternatives.[31] Awarding lost profits damages based on a portion of the infringer's sales can fully compensate the patentee for infringement, as required by Section 284.

> ***Recommendation.*** Courts should reject dual awards of lost profits and reasonable royalty damages when competition from alternatives would have prevented the patentee from making all the infringer's sales in a world but for infringement.

III. CONCLUSION

The guiding principle in the calculation of lost profits damages is the construction of the hypothetical market but for infringement. In that market, the patented invention may sometimes compete with noninfringing alternatives. Accurately calculating damages in the face of that competition requires an examination of consumer preferences for the patented invention over alternatives. Economic tools, including those frequently used in antitrust analysis, can support that calculation.

The case law has evolved to recognize the importance of "the realities of the market."[32] But further flexibility in the legal rules that apply to lost profits damages would allow a more economically grounded calculation, leading to more accurate awards and full compensation of

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[29] *Rite-Hite Corp.*, 56 F.3d at 1554.

[30] One situation in which dual awards might be appropriate is when markets for the patented product are separated by geography or type of use. A patentee may seek to earn royalties in one market (making reasonable royalty damages appropriate) but sell its invention exclusively in another (making lost profits appropriate). O'Brien, *supra* note 11, at 21 n.74.

[31] *See* O'Brien, *supra* note 11, at 21-22; Comment of John W. Schlicher at 54 (5/1/09) (when law insists that patentee recover damages on every infringing unit sold, the patentee is better off financially than it would have been absent infringement).

[32] SmithKline Diagnostics, Inc. v. Helena Lab. Corp., 926 F.2d 1161, 1166 (Fed. Cir. 1991) (considering whether "others would likely have captured sales made by the infringer, despite a difference in the products").

patentees. Patentees that have proven entitlement to lost profits damages should not be denied that compensation and limited to reasonable royalties based on overly-rigorous requirements to show the precise amount of damages.

To achieve accurate awards, calculation of lost profits damages must also take account of competition the patented product would have faced but for infringement. Courts should reject as not based on sound economics the entire market value rule and dual awards of lost profits and reasonable royalty damages in most situations. Additional focus on creating the world but for infringement, including a full appreciation of the role of noninfringing alternatives in that world, will help compensate patentees through damages as the market would have done, avoiding the under and overcompensation that can harm innovation, competition and consumers.

CHAPTER 6
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CHAPTER 6
THE HYPOTHETICAL NEGOTIATION IN REASONABLE ROYALTY DAMAGES

I. INTRODUCTION

Much of the controversy in the patent community concerning damage awards has focused on whether the law governing reasonable royalty damages appropriately compensates patentees. Different perspectives on this question have fueled a debate on the wisdom of legislative changes to reasonable royalty damages law as part of a broader patent law reform effort.[1] Companies fall on opposite sides of this question depending on a number of factors, including whether they view themselves as more likely defendants or plaintiffs in patent litigation, whether they use patents primarily defensively or offensively, how likely it is that a patent in their industry might confer market power, and how many patents typically cover a single product.

Different sides of the debate have at times looked to median damage awards as evidence of both the presence and the absence of a problem. But medians cannot answer the question of whether patent damages law appropriately compensates patentees. They supply no information about the accuracy of individual awards or the effect of very large awards that arguably motivate some litigation. That said, several factors suggest that a careful study of the economic underpinnings of reasonable royalty damages law would be beneficial. On the one hand, full compensation is important to incentivize invention and support licensing in a growing open technology paradigm.[2] On the other hand, dramatic increases in litigation in the information technology (IT) industries and the rise in business models that use patents only to extract rents, if driven by awards that overcompensate patentees, could deter innovation and disrupt competition in technology markets.[3]

As discussed in Chapter 4, damages law appropriately compensates patentees for infringement when it aligns damage awards with the economic value of the invention by replicating the market reward. When a patentee cannot or chooses not to prove lost profits or other direct harm, the market reward is the royalty to which a willing licensor and willing licensee would agree in a hypothetical negotiation. But courts sometimes reject, either implicitly or explicitly, a limitation based on the maximum amount a willing licensee would pay. In doing so, they often seem motivated by concerns about compensating patentees for unproven direct harm and deterring infringement. Those concerns are better addressed through other areas of remedies law, including lost profits damages, enhanced damages and injunctions. Allowing those concerns to distort the reasonable royalty damages calculation risks overcompensating patentees in litigation as compared to the market and creating problems such as higher prices, increased patent speculation, and decreased innovation.

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[1] S. REP. No. 111-18, at 3 (2009).

[2] *See* Chapter 1.

[3] *See* Chapter 2.

This Chapter and Chapter 7 seek to derive an economically grounded approach to calculating reasonable royalty damages and to compare that approach to the rules developed through case law. Ensuring that the legal rules reflect an understanding of the economics underlying the market in which technology competes will help align a patentee's compensation with the economic value of the patented invention, and align patent law with competition policy.

II. RECENT CONTROVERSIES SURROUNDING REASONABLE ROYALTY DAMAGE AWARDS

A. Support for Damages Reform

Those who complain about the current state of damages law come mainly from the IT industries. They argue that patent value has become increasingly divorced from the economic value of the underlying technology in recent years because of excessive damages awards.[4] From 2002-2009, there were at least eleven damage awards over $100 million and one that was over $1 billion, representing a marked increase in landmark damage awards compared to 20 years ago.[5] While some very large awards have been overturned,[6] "outlier" cases still raise concerns because they inform and influence the licensing and settlement negotiations that resolve the vast majority

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[4] *See, e.g.*, Yen at 47 (12/5/08) ("Increasingly, activity in the marketplace is driven not by increased innovation but by efforts to exploit imbalances in a patent system that overvalues patents, particularly weak ones, and thereby actually suppresses marketplace innovation."); CCIA Comment at 6-7 (2/5/09); Doyle at 143 (5/5/09) (the current damages system "encourages what I would consider opportunistic litigation that has little relation to the value of a patent, its patent-worthiness, its validity, let alone whether or not it's infringed").

[5] Paul Janicke, *Patent Damages, Patent Verdicts from 1-1-05 to 1-6-09*, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009), *available at* http://ftc.gov/bc/workshops/ipmarketplace/feb11/docs/janicke-medianverdits.pdf; Janicke at 9 (2/11/09) (explaining that these numbers are "only what the jury foreman announced" and do not reflect enhancements (e.g., for willfulness or interest) or subsequent judicial actions reducing or vacating the award). *See also* Levko at 21 (2/11/09) (reporting that there had been "something like 22 cases" with awards over $100 million (in 2008 dollars) in 14 years, including six in 2008 alone); PricewaterhouseCoopers, *2010 Patent Litigation Study, The Continued Evolution of Patent Damages Law: Patent Litigation Trends and the Impact of Recent Court Decisions on Damages*, at 8, Chart 2c (Sept. 2010), (listing eight cases in which the initially adjudicated damage award exceeded $200 million since 2007 (and noting that some had subsequently been vacated or otherwise modified)), *available at* http://www.pwc.com/us/en/forensic-services/publications/2010-patent-litigation-study.jhtml.

[6] *See, e.g.*, Innovation Alliance Comment at 10 (2/6/09) ("With few exceptions, the largest jury verdicts awarded each year are typically reduced or overturned upon appeal, as in the *Alcatel-Lucent* case.") (*citing* Innovation Alliance, *Moving Beyond the Rhetoric: Jury Damage Verdicts in Patent Infringement Cases 2005 – 2007* (2008), *available at* http://www.innovationalliance.net/files/JURY%20DAMAGE%20VERDICTS%20IN%20PATENT%20INFRINGEMENT%20CASES%5B1%5D.pdf).

of patent disputes.[7] (Appendix A reviews available statistics on patent litigation outcomes and damages awards.) Supporters of reform also point to the ten-fold disparity between damage awards made by juries compared to judges and the high median award of $31 million in the telecommunications sector as evidence of a problem.[8]

Panelists assert that these awards have generated a "lottery-ticket mentality"[9] that encourages patent assertion entities (PAEs)[10] to purchase patents solely for the purpose of asserting them against products that were developed without any input from the inventors, i.e., the ex post licensing described in Chapter 2. Indeed, all panelists for high-tech companies reported steep increases in patent litigation almost entirely attributable to suits brought by PAEs.[11] They argue that this increased ex post litigation imposes a substantial burden on manufacturing companies and deters innovation by diverting resources and increasing the risk associated with introducing new products.[12]

The cases presenting the greatest risk for excessive damage awards, according to panelists, are those in which the patented invention is one component of many in a complex

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[7]*See* Squires at 195 (12/5/08); Reines at 33 (2/11/09) (emphasizing that settlements are affected by trial outcomes through "a magnification process where the anomalous outcomes at trial or fear of anomalous outcomes at trial can drive a whole range of decision-making"); NERA Economic Consulting Comment at 4-5 (3/9/09) (reasoning that a company will take into account even a relatively low probability of an excess damage award in its decision making and market behavior).

[8]Coalition for Patent Fairness and Business Software Alliance Comment at 9 (2/5/09); PricewaterhouseCoopers, *A Closer Look: 2008 Patent Litigation Study, Damages Awards, Success Rates and Time-to-Trial*, at 3, Chart 2C (2008), *available at* http://www.pwc.com/en_US/us/forensic-services/assets/2008_patent_litigation_study.pdf.

[9]Squires at 166 (12/5/08); *see also* Janicke at 10 (2/11/09) ("these [very large verdicts] are the [ones] that spur the filing of patent litigation, hundreds of millions of dollars").

[10]This report uses the term "patent assertion entity" rather than the more common "non-practicing entity" (NPE) to refer to firms whose business model focuses on purchasing and asserting patents. See Chapter 2 for a discussion of the different types of non-practicing entities and their impact on innovation and competition.

[11]*See infra* Chapter 2, Section IV.A.

[12]Yen at 54 (12/5/08) (stating that "[t]he money to pay unjustified settlements is taken away from R&D and promising technologies, and the added costs ultimately are passed on to the consumer, and more troubling perhaps is the lost opportunity for new products and services"); Underweiser at 159 (2/11/09) (explaining that "transaction costs" from litigation mean "your products are going to cost more" and that "you won't have the innovations making their way into products"); McCurdy at 42 (12/5/08); Software & Information Industry Association Comment at 2-3 (2/5/09); Coalition for Patent Fairness and Business Software Alliance Comment at 3, 7-8 (2/5/09).

product.[13] IT products, such as personal computers and cell phones, are covered by thousands of patents. As discussed in Chapters 2 and 3, the notice function is poorly served in these circumstances, making it unfeasible for manufacturers to identify all patents that might read on a product.[14] Proponents of reform explain that patentees often seek damages based on a percentage of the whole product even though the patent's inventive contribution relates to a very small aspect of the product. One proposed solution calls for damages rules that "apportion" the award.[15]

B. Opposition to Damages Reform

Panelists and commentators representing a variety of industries and business models strongly warned against adopting any change in damages law intended to systematically lower awards. They argued that reducing the value of patents or injecting additional uncertainty and complexity into damages calculations would undermine the patent system's incentives to invest in risky research and development in promising industries. Lower patent values would also encourage infringement rather than licensing, they worried, reducing incentives to invent and the opportunity to engage in technology transfer licensing.[16]

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[13]Cotter at 134, 198 (12/5/08) (describing how hold-up can occur in the context of "a patent on a component"); Lemley at 253 (5/5/09) ("Most of the discussion here has been . . . pointing in the direction that the problem with reasonable royalty damages is that they are too high in many-component industry cases for a variety of reasons."); NERA Economic Consulting Comment at 19-23 (3/9/09).

[14]*See* Chapter 2, Section III.A; Chapter 3, Section III.

[15]Doyle at 210 (5/5/09) ("it seems to me that apportionment, just by itself, as a rule standing alone is the only thing that anyone's come up with that has half a chance of focusing the discussion"); Schlicher at 210 (5/5/09) (agreeing with Doyle, explaining that the award should be an "approximation of the value of the invention given its advantages"); Squires at 167-68 (12/5/08) ("where the inventive contribution is one of many components in a complex product or service, . . . then valuation should be correlated to the component"); Software & Information Industry Association Comment at 7 (2/5/09); Coalition for Patent Fairness and Business Software Alliance Comment at 6 (2/5/09). *Cf.* Lemley at 215 (5/5/09) ("courts always already do apportionment in a reasonable-royalty case, they just don't do it very well"); Thomas at 149 (12/5/08) ("Apportionment is part of our law . . . . Many of us believe that it's been unevenly applied . . . .").

[16]Rhodes at 196 (2/11/09) (if you "decrease damages, you do lose part of the deterrent [e]ffect against infringement"); Layne-Farrar at 51 (2/11/09) (observing that we "don't want to . . . encourage under-the-radar infringement"); PhRMA Comment at 14, 18-20 (2/10/09); BIO Comment at 2 (5/15/09); NanoBusiness Alliance Comment (2/5/09) ("Changes which reduce our ability to receive adequate compensation for infringement of those patents will make it difficult to protect our intellectual property, and therefore will discourage investment in our field."); National Venture Capital Association Comment at 2 (2/10/09); Epstein at 169 (5/4/09) ("I think passing significant changes to damages law is the fastest way to shut down the overall licensing and secondary patent marketplace.").

Panelists opposed to changes in damages law dispute the argument that recent awards indicate any problem. They point out that median damage awards (adjusted for inflation) have remained stable since 1995 at approximately $5 million, an amount that is modest compared to litigation costs.[17] They also explain that where a jury's damage award is excessive, courts can and have corrected it.[18] The current legal rules are effective and flexible for addressing the wide variety of fact scenarios that arise in damages calculation, they maintain. In particular, those factors track the considerations that influence real-world licensing negotiations[19] and allow consideration of the value added by a patented component in an infringing product.[20]

C. The Need to Review Damages Law

Aggregated statistics alone cannot answer the question of whether patent damages law appropriately compensates patentees. As one commentator cautioned, relying too much on

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[17]PricewaterhouseCoopers, *supra* note 8, at 2, Chart 2a (reporting that the "median annual damages award has remained fairly stable over the last 13 years," and that "[t]he median was $3.9 million from 1995 through 2000, and $3.8 million from 2001 through 2007" in 2007 dollars). *See also* PricewaterhouseCoopers, *supra* note 5, at 2, Chart 2a (reporting that between 1995 and 2009 annual median awards averaged $5.2 million and ranged from $2.2 million to $10.5 million (in 2009 dollars), but showed "no discernable trend" over that period); Janicke at 10 (2/11/09) (reporting a median jury verdict of $5.3 million for the period January 2005 through January 2009); PhRMA Comment at 17 (2/10/09); Innovation Alliance Comment at 10 (2/6/09).

[18]Innovation Alliance Comment at 10 (2/6/09); Innovation Alliance, *Moving Beyond the Rhetoric, Jury Damage Verdicts in Patent Infringement Cases 2005-2007* (2008), *available at* http://www.innovationalliance.net/files/JURY%20DAMAGE%20VERDICTS%20IN%20PATENT%20INFRINGEMENT%20CASES%5B1%5D.pdf (reporting that from 2005 to 2007, there were 47 patent cases where the jury found damages of $2 million or more, and in 12 cases, the damage verdict was set aside or the trial judge found the damages were not supported by the evidence); PhRMA Comment at 13, 17 (2/10/09); Chief Judge Paul R. Michel of the Court of Appeals for the Federal Circuit argued that judicial review of excessive jury awards shows that the system is working, not that it is broken. C.J. Michel at 116-17 (12/05/08); *but see* Daralyn J. Durie & Mark A. Lemley, *A Structured Approach to Calculating Reasonable Royalties*, 14 LEWIS & CLARK L. REV. 627, 634 (2010) (surveying 267 cases in which damages were awarded, and finding only three in which the district court granted JMOL on the issue of damages).

[19]Rhodes at 237-38 (2/11/09) (the *Georgia-Pacific* factors "mirror a lot of the considerations that take place in actual licensing negotiations" and "are trying to replicate what type of dynamic" would exist in the hypothetical negotiation); Johnson at 243-44 (2/11/09) (pharmaceutical company representative explaining that when his company "sit[s] down to negotiate [licences], we use methodologies that are very much like the *Georgia-Pacific* factors").

[20]Johnson at 268 (2/11/09) (pharmaceutical company representative suggesting that the award should be based on "compar[ing the invention] with its closest non-infringing alternat[ive]"); PhRMA Comment at 20 (2/10/09) (when the patented invention is a small component of a product, "a reasonable royalty would be determined by assessing the value to the infringer of using the patented invention over the closest non-infringing substitute").

medians "tell[s] you very little about the awards that matter most, those for the very few, very valuable inventions."[21] Moreover, it is an impossible and unproductive task to attempt to determine whether a sampling of awards is incorrect in the sense that they made a patent holder better or worse off in court than it would have been in the marketplace.[22]

That said, a review of the available statistics on reasonable royalty awards, combined with the recent controversy in the patent community, suggests that a study of the relationship between the legal rules governing damages and the economic principles that should guide damages calculations would be beneficial. On the one hand, it is essential to ensure that the laws governing patent damage awards protect incentives to invent and innovate by affording compensation equal to the loss caused by infringement. On the other hand, recent very large damage awards for minor components of complex products and dramatic, industry-specific increases in patent litigation do raise questions of whether damages law is sufficiently economically grounded. The question seems most pressing in that subset of cases where the invention is one component of a complex product. Some panelists asserted that excessive reasonable royalty awards result from a failure to use economically correct approaches to calculation and legal rules that "obscure[] the effort to match damage awards to the economic values of inventions."[23]

III. OVERVIEW OF REASONABLE ROYALTY DAMAGES LAW

Section 284 of the patent statute mandates that patentees recover "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer . . . ."[24] A reasonable royalty is available as a remedy in all cases where the patentee has not proven entitlement to lost profits caused by the infringement.[25] Reasonable royalties may be awarded to a patent owner that was injured and competed but was unable to establish lost sales, one that licensed exclusively, or one that licensed broadly, leading one author to call them a "catch-all category of patent damages."[26]

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[21]John Schlicher Comment at 39 (5/15/09).

[22]Douglas G. Kidder & Vincent E. O'Brien Comment at 1 (5/5/09).

[23]Schlicher Comment at 4, 38 (5/15/09); *see also* NERA Economic Consulting Comment at 19-20 (3/9/09) (discussing specific unreliable approaches to determining reasonable royalty damages).

[24]35 U.S.C. § 284.

[25]Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1554 (Fed. Cir. 1995) ("A patentee is entitled to no less than a reasonable royalty on an infringer's sales for which the patentee has not established entitlement to lost profits.") (en banc); JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, PATENT DAMAGES LAW AND PRACTICE § 1:3 (2008).

[26]SKENYON et al., *supra* note 25, § 3:2, at 3-3.

Courts invoke the hypothetical negotiation framework when calculating reasonable royalty damages. The seminal case, *Georgia-Pacific Corp. v. United States Plywood Corp.*, described the proper measure of such damages: "The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement."[27] The case law recognizes that the central tenet of this framework is the willing licensor/willing licensee model, under which the awarded amount must be acceptable to both parties.[28] The royalty must adequately compensate the patentee for permitting the use and still leave the infringer an appropriate level of anticipated profits from using the invention.[29] As discussed below, however, some recent cases seem to reject or ignore that the requirement of a willing licensee places an upper bound on reasonable royalty damages.[30]

Courts apply two assumptions when implementing the hypothetical negotiation. First, the finder of fact must assume that the hypothetical negotiation takes place at the time the infringement began. This timing determines the information available to the parties during the negotiation.[31] Thus, in setting a reasonable royalty rate, considerations such as the infringer's expected profit and available alternatives are "to be determined not on the basis of a hindsight evaluation of what actually happened, but on the basis of what the parties to the hypothetical license negotiations would have considered at the time of the negotiations."[32] Subsequent events may be considered as evidence (a "book of wisdom") shedding light on the expectations that

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[27]Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd*, 446 F.2d 295 (2d Cir. 1971). Chapter 7, Section II lists the *Georgia-Pacific* factors.

[28]*See, e.g.*, Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009) ("The hypothetical negotiation tries, as best as possible, to recreate the ex ante licensing negotiation scenario and to describe the resulting agreement.").

[29]Applied Med. Res. Corp. v. U.S. Surgical Corp., 435 F.3d 1356, 1361 (Fed. Cir. 2006) ("A reasonable royalty is the amount that 'a person, desiring to manufacture [, use, or] sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make [, use, or] sell the patented article, in the market, at a reasonable profit.'") (*quoting* Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc., 750 F.2d 1552, 1568 (Fed. Cir.1984)).

[30]*See* Section IV, *infra*. Monsanto Co. v. Ralph, 382 F.3d 1374, 1383 (Fed. Cir. 2004) (rejecting infringer's argument that a "reasonable royalty deduced through a hypothetical negotiation process can never be set so high that no rational self-interested wealth-maximizing infringer acting ex ante would have ever agreed to it").

[31]Riles v. Shell Exploration and Prod. Co., 298 F.3d 1302, 1313 (Fed. Cir. 2002) (reasonable royalty determination "must relate to the time infringement occurred, and not be an after-the-fact assessment."); Unisplay S.A. v. American Elec. Sign Co., 69 F.3d 512, 518 (Fed. Cir. 1995) (rejecting a royalty based on evidence of likely value at time of trial).

[32]Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1081 (Fed. Cir. 1983).

would have guided the parties during negotiation,[33] but the focus remains on the value at the time infringement began.

Second, courts require the finder of fact to assume that at the time of the negotiation the parties know with certainty that the patent is valid and infringed by the defendant's product or process.[34] This assumption ensures that the patentee, having incurred the risk and burden of trial and prevailed, is fully compensated.[35] As one panelist explained, if the hypothetical negotiation incorporated the risk that the patentee might lose on liability, the damages award would effectively "discount[] twice for the legal risk." The patentee would have run the legal risk once by going through trial to a judgment, and then had its recovery discounted by the legal risk in the determination of the reasonable royalty.[36]

IV. CONCERNS WITH THE HYPOTHETICAL NEGOTIATION FRAMEWORK

As discussed in Chapter 4, the goal of compensatory damages is to put the patentee in the position it would have been but for the infringement by providing the market reward for the invention. The case law rightly equates this goal with the statutory mandate that the patentee receive "damages adequate to compensate for the infringement." The law allows a patentee to show lost profits caused by the infringement. And, as discussed in Chapter 5, the law should allow patentees flexibility in creating the "but for" world so that they can be fully compensated.

However, when a patentee fails to prove lost profits caused by infringement, his legal redress is limited to compensation for the lost opportunity to license the infringer. It is the return available from the right to license the patent that is injured in this case, not the return from the exclusive opportunity to sell a product incorporating the patented invention. A patentee who would not have lost sales or suffered other direct damages from infringement would rationally

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[33]Sinclair Refining Co. v. Jenkins Petroleum Co., 289 U.S. 689, 698 (1933) (post-infringement evidence represents a "book of wisdom" providing "[e]xperience [that] is then available to correct uncertain prophecy").

[34]*See, e.g.*, *Lucent Techs*., 580 F.3d at 1325 ("The hypothetical negotiation also assumes that the asserted patent claims are valid and infringed.").

[35]*See* Rite-Hite Corp. v. Kelley Co., 774 F. Supp. 1514, 1535 (E.D. Wis. 1991) ("In negotiating a settlement, the typical patentee is constrained by the risk and expense of litigating a patent suit. Risk and expense are not factors in the hypothetical royalty negotiation, because the patentee is presumed to know that the patent is valid and infringed."), *aff'd in part, vacated in part on other grounds*, 56 F.3d 1538, 1554 (Fed. Cir. 1995) (en banc).

[36]Cotter at 85 (2/11/09). *See also id.* at 83-85; Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, 34 J. CORP. L. 1151, 1182-83 & n.156 (2009).

want to license the patent at the maximum rate the infringer would pay.[37] That rate will not be more than the incremental value of the invention compared to available alternatives because, at higher rates, the infringer would choose an alternative.[38] A patentee would be unwilling to license at this rate only if it expected greater returns from marketing the invention itself. But in that case, the patentee would have a claim to lost profits. Thus, absent proof of lost profits caused by infringement, the appropriate measure of compensatory damages is the hypothetical negotiation amount between a willing licensor and willing licensee.

Despite this reasoning, two lines of cases allow or comment favorably on damage awards that arguably added to or exceeded a reasonable royalty determined using the hypothetical negotiation framework. In the first line of cases, the Federal Circuit affirmed awards adding to the hypothetical negotiation amount. In *H.M. Stickle v. Heublein*, the court stated that a "trial court may award an amount of damages greater than a reasonable royalty so that the award is 'adequate to compensate for the infringement.'"[39] In *Maxwell v. J. Baker, Inc.*, the court upheld a damage award where the district court had instructed the jury to determine two awards – a reasonable royalty award based on the hypothetical negotiation, and an additional award to the extent needed to provide "adequate compensation."[40] The opinions do not, however, describe the economic basis of any harm that the patentee might have suffered for which compensation is required beyond the absence of royalty payments for the infringing use.[41]

A second line of cases purports to apply the hypothetical negotiation framework, but arguably allows damage awards exceeding amounts to which a willing licensee would have

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[37]The negotiated royalty between the patentee and licensee (hypothetical or otherwise) may be less than the maximum amount the licensee is willing to pay, depending on the bargaining power of the parties. *See* SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 137 (2004).

[38]*See* Chapter 7, Section III.A.

[39]H. M. Stickle v. Heublein, Inc., 716 F.2d 1550, 1563 (Fed. Cir. 1983); *see also*, King Instruments Corp. v. Perego, 65 F.3d 941, 951 n.6 (Fed. Cir. 1995) (listing "discretionary awards of greater than a reasonable royalty" as one response to the problem of inadequate reasonable royalty awards); *but see* Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1579-80 (Fed. Cir. 1996) (rejecting augmentation of a reasonable royalty damage award to cover litigation expenses).

[40]Maxwell v. J. Baker, Inc., 86 F.3d 1098, 1109-10 (Fed. Cir. 1996). The court also described the jury verdict as consistent with a reasonable royalty. *Id*. at 1110.

[41]Mark A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 666-67 (2009) (identifying the damages calculation in the *H.M. Stickle* and *Maxwell* cases as "problematic"); Brian J. Love, *The Misuse of Reasonable Royalty Damages as a Patent Infringement Deterrent*, 74 MO. L. REV. 909, 920 (2009) (criticizing *Maxwell* decision for allowing damage award that was double what a jury identified as a reasonable royalty).

agreed.[42] In *Golight, Inc. v. Wal-Mart Stores, Inc.*,[43] the Federal Circuit affirmed a reasonable royalty award that was nearly four times greater than the infringer's forecasted profit. The court explained that "'[t]here is no rule that a royalty be no higher than the infringer's net profit margin.'"[44] In *Monsanto v. McFarling* and *Monsanto v. Ralph*, the Federal Circuit affirmed a single use royalty rate that made it more expensive for a farmer to save infringing soybean seeds from crops that he grew and replant them than it would have been to buy new seeds and plant those.[45] Certainly a willing licensee farmer would reject that licensing offer and buy new seeds instead.[46]

The cases identify two concerns that may motivate courts to allow damage awards beyond what a willing licensor and licensee would have agreed to in a hypothetical negotiation: the counterfactual nature of the hypothetical negotiation and the insufficient deterrent to infringement provided by reasonable royalty damages. As described below, these concerns do

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[42]One commentator notes that "recent cases have highlighted that, as a legal matter, reasonable royalty awards may exceed the amount the parties would have agreed to" in the hypothetical negotiation. He explains that such "decisions make no economic sense." Cotter, *supra* note 36, at 1185 n.163 (*citing* Mars, Inc. v. Coin Acceptors, Inc., 527 F.3d 1359 (Fed. Cir. 2008)), Golight, Inc. v. Wal-Mart Stores, Inc., 355 F.3d 1327 (Fed. Cir. 2004), and Monsanto Co. v. Ralph, 382 F.3d 1374 (Fed. Cir. 2004)). *See also* Amy L. Landers, *Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law*, 46 SANTA CLARA L. REV. 307, 347-354 (2006) (describing *Ralph* and *Golight* cases as ignoring constraints that the requirement of a willing licensor should place on damage awards); Love, *supra* note 41, at 918-19 (criticizing *Monsanto* cases for awarding inflated damages that were higher than the purchase price of seeds).

[43]355 F.3d 1327 (Fed. Cir. 2004).

[44]*Id.* at 1338 (*quoting* State Indus., Inc. v. Mor-Flo Indus., Inc., 883 F.2d 1573, 1580 (Fed. Cir.1989)) (rejecting defendant's contention that the royalty award "left Wal-Mart selling the accused product well below cost" and "should be capped at . . . Wal-Mart's profit forecast for the product," and explaining that defendant's evidence showed what it "might have preferred to pay, which is not the test for damages."). *See also Mars*, 527 F.3d at 1373 (stating "an infringer may be liable for damages . . . that exceed the amount that the infringer could have paid to avoid infringement" and rejecting counter-argument as "wrong as a matter of law"); Chapter 7, Section III.A (discussing *Mars* and the role of alternative technologies in the hypothetical negotiation).

[45]Monsanto Co. v. McFarling, 488 F.3d 973, 978-81 (Fed. Cir. 2007) (affirming $40 royalty per bag of soybean seed costing between $26 and $29); Monsanto Co. v. Ralph, 382 F.3d 1374, 1384 (Fed. Cir. 2004) (affirming royalties of $52-55 per bag of soybeans). The court applied the reasonable royalty damage award in both cases to every bag of infringing seed replanted over a two-year period of infringement. The royalty was based on a single planting of infringing seeds, so it did not encompass the right to save and grow multiple generations of seeds. Thus, the damages royalty is analogous to the purchase of a bag of seed and not an unlimited license to grow multiple generations of seed. *McFarling*, 488 F.3d at 977, 981; *Ralph*, 382 F.3d at 1383 (describing damage award of $52-55 per bag of saved seed as "reasonable royalties for licenses to save and replant for a single year").

[46]*See* additional discussion of *Ralph* in Section IV.A., *infra.*

not justify inflating the reasonable royalty award beyond the maximum amount a willing licensee would have paid, assuming a valid and infringed patent. Doing so can overcompensate patentees by awarding more than the economic value of the invention, which leads to the problems described in Chapters 2 and 4.

A. The Counterfactual Nature of the Hypothetical Negotiation

The case law and some commentators and panelists worry that, due to its counterfactual nature, the hypothetical negotiation is unreliable.[47] The Federal Circuit has characterized the notion of a voluntary agreement between parties in litigation as "absurd,"[48] and "a pretense that the infringement never happened."[49] Indeed, the fact that the parties have litigated the matter through trial is evidence of their inability to reach agreement on payments for use of the patented technology. These points are of course true, and they raise many practical issues for implementing the hypothetical negotiation, which are discussed in Chapter 7. Determining an accurate reasonable royalty award to fully compensate a patentee can be very difficult. But the fact that the parties litigated through trial rather than reaching a licensing agreement does not justify giving short shrift to the willing licensor/willing licensee model or inflating reasonable royalty damages beyond the economic value of the invention.

There are two reasons why the parties may have failed to reach agreement before trial where both otherwise would have been open to a licensing arrangement. Neither should undermine the hypothetical negotiation analysis. First, one or both parties could have had unrealistic expectations about the likely size of the reasonable royalty award. The patentee may overvalue the invention, or the infringer may undervalue it. Since one would expect a license in this situation but for one party's imperfect information, it is appropriate for the court to award a reasonable royalty based upon information offered by the parties about the value of the invention. It falls to the court to set the award based on the expectations of more realistic negotiators.[50]

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[47]Panelists worried about the ability of factfinders to implement the hypothetical negotiation. *See, e.g.*, Rooklidge at 157-58 (5/5/09) (discussing how results from mock trials suggested that juries were not constrained by the structure of the hypothetical negotiation in setting an award); Robinson at 146 (2/11/09) (asking "whether th[is] artificial legal construct really resonates to a typical juror"); Thomas at 146 (12/5/08) ("One of the big questions now is: Is th[e hypothetical negotiation] framework essentially useless?").

[48]Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1554 (Fed. Cir. 1995) (en banc).

[49]Panduit Corp. v. Stahlin Bros. Fibre Works, Inc., 575 F.2d 1152, 1158 (6th Cir. 1978).

[50]*See* Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L. J. 1, 76 (2001); Vincent E. O'Brien, *Economics and Key Patent Damages Cases*, 9 U. BALT. INTELL. PROP. L.J. 1, 27 (2000) (criticizing *Rite-Hite* for justifying a high royalty on the basis that the patentee did not wish to grant a license).

Second, even if the parties had similar views on the value of the invention, they may have had very different views on the validity and infringement of the patent that made them unable to compromise on a litigation risk discount for the reasonable royalty. Again, it appropriately falls to the court to resolve the patent merits and award damages based on ascertained validity and infringement.[51] The parties' failure to reach agreement in either circumstance does not make it necessary to supplement the hypothetical negotiation amount or award more than a willing licensee would pay (assuming validity and infringement) to fully compensate the patentee.

Another important source of courts' unease with the willing licensor/willing licensee model is a concern that the patentee would never accept the maximum royalty the infringer would have paid in a hypothetical negotiation. In some cases, courts have been willing to determine reasonable royalty damages based on what the patentee would have accepted with less concern for what the infringer would pay.[52] That might happen when the patentee could make more selling the invention exclusively than through licensing, but the patentee fails to prove lost profits or chooses not to. One treatise explains that "in the vast majority of damage cases today, the reasonable royalty *damages* awarded are rarely the 'floor' represented by a negotiated royalty."[53] The Federal Circuit, the treatise continues, "routinely affirms 'reasonable royalty awards' that are obviously well in excess of what the parties would have actually" negotiated.[54] Arguably, in these circumstances, the court considers a "reasonable royalty" as not just the award based on the hypothetical negotiation, but as "the money awarded to the patent owner (however it is computed)" in cases where "the patent owner is unable to prove actual damages (i.e. lost profits)."[55] One commentator posits that courts have expanded reasonable royalty damages beyond the hypothetical negotiation amount in order to adequately compensate patentees that fail to meet overly rigorous requirements for proving lost profits damages.[56]

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[51]*See, e.g.*, Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009) ("The hypothetical negotiation also assumes that the asserted patent claims are valid and infringed.").

[52]See discussion of *Monsanto Co. v. Ralph*, *infra* notes 59-63.

[53]SKENYON et al., *supra* note 25, § 3:2 at 3-3.

[54]SKENYON et al., *supra* note 25, § 3:5 at 3-18. These include a number of cases in which the award was a substantial percentage of the revenues from the infringing sales. SmithKline Diagnostics, Inc. v. Helena Labs. Corp., 926 F.2d 1161, 1168 (Fed. Cir. 1991) (refusing to award a competing patentee lost profits but upholding a reasonable royalty award of 25% of the infringing product's sales price); Minco, Inc. v. Combustion Eng'g, Inc., 95 F.3d 1109, 1119 (Fed. Cir. 1996) (emphasizing that the patentee and infringer "competed head-to-head" in awarding reasonable royalty of 20% of the infringer's sales price for sales beyond 95% of the patentee's production capacity).

[55]SKENYON et al., *supra* note 25, § 3:2 at 3-3.

[56]Lemley, *supra* note 41, at 661-69. As discussed in Chapter 5, the law of lost profits must be flexible in allowing patentees to demonstrate the harm caused by infringement. Rigid rules that reject claims to lost profits damages based on a lack of precision in proving the amount of damages, rather than entitlement to them, undermines the ability of damages law to fully compensate patentees. *See id*. at 657-61.

Concerns about compensating unproven lost profits damages should not be allowed to inflate a reasonable royalty damage award beyond the maximum amount that a willing licensee would have paid. Arguments that the patentee would reject that maximum amount are based on an assumption that the patentee could have made more by not licensing, which means it sold a product. But if the patentee were better off selling or licensing the invention exclusively, it should be entitled to damages based on lost profits. When a patentee has failed or chosen not to prove its lost profits,[57] allowing amorphous or unproven claims of harm to override the hypothetical negotiation's requirement of a willing licensee risks damage awards that are unconnected to the economic value of the invention.[58] This result misaligns the patent system and competition policy by overcompensating patentees compared to a market absent infringement.

Monsanto v. Ralph[59] illustrates how reasonable royalty calculations that reject the requirement of a willing licensee can overcompensate patentees whose harm is better measured through lost profits. Monsanto developed and patented a series of "Roundup Ready" seeds that it sold to farmers with the restriction that they not save and replant harvested seeds. Ralph did just that, however, and infringed Monsanto's patents. Each time the farmer replanted a bag of saved seed, Monsanto and its distributors lost a sale. Thus, satisfying patent law's overarching goal of putting Monsanto in the position it would have been but for the infringement should have involved calculating its lost profits based on the number of saved bags.[60] In spite of this, Monsanto pursued, and the Federal Circuit affirmed, a reasonable royalty damage award of about $55 applied to each bag of saved infringing soybean seed. That royalty significantly exceeded the approximately $25 cost per bag of new seed, the amount a willing licensee would have paid and, presumably, any profits that Monsanto lost due to the infringement.[61]

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[57]One commentator has asserted that some patentees that have lost profits claims choose to pursue reasonable royalty damages in hope of a larger award. Lemley, *supra* note 41, at 667-68. "Reasonable royalty has now become the more prevalent measurement of damages." Levko at 19 (2/11/09); Aron Levko, *2009 Patent Damages Study: Preliminary Results* 9, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/feb11/docs/alevko.pdf (reporting that reasonable royalties account for 54% of awards since 2000, an increase over prior years).

[58]Lemley, *supra* note 41, at 667-68 ("By importing compensation concepts from lost profits into the reasonable royalty context without importing the strict elements of proof, these courts have turned the reasonable royalty from a floor on patent damages designed to avoid undercompensation into a windfall that overcompensates patentees.").

[59]382 F.3d 1374 (Fed. Cir. 2004).

[60]Ralph did argue that lost profits were shown and those should have been the measure of damages. The court did not respond to this argument. *Id.* at 1383.

[61]*Id.* at 1377-79; *see* n.45, *supra*.

The court reached this result by accepting the "limits" of the hypothetical negotiation where Monsanto was unwilling to license farmers to save and replant seed "at any price."[62] Those limits freed the court to affirm a reasonable royalty award without concern for whether a willing licensee would have paid it.[63] But the impossibility of identifying a bargain between a willing licensor and willing licensee in this case stems not from a flaw in the hypothetical negotiation framework, but from the fact that lost profits are the more appropriate measure of damages for patentees that wish to market their inventions exclusively rather than license them.

In at least one case, *Rodime v. Seagate*,[64] the Federal Circuit rejected a patentee's attempt to incorporate unproven direct harm into a reasonable royalty calculation. The patentee, Rodime, sought consequential business damages beyond the reasonable royalty amount. The patentee argued that the infringer's refusal to take a license deprived it of a revenue stream that would have prevented bankruptcy. The court explained that allowing both consequential business damages and reasonable royalty damages would be improper: "The 'consequential damages' Rodime [the patentee] seeks are merely a species of lost profits. Having elected to pursue only a reasonable royalty, Rodime cannot, in the district court's words, 'bootstrap evidence of its lost profits back into the case by reference to 'reasonable royalties.'"[65] Courts should not allow such "bootstrapping" to support reasonable royalty awards beyond what a willing licensee would pay in the hypothetical negotiation.

B. Deterrents to Infringement

Closely related to the concern about the counterfactual nature of the hypothetical negotiation is the worry that reasonable royalty damages do not deter infringement, but rather allow a patentee's competitor to simply "elect[] to infringe" and thereby "impose a 'compulsory license.'"[66] The case law explains that "the infringer would have nothing to lose, and everything to gain [from choosing to infringe] if it could count on paying only the normal, routine royalty

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[62] *Id.* at 1384.

[63] Ralph argued that the reasonable royalty awarded exceeded his anticipated profits and violated the hypothetical negotiation framework. The Federal Circuit rejected that argument: "[A]lthough an infringer's anticipated profit from use of the patented invention is among the factors to be considered in determining a reasonable royalty, the law does not require that an infringer be permitted to make a profit." *Id*. at 1383.

[64] 174 F.3d 1294 (Fed. Cir. 1999).

[65] *Id*. at 1308.

[66] Panduit Corp. v. Stahlin Bros. Fibre Works, Inc., 575 F.2d 1152, 1158 (6th Cir. 1978).

non-infringers might have paid."[67] Some cases contain overtones of punishing infringers[68] even though compensatory damages for the strict liability offense of infringement are not meant to be punitive. This argument ignores several other deterrents to infringement incorporated within the patent system, and it presents an inappropriate reason to inflate reasonable royalty awards beyond the market reward for the invention.[69]

First, the argument incorrectly assumes that damages following trial will be the "normal, routine royalty." The law, however, requires that the hypothetical negotiation amount incorporate the assumption that the patent is valid and infringed.[70] Therefore, a reasonable royalty should be higher following trial than it would have been before because uncertainties regarding liability have been resolved. Regular licensees would have bargained for a royalty rate reflecting a discount for the probability that they would not have been found liable. The higher royalty paid following litigation will provide some deterrent to infringement and encourage settlement. The cases sometimes call for an "infringer's royalty."[71] A royalty that is higher than established rates because liability is ascertained is appropriate, but inflating damage awards for other reasons unrelated to economic proof is not.

Second, the primary mechanism for deterring intentional infringement is the award of enhanced damages and attorneys fees for willful infringement, which target only intentional and not inadvertent infringement.[72] Attempts to adjust compensatory damages to increase their deterrence value risks making such damages punitive, which is inappropriate for the strict liability offense of infringement in a patent system that suffers from significant uncertainty and

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[67]H.M, Stickle v. Heublein, Inc., 716 F.2d 1550, 1563 (Fed. Cir. 1983) (*quoting Panduit*, 575 F.2d at 1158).

[68]*Ralph*, 382 F.3d at 1384 ("the 'imposition on a patent owner who would not have licensed his invention for [a given] royalty is a form of compulsory license, against the will and interest of the person wronged, in favor of the wrongdoer'") (*quoting Rite-Hite*, 56 F.3d at 1554 n.13) (en banc).

[69]*See generally* Love, *supra* note 41.

[70]*See, e.g.*, Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009) ("The hypothetical negotiation also assumes that the asserted patent claims are valid and infringed.").

[71]King Instruments Corp. v. Perego, 65 F.3d 941, 951 n.6 (Fed. Cir. 1995) ("Such an increase, which may be stated by the trial court either as a reasonable royalty for an infringer . . . or as an increase in the reasonable royalty determined by the court, is left to its sound discretion.") (*quoting H.M. Stickle*, 716 F.2d at 1563).

[72]*In re* Seagate Tech., LLC, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (en banc) ("[T]o establish willful infringement, a patentee must show by clear and convincing evidence that the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent . . . . If this threshold objective standard is satisfied, the patentee must also demonstrate that this objectively-defined risk . . . was either known or so obvious that it should have been known to the accused infringer.").

lack of notice. That result could lead to the market distortions of overcompensation discussed in Chapters 2 and 4 and deter innovation by potential targets of infringement suits.

Third, other significant costs and risks of infringement deter intentional infringement and provide motivation to avoid inadvertent infringement. Infringement can lead to substantial litigation costs, including potentially onerous discovery demands and business uncertainty.[73] Moreover, the threat of an injunction provides an especially significant deterrent to knowing infringement. If an adjudged infringer has sunk costs into research and development, or a plant and equipment, to produce the infringing product, it risks losing that investment if it cannot obtain a license.[74]

Some participants raised the concern that, in the wake of the Supreme Court's *eBay, Inc. v. MercExchange, LLC*[75] decision, permanent injunctions will no longer be available to firms that do not practice their patents, and therefore provide less of a deterrent to infringement.[76] As discussed in Chapter 8 and Appendix B, a careful review of the cases demonstrates that the injunction analysis is more refined and nuanced than this argument suggests, allowing non-manufacturing patent owners to obtain injunctions in many scenarios.[77] Moreover, Chapter 8 advocates an injunction analysis that supports the deterrence value of injunctions. Thus, the change in injunction law brought by *eBay* and other concerns that reasonable royalty damages do not deter infringement cannot justify awarding damages beyond the amount resulting from the hypothetical negotiation analysis.

V. CONCLUSION AND RECOMMENDATION

The construct of a hypothetical, voluntarily negotiated agreement is widely used in reasonable royalties determinations. Several panelists agreed that it was a "useful tool,"[78] and perhaps there is no "alternative that is any better."[79] The willing licensor/willing licensee model can provide a patentee with the market reward based on the economic value of the invention by

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[73]Rooklidge at 180 (5/5/09).

[74]*See* Chapter 8, Section IV.B.

[75]547 U.S. 388 (2006).

[76]Innovation Alliance Comment at 10 (2/5/09); Maghame at 233 (2/11/09) (representative of R&D firm expressing concern "that injunctions may no longer be available in a lot of instances"); Lasersohn at 183-84 (2/11/09) (venture capitalist representative stating that "the fact that injunctive relief is less available is a huge issue for us").

[77]*See* Chapter 8, Section II.B. *See also eBay*, 547 U.S. at 393 (explicitly warning against an analysis that would automatically deny injunctions to patentees that do not practice the invention).

[78]Underweiser at 219-21 (2/11/09); *see also* Cotter at 41 (2/11/09).

[79]Loeb at 224-25 (2/11/09); Lasersohn at 232 (2/11/09); O'Brien at 174 (5/5/09).

determining the bargain the parties would have struck in light of competition from alternatives. Admittedly, the calculation is difficult due to its hypothetical nature. But as discussed in Chapter 7, courts and the parties can bring greater economic discipline to this analysis, thereby enhancing its usefulness as a tool for determining the market reward.

> ***Recommendation.*** The Commission recommends that courts award reasonable royalty damages consistent with the hypothetical negotiation analysis and willing licensor/willing licensee model. Concerns about punishing infringement, deterring infringement, the counterfactual nature of the analysis or unproven lost profits that the patentee may have suffered should not inflate the reasonable royalty damage award beyond what a willing licensee would have paid for a patent known to be valid and infringed. Doing so risks awarding patentees more than the economic value of their inventions compared to alternatives and creating problems of overcompensation and market distortion.

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CHAPTER 7
CALCULATING REASONABLE ROYALTY DAMAGES

I. INTRODUCTION

The goal of a reasonable royalty damages calculation is to replicate the market reward (assuming a valid and infringed patent) for the invention in the absence of infringement for a patentee that would not have, or cannot prove that it would have, made the infringer's sales. As discussed in Chapter 6, the proper measure of damages in this case depends on what a willing licensee and licensor would have agreed to in a hypothetical negotiation.

Accurately calculating reasonable royalty damages based on a hypothetical negotiation presents numerous challenges for litigants and courts. An economically grounded approach that reflects an appreciation of the role of competition in establishing the economic value of an invention would increase the accuracy of that determination. Such analysis is important for avoiding undercompensation of patentees, which can undermine incentives to innovate and discourage innovation models based on technology transfer, as described in Chapter 1. Accurate damage determinations are also important for avoiding overcompensation of patentees, which can distort competition among technologies and deter innovation by raising costs and risks for innovators, as described in Chapters 2 and 4. This Chapter suggests several steps courts should take to increase the accuracy of reasonable royalty damage awards. They include: treating the *Georgia-Pacific* factors appropriately; recognizing that alternatives cap the royalty a willing licensee would pay; excluding unreliable expert testimony from evidence; and eliminating the entire market value rule.

II. OVERVIEW OF THE GEORGIA-PACIFIC FACTORS AND THEIR IMPLEMENTATION

A. The Factors

Awards of reasonable royalty damages typically have been based on a list of 15 factors identified by the district court in the *Georgia-Pacific* case.[1] Factor 15 is the hypothetical negotiation amount and the other 14 factors list categories of evidence. The factors are:

1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.

2. The rates paid by the licensee for the use of other patents comparable to the patent in suit.

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[1]Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd*, 446 F.2d 295 (2d Cir. 1971); *see also* JOHN M. SKENYON, CHRISTOPHER S. MARCHESE & JOHN LAND, PATENT DAMAGES LAW AND PRACTICE § 3:6, at 3–25 (2008) (hypothetical negotiation is "almost always" based on *Georgia-Pacific* factors).

3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.

4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.

5. The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.

6. The effect of selling the patented specialty in promoting sales of other products of the licensee; that existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.

7. The duration of the patent and the term of the license.

8. The established profitability of the product made under the patent; its commercial success; and its current popularity.

9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.

10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.

12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.

13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.

14. The opinion testimony of qualified experts.

15. The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement.

This list has become "virtually codified" by the Federal Circuit, and serves as a "touchstone" for expert testimony and courts reviewing an award.[2] As one commentator observed, "some courts described the law governing so-called 'reasonable royalty' damages solely by reference to the *Georgia-Pacific* list."[3] Courts frequently cite the district court decision as authoritative.[4] Indeed, standard jury instructions often recite a list of all or nearly all of these factors.[5] Expert witnesses often structure testimony around them, and may feel compelled to opine on each factor to protect their overall assessment from attack.[6]

B. Reactions to the *Georgia-Pacific* Factors

Several panelists and commentators strongly supported the prominence of the *Georgia-Pacific* factors in calculating reasonable royalty damages.[7] They identified the factors' flexibility

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[2]RICHARD F. CAULEY, WINNING THE PATENT DAMAGES CASE: A LITIGATOR'S GUIDE TO ECONOMIC MODELS AND OTHER DAMAGE STRATEGIES 6–7 (2009).

[3]JOHN W. SCHLICHER, PATENT LAW: LEGAL AND ECONOMIC PRINCIPLES § 13:146 (1992).

[4]*See, e.g.*, Minks v. Polaris Indus., Inc., 546 F.3d 1364, 1372 (Fed. Cir. 2008) ("A determination of the royalty stemming from a hypothetical negotiation is often made by assessing factors such as those set forth in *Georgia-Pacific* . . . .").

[5]*See, e.g.*, Skenyon at 103 (2/11/09); Mitchell G. Stockwell, *Implementing eBay: New Problems in Guiding Judicial Discretion and Enforcing Patent Rights*, 88 J. PAT. & TRADEMARK OFF. SOC'Y 747, 759 n.58 (2006) ("Many standard jury instructions for determining a reasonable royalty reference the multi-factor test set forth in *Georgia-Pacific* . . . ."); *see also* Pattern Jury Instructions: Fifth Circuit, Civil Cases § 9.8 (Comm. on Pattern Jury Instructions Dist. Judges Ass'n Fifth Circuit 2006) (*citing* the *Georgia-Pacific* factors) *available at* http://www.lb5.uscourts.gov/juryinstructions/fifth/2006CIVIL.pdf; Uniform Jury Instructions for Patent Cases in the United States District Court for the District of Delaware Instruction 6.11 (1993) (Factors for Determining Reasonable Royalty) (repeating the *Georgia-Pacific* factors); Am. Intell. Property Law Ass'n, Model Patent Jury Instructions, 45–47 (listing substantially all of the *Georgia-Pacific* factors and "[a]ny other economic factor that a normally prudent business person would, under similar circumstances, take into consideration in negotiating the hypothetical license."). *But cf.* Model Patent Jury Instructions for the Northern District of California (Nov. 29, 2007), *available at* http://www.cand.uscourts.gov/filelibrary/5/Model-Patent-Jury-Instructions.pdf (citing *Georgia-Pacific* but not listing factors and advising jury to use the general hypothetical negotiation framework applying the evidence presented).

[6]Brian C. Riopelle, *Direct and Cross-examination of a Damages Expert*, 766 PLI/Pat 781, 806 (2003) (to "bolster [a damages expert's] credibility . . . he should say he considered all the factors set forth in the *Georgia-Pacific* case").

[7]Loeb at 180 (2/11/09); Johnson at 244 (2/11/09); Rhodes at 166 (2/11/09); PhRMA Comment at 16 (2/10/09); Innovation Alliance Comment at 11 (2/5/09) ("*Georgia-Pacific* simply restated the basic principles and methodology that have historically guided courts in matters of patent damages . . . . [They] are rooted in well-established (and arguably incontrovertible) legal and economic principles of compensatory damages generally.").

as an important benefit.[8] The conditions under which parties enter licensing negotiations vary tremendously, and flexibility is important in properly considering them.[9] The discussions of technology transfer licensing in Chapter 1 and ex post licensing in Chapter 2 illustrate how licensing covers an extremely diverse range of technology and economic conditions. Several panelists agreed that the *Georgia-Pacific* factors allow consideration of issues that would govern real-world negotiations in a variety of contexts. For instance, one panelist praised the *Georgia-Pacific* factors as "mirror[ing] a lot of the considerations that take place in actual licensing negotiations," and "replicat[ing] what type of dynamic there would be between the patent holder and one wanting to use the patented invention."[10]

Other panelists, however, were highly critical of the *Georgia-Pacific* case and the manner in which the factors are used in litigation today.[11] In particular, many argued that the list of factors provides little or no guidance to juries.[12] One panelist stated, "the judge throws the grab bag with all the factors to the jury and says, 'Do what you think is right.'"[13] Another explained, "*Georgia-Pacific* provides a list of sometimes overlapping factors (the 'GP factors'), without giving a framework in which to evaluate those factors."[14]

The lack of guidance and framework in the *Georgia-Pacific* approach creates two related problems, according to panelists. First, it permits the patentee to introduce or emphasize information that leads the jury away from an economically grounded analysis based on facts that

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[8]Maghame at 234 (2/11/09) ("you need the flexibility to do a market based evaluation"); Burton at 77, 94 (2/11/09); Levko at 137 (2/11/09); Gauri Prakash-Canjels, Ph.D. Comment at 3 (4/16/09).

[9]Innovation Alliance Comment at 11 (2/5/09) (flexibility is needed so that "courts and juries . . . [can] consider any and all evidentiary factors that would have been deemed relevant by the parties in a hypothetical negotiation"); Lasersohn at 231 (2/11/09) (experts rely on the *Georgia-Pacific* factors because determining economic value is "complicated," varying according to company, competitor, and economic environment); Loeb at 225 (2/11/09).

[10]Rhodes at 237-38 (2/11/09); *id.* at 166 ("the 15 *Georgia-Pacific* factors really do replicate [] real world licensing negotiation"); Johnson at 243-44 (2/11/09) (In negotiating hundreds of licenses per year, one panelist's firm uses "methodologies that are very much like the *Georgia-Pacific* factors.").

[11]Schlicher at 201 (5/5/09) (characterizing the case as a "historical tragedy"); Simon at 243 (2/11/09) (observing that the Second Circuit reduced the award since the *Georgia-Pacific* district court had failed to leave an appropriate profit for the infringer).

[12]Leonard at 47 (2/11/09) (calling the *Georgia-Pacific* factors a "grab bag"); Levine at 37, 132 (2/11/09); Simon at 200 (2/11/09); Chaikovsky at 195 (5/5/09) (describing "the *Georgia-Pacific* factors where I have so many factors and anyone can kind of pick or choose"); Verizon Comment at 8 (3/20/2009).

[13]Janicke at 15 (2/11/09).

[14]NERA Economic Consulting Comment at 18 (3/9/09).

would have informed the licensing decision.[15] One panelist drew a distinction between the facts necessary to support lost profits and reasonable royalty damages: "[L]ost profits tend[] to be constrained by the facts, and reasonable royalty isn't constrained by the facts, but by the imagination of the expert witness."[16] Second, the lack of guidance leads to "basically a free for all"[17] in which juries may render highly unreliable awards[18] that courts may not be able to overturn, given deferential standards for reviewing jury verdicts.[19] One academic stated, "the *Georgia-Pacific* factors . . . can be so easily manipulated by the trier of fact to reach virtually any outcome."[20]

C. The Role of the *Georgia-Pacific* Factors

Courts can improve reasonable royalty damages calculations by emphasizing the hypothetical negotiation and willing licensor/willing licensee model as the conceptual framework against which conduct of the damages trial should be tested.[21] The first fourteen *Georgia-Pacific* factors do not supply that conceptual framework. Rather, they are properly understood as a non-

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[15]Schlicher at 202 (5/5/09) (emphasizing that the *Georgia-Pacific* factors permit evidence on the infringer's total profits and revenue); *see also* O'Brien at 205 (5/5/09) (*Georgia-Pacific* "emphasi[zes] [] the profitability of the product" even though "the value of a component has little to do with the profitability of the product"). *Cf.* Rooklidge at 192 (5/5/09) (emphasizing the substantial prejudicial impact of permitting evidence on the "company's gross revenues or market capitalization").

[16]McKelvie at 193-94 (12/5/09).

[17]Reines at 82 (2/11/09).

[18]Doyle at 209 (5/5/09) (declaring that "*Georgia-Pacific* is notoriously empty of any real meaning here. It certainly hasn't led to predictability of results.").

[19]*See infra* Section IV.B (describing standards of review for jury verdicts).

[20]Cotter at 39 (2/11/09); *see also* Schlicher at 201 (5/5/09) ("Any rule that says consider 15 things and anything else you think is relevant and arrive at a number permits any number."); Simon at 200 (2/11/09) ("[W]hatever a jury comes back [with] can be supported . . . because you can choose all, some or none of those 15 factors.").

[21]Several panelists and commentators suggested the need for a conceptual economic framework to guide reasonable royalty calculations. *See, e.g.*, O'Brien at 205 (5/5/09) ("it would be much better having a conceptual framework . . . as opposed to this list"); Agisim at 254-55 (2/11/09) ("ultimately . . . you need to create an objective standard"); John W. Schlicher, *Patent Damages, the Patent Reform Act, and Better Alternatives for the Courts and Congress*, 91 J. PAT. & TRADEMARK OFF. SOC'Y 19, 46 (2009) ("Factors are useless without a coherent theory of reasonable royalty damages that enables judges and juries to understand what they are trying to accomplish by an award and how to go about doing so."); Levine at 37 (2/11/09) (suggesting courts consider "governing principles"); Leonard at 37 (2/11/09) ("What we really need is a framework, a conceptually sound and coherent framework that lays out . . . how you do it, and the valuation principles.").

exhaustive list of categories of evidence potentially relevant to computing a reasonable royalty.[22] Evidence within one of these categories may or may not be useful in proving the willing licensor/willing licensee amount in any particular case.

An increased emphasis on the hypothetical negotiation, with its requirement of a willing licensee,[23] and a better appreciation for the appropriate role of the *Georgia-Pacific* factors will have practical consequences that courts should implement. First, courts should make damages determinations as the trier of fact or review the sufficiency of jury determinations with a focus on what a willing licensee and licensor would have agreed to in the hypothetical negotiation. Second, as further discussed in section IV of this Chapter, courts should not treat evidence as reliable and admissible only because it falls into one of the *Georgia-Pacific* categories. Third, courts should aid juries with instructions that focus attention on the hypothetical negotiation, including the requirement of a willing licensee, as the touchstone for their determination. When jury instructions present a complete or partial list of the *Georgia-Pacific* factors, they provide little guidance. Simply admitting evidence that corresponds to any of the *Georgia-Pacific* categories and charging the jury to use it to come up with a royalty can lead to confusion for juries in making awards[24] and difficulty for courts in reviewing them.[25]

The wide variety of fact scenarios to which the hypothetical negotiation model may apply counsels for a flexible approach when identifying evidence that may inform that determination. However, flexibility must be combined with a framework for testing and using the available evidence. Without such discipline, the *Georgia-Pacific* factors provide a grab bag for use by parties seeking to establish whatever reasonable royalty serves their purposes. Their competing claims may bear little or no relationship to each other or to a credible effort to implement the hypothetical negotiation model.[26] Many courts and parties already apply this discipline, but broader application would help increase the accuracy of reasonable royalty damage awards.

> ***Recommendation.*** Courts should consistently adopt and apply the hypothetical negotiation and willing licensor/willing licensee model as the conceptual framework against which conduct of the damages trial is tested. In particular,

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[22] *See infra* Section II.A for a review of the *Georgia-Pacific* factors.

[23] *See* Chapter 6.

[24] Levine at 37 (2/11/09) ("Sometimes the grab bag of factors is simply presented to the jury, and the jurors have to figure out or sort of divine from that what kind of reward to give.").

[25] Daralyn J. Durie & Mark A. Lemley, *A Structured Approach to Calculating Reasonable Royalties*, 14 LEWIS & CLARK L. REV. 627, 632 (2010) ("the fifteen-factor test makes it extremely difficult for judges to review a jury damage award for substantial evidence, either on judgment as a matter of law (JMOL) or on appeal").

[26] Schlutz at 132 (5/5/08) ("you'll have these experts on the plaintiff side versus the defense side and sometimes the difference in their valuation will be a thousandfold").

courts should recognize that the first fourteen *Georgia-Pacific* factors provide only a list of evidence categories. Implementing this recommendation will have a variety of practical consequences.

III. THE ROLE OF ALTERNATIVE TECHNOLOGIES

The hypothetical negotiation's assumption of a willing buyer and willing seller depends on the existence of royalty rates that are acceptable to both parties. From the patentee's perspective, the damages must at least cover income that would have been earned but for the infringement.[27] From the infringer's point of view, the maximum royalty cannot exceed the increased profits the infringer anticipates based on using the patented invention rather than the next best alternative.[28] A willing licensee and willing licensor would typically reach a price somewhere within this bargaining range, leaving both to profit from the agreement.[29] Even if that is not the case and the licensee pays the bargaining range's maximum amount, competition from alternative technologies plays an important role in establishing the maximum reasonable royalty. Damages determinations that do not give sufficient weight to competition from alternatives risk overcompensating patentees and distorting competition, as discussed in Chapters 2 and 4.

A. Competition from Alternatives Defines a Cap for Reasonable Royalty Damages

In many instances, technologies compete for incorporation into new products, as discussed in Chapters 1 and 2. Product designers choose technologies based in part on technical advantages, consumers' willingness to pay, and costs, some of which may include patent royalties. For some non-core technologies, a high-tech firm "almost invariably ha[s] another option at the time" of its "design decision," which it would choose if a patentee's royalty demand

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[27]It may be that a patentee is only willing to accept an amount that is more than the infringer would pay because the cost of the infringement in terms of lost profits or other direct damages is high. In that case, the patentee should receive lost profits damages rather than an inflated reasonable royalty damages, as discussed in Chapters 4 and 6.

[28]RICHARD B. TROXEL & WILLIAM O. KERR, CALCULATING INTELLECTUAL PROPERTY DAMAGES § 5:18 at 269 (2009) (determining the value of the patented technology requires a comparison of "the gains that the infringer expects to receive from using the infringing technology with the gains that would have been available had the infringer gone forward with the next-best noninfringing alternative").

[29]*See, e.g.,* Gregory K. Leonard & Lauren J. Stiroh, *A Practical Guide to Damages*, *in* ECONOMIC APPROACHES TO INTELLECTUAL PROPERTY POLICY, LITIGATION AND MANAGEMENT 52-58 (Gregory K. Leonard & Lauren J. Stiroh eds., 2005); *cf.* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1995-96 (2007) (analyzing the negotiation of reasonable royalties under various conditions "[u]sing the standard economic theory of Nash bargaining, [in which] the negotiated royalty rate depends upon the payoff that each party would obtain if the negotiations break down, i.e., on each party's threat point in the licensing negotiations").

was excessive.[30] When substitute technology is not available, a product designer may leave the patented feature off its product if revenues attributable to the feature do not justify the royalty demand.[31] Thus, at the time a company is designing a product, the incremental value that a patented technology provides over alternatives (including an alternative product that lacks the patented feature) constrains the royalty.[32] The most a company would be willing to pay for patented technology is the incremental value (i.e., the incremental profit) of the patented technology over the alternative.

Because the incremental value of patented technology over alternatives plays such a crucial role in licensing negotiations, it must play a commensurate role in the hypothetical negotiation that determines reasonable royalty damages. Commentators explain that evaluating the available alternatives is "[e]conomically . . . crucial to establishing what the parties would have agreed to" in the hypothetical negotiation.[33] Indeed, with "sufficient data" the alternative "can be incorporated directly into determining the licensee's maximum willingness to pay."[34] Academics,[35] practitioners,[36] economists,[37] and business representatives[38] acknowledged the

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[30]Simon at 202-03 (2/11/09) .

[31]O'Brien at 173-74 (5/5/09); Fresenius Med. Care Holdings, Inc., v. Baxter Int'l., Inc., No. C 03-01431, 2006 WL 1646113, at *2 (N.D. Cal. June 12, 2006) (allowing evidence that the infringer could have successfully competed without the patented feature, and therefore would not have been willing to pay a high royalty).

[32]Lance E. Gunderson, Stephen E. Dell & Scott W. Cragun, *The "Analytic Approach" as a Technique to Determine a Reasonable Royalty*, *in* ECONOMIC DAMAGES IN INTELLECTUAL PROPERTY: A HANDS-ON GUIDE TO LITIGATION 181, 182 (Daniel Slottje ed., 2006) ("Generally, the maximum royalty amount that licensee would be willing to pay is the excess profit licensee would expect to earn from the infringing products over the return from its [next best alternative].").

[33]Peter B. Frank, Vincent E. O'Brien & Michael J. Wagner, *Patent Infringement Damages*, *in* LITIGATION SERVICES HANDBOOK: THE ROLE OF THE FINANCIAL EXPERT Ch. 22 at 16 (Roman L. Weil, Peter B. Frank, Christian W. Hughes & Michael J. Wagner eds., 2007).

[34] Leonard & Stiroh, *supra* note 29, at 63-64.

[35]Cotter at 138 (12/5/09) ("hypothetical bargain . . . should wind up reflecting the expected value of the patented technology in comparison to the next best alternative"); Janicke at 42 (2/11/09) (proposing "the value added by a particular patent" as the best criterion for reasonable royalties).

[36]Schlicher, at 230-31 (5/5/09) ("damages ought to be the difference between the profits that a company would have made selling a PDA with that memory chip minus the profits the company would have made . . . using the next-best kind of memory chip it would have"); *cf.* Rooklidge at 180 (5/5/09) (suggesting that "comparing the infringing product to the next-best alternative may very well work in the vast majority of cases, but in some cases there may be alternate evidence that's available").

[37]Gilbert at 221 (5/5/09) (central inquiry is "the incremental contribution [of the patented technology] relative to the next-best noninfringing alternative"); Leonard at 127 (2/11/09) (describing how to estimate

importance of the value of the patented technology over alternatives to a reasonable royalty damages analysis.

Recognizing the key economic role of alternatives does not undermine the flexibility of an analysis that considers a broad range of factors, including the relevant *Georgia-Pacific* factors. Some panelists argued that value over alternatives should not become a "single factor" test that unduly inhibits the flexibility of *Geogia-Pacific*.[39] However, the value of patented technology over alternatives determines only the upper end of a bargaining range, whose lower end is determined by the amount that the licensor is willing to accept.[40] Other factors, including the *Georgia-Pacific* factors, may be relevant in constructing the bargaining range and establishing a royalty within it.[41]

1. Case Law Addressing Alternatives

Georgia-Pacific factor nine allows consideration of alternatives.[42] The Federal Circuit has recognized that alternatives represent "a factor relevant to the determination of a proper royalty during hypothetical negotiations," explaining that an infringer would be in "a stronger position to negotiate for a lower royalty rate knowing it had a competitive device 'in the

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"the incremental value that the patented technology gives you as the infringer"); O'Brien at 174 (5/5/09) (opining that "it's not necessarily the maximum, but it's a benchmark").

[38]PhRMA Comment at 20 (2/10/09); Verizon Communications, Inc. Comment at 9 (3/20/09); Johnson at 268 (2/11/09) (a pharmaceutical company representative endorsing "compar[ing] [an invention] with its closest non-infringing alternate").

[39]Burton at 133 (2/11/09); *see also id.* at 77 (2/11/09) (expressing concern about "proposals that put a single factor first or make that the primary one," emphasizing that each case is "different, and it's really important to be flexible in your analysis"); Rhodes, at 238-39 (2/11/09) (pointing out that the *Georgia-Pacific* factors include consideration of the added benefit of the patented invention as compared to prior products, but do constrain the analysis); Lasersohn at 230-32 (2/11/09); Maghame at 258 (2/11/09).

[40]*See, e.g.*, Leonard & Stiroh, *supra* note 29, at 52 (explaining that a reasonable royalty "must be one in which both sides benefit from the bargain").

[41]NERA Economic Consulting Comment at 16 (3/9/09) (describing ways to "determine where within the range the negotiated royalty would fall"); Leonard & Stiroh, *supra* note 29, at 60 (suggesting that some *Georgia-Pacific* factors may be used to assess bargaining power and thus where within the bargaining range the final royalty would lie).

[42]*Georgia-Pacific*, 318 F. Supp. at 1120 ("The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.").

wings.'"[43] Some district courts have also acknowledged the importance of alternatives to the reasonable royalty analysis.[44]

A leading case is *Grain Processing Corp. v. American Maize-Products Co.*[45] The district court, Judge Frank Easterbrook sitting by designation, held that the cost difference between using the patented technology and an alternative "effectively capped the reasonable royalty award" since if the patentee "had insisted on a [greater] rate. . . in the hypothetical negotiations" the infringer would have adopted the alternative technology.[46] Judge Easterbrook's award of a three percent royalty represented his "best estimate" of what the parties would have reached in light of the 2.3% cost saving from the patented technology as well as other cost savings associated with a hypothetical license agreement.[47]

The parties did not appeal the royalty amount, so the Federal Circuit did not review it. However, the appeals court stated that Judge Easterbrook "supported [the] royalty amount with

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[43]Zygo Corp. v. Wyko Corp., 79 F.3d 1563, 1571-72 (Fed. Cir. 1996); *see also* Total Containment, Inc. v. Environ Products, Inc., Nos. 96-1138, 96-1151, 1997 WL 16032 (Fed. Cir. Jan. 17, 1997) (unpublished opinion) (observing that "when faced with an unreasonably high license fee for patented technology, the market players ordinarily opt for " the technology).

[44]SmithKline Diagnostics, Inc. v. Helena Laboratories Corp., No. Civ.A. B-83-10, 1989 WL 418791, at *6 (E.D. Tex. June 30, 1989) (a willing licensee "would be less inclined to agree to a high royalty because of the availability of such non-infringing alternatives"); Novozymes A/S v. Genencor Int'l, Inc., 474 F. Supp. 2d 592, 607 (D. Del. 2007) (parties "would consider available, or soon to be available, alternatives" in agreeing to a royalty); *Fresenius*, 2006 WL 1646113, at *2 (alternatives are "a key part" of damages determination); Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc., No. IP 96-1718-C-H/K, 2002 WL 1801525, at *74 (S.D. Ind. July 5, 2002) (an important factor to consider), *aff'd in part, rev'd in part, and remanded*, 381 F.3d 1371 (Fed. Cir. 2004), *vacated*, 315 Fed. Appx. 273 (Fed. Cir. 2009).

[45]185 F.3d 1341, 1350-51 (Fed. Cir. 1999). This decision was the last in a series addressing the proper remedy in the case. *See* Grain Processing Corp. v. American Maize-Products Co., 893 F. Supp. 1386 (N.D. Ind. 1995) (finding infringement, denying lost profits, and awarding a reasonable royalty), *aff'd in part, vacated in part*, 108 F.3d 1392 (Fed. Cir. 1997) (nonprecedential) (reversing and remanding the denial of lost profits), *further decision on remand*, 979 F. Supp. 1233 (N.D. Ind. 1997) (again denying lost profits and awarding a reasonable royalty), *aff'd*, 185 F.3d 1341 (Fed. Cir. 1999) (affirming the denial of lost profits).

[46]*Id.* at 1347 (describing the district court's reasoning regarding a reasonable royalty). *See also Grain Processing*, 893 F. Supp. at 1392-93.

[47]*Grain Processing*, 893 F. Supp. at 1392-93. The benefits of the license included eliminating the risk that the alternative might have turned out to infringe the patent, which had happened in the infringer's initial attempts to design around the patent. *Id.* Judge Easterbrook also cited evidence of comparable royalties and emphasized that "[a]s the infringer, AMP must bear the effects of uncertainty" resulting from the lack of more detailed cost evidence. *Id.*

sound economic data and with actual, observed behavior in the market."[48] The Federal Circuit also explained (in affirming a denial of a lost profit award) that "only by comparing the patented invention to its next-best available alternative(s) – regardless of whether the alternative(s) were actually produced and sold during the infringement – can the court discern the market value of the patent owner's exclusive right, and therefore his expected profit or reward, had the infringer's activities not prevented it from taking full economic advantage of this right."[49]

In spite of its comments in *Grain Processing*, the Federal Circuit more recently suggested that alternatives do not cap reasonable royalty damage awards. In *Mars, Inc. v. Coin Acceptors, Inc.*,[50] the court stated in dicta that it "is wrong as a matter of law to claim that reasonable royalty damages are capped at the cost of implementing the cheapest available, acceptable, noninfringing alternative."[51] The *Mars* court continued, "to the contrary, an infringer may be liable for damages, including reasonable royalty damages, that exceed the amount that the infringer could have paid to avoid infringement."

> ***Recommendation.*** Courts should recognize that when it can be determined, the incremental value of the patented invention over the next-best alternative establishes the maximum amount that a willing licensee would pay in a hypothetical negotiation. Courts should not award reasonable royalty damages higher than this amount.

B. The Timing of the Hypothetical Negotiation

An infringer's ability to choose alternatives to the patented technology and the cost of utilizing those alternatives can depend on the timing of the hypothetical licensing negotiation.[52] In particular, when designing a product, a potential licensee may make many design choices, after which it will make investments (e.g., building manufacturing facilities) that depend on those choices. Costs associated with switching to a different design arise for many reasons, including the expense of retooling a manufacturing facility or ensuring interoperability with related

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[48] *Grain Processing,* 185 F.3d at 1353 n.5.

[49] *Id*. at 1351.

[50] 527 F.3d 1359 (Fed. Cir. 2008).

[51] *Id.* at 1373.

[52] Levine at 73-74 (2/11/09) (explaining that in assessing "the next best alternative . . . [w]hat's really important if you're applying that test properly is the timing," specifically that it not be "after the infringer has incurred a whole lot of switching costs"); Leonard & Stiroh, *supra* note 29, at 57-58; Schlicher at 184-85 (5/5/09).

products. As these switching costs[53] increase, the royalty a willing licensee would pay for permission to use the technology and avoid redesign increases.[54] Thus, if the hypothetical negotiation is deemed to take place after switching costs have increased, the reasonable royalty may be higher than it would have been at the time of the design choice.[55]

A reasonable royalty damages award that is based on high switching costs, rather than the ex ante value of the patented technology compared to alternatives, overcompensates the patentee. It improperly reflects the economic value of investments by the infringer rather just than the economic value of the invention.[56] To address this issue, panelists suggested setting the hypothetical negotiation at the time the decision to use the infringing technology was made.[57] For instance, one panelist suggested that the hypothetical negotiation be made "more rational and more predictable" by framing the question to the jury as: "What is the projected economic value to the defendant of using this technology in light of the other possible alternatives before incurring the [sunk] costs?"[58] The case law on damages places the hypothetical negotiation at "the time infringement began"[59] but does not precisely define that point in time.

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[53]The term "switching costs" is used throughout this chapter to refer to the costs that an infringer would incur as a result of switching from its current design to the best alternative, including any costs of redesign, investments in additional plant or equipment, any difference in incremental production costs, and any difference in consumers' willingness to pay for the product.

[54]Scholars and practitioners have analyzed the potential for patentees to extract higher royalties from infringers that face switching costs by threatening an injunction. *See* Chapter 8, Section IV.B.

[55]The Federal Circuit has acknowledged that the result of the hypothetical negotiation can vary significantly depending on when one assumes it occurred. Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 869 (Fed. Cir. 2003) ("The correct determination of this date is essential for properly assessing damages. The value of a hypothetical license negotiated in 1994 could be drastically different from one undertaken in 1995 . . . ."), *vacated on other grounds*, 545 U.S. 193 (2005).

[56]Gilbert at 186, 200 (5/5/09) (suggesting that there should be one more factor in determining damage awards "saying something about not attributing value to sunk investments" made by the infringer); Lemley at 182 (5/5/09) (stating that reasonable royalty negotiations should not permit "somebody to capture . . . value that's the result of an irreversible investment made after that technology was chosen").

[57]Badenoch at 130 (2/12/09) (decision point for hypothetical negotiation should be "decision time for the infringement"); O'Brien at 173 (5/5/09) ("I think if you take it back in then when the decision was made, you'd get around a lot of" the hold-up problem).

[58]Cotter at 83 (2/11/09).

[59]*See, e.g.*, Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1545, 1554 (Fed. Cir. 1995) (en banc) (*citing* Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1078 (Fed. Cir. 1983)).

Recommendation. To prevent damage awards based on switching costs, courts should set the hypothetical negotiation at an early stage of product development, when the infringer is making design decisions.[60]

C. Consideration of Alternative Technologies When Establishing a Reasonable Royalty Applied to Standards

The ability of patentees to demand and obtain royalty payments based on the switching costs faced by accused infringers, rather than the ex ante value of the patented technology compared to alternatives, is commonly called "hold-up."[61] One important context in which hold-up may have especially severe consequences for innovation and competition is standardized technology.

In many IT industries, interoperability among products and their components is critical to developing and introducing innovative products that satisfy a range of consumer needs. Frequently, firms achieve this goal by working together in standard setting organizations (SSOs) to jointly adopt industry-wide technical standards. SSOs conduct extensive processes for identifying and evaluating alternative technologies and ultimately choosing those to incorporate into the standard.[62] While firms may not formally commit to using a standard in producing their products, as a practical matter they will generally find it necessary to use standardized technology if it becomes successful in the marketplace.

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[60]This analysis is consistent with infringement case law holding that early stage product development is sufficient for infringement liability. Roche Prods., Inc. v. Bolar Pharms. Co., 733 F.2d 858, 863 (Fed. Cir. 1984) (use of patented compound in experiments designed to enable launch of competing product constituted infringement); Soitec, S.A. v. Silicon Genesis Corp., 81 Fed. Appx. 734, 737 (Fed. Cir. 2003) (unpublished opinion) ("the early stages of process development is nonetheless a violation of patent law").

[61]"Hold-up" is used throughout this report to describe a patentee's ability to extract a higher licensing fee after an accused infringer has sunk costs into implementing the patented technology than the patentee could have obtained at the time of design decisions, when the patented technology competed with alternatives. The patentee's ability to extract hold-up value is based on fear of an injunction (*see* Chapter 8) and potential damages to the extent they overcompensate patentees compared to the ex ante economic value of the technology. "Hold-up" is sometimes used in a more narrow sense, not intended here, to describe situations in which a patent owner fails to disclose his patents to a standard setting organization and attempts to license after an industry is locked into using the standard. *See, e.g.*, U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 35 (2007), *available at* http://www.ftc.gov/reports/innovation/P040101PromotingInnovationandCompetitionrpt0704.pdf

[62]*See id*. at 33; Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603, 607 (2007) ("Standards and patents are very important in information technology, but not only there."); Krall at 134 (3/18/09) ("The standard setting practice is really a critical part of the technology development process.").

Before the standard is chosen, technologies often compete against each other for inclusion in the standard, but once a particular patented technology is incorporated in a standard, its adoption eliminates alternatives.[63] At that point, a firm with a patent reading on the standard may have market power in the relevant technology market. If so, the patentee can demand a royalty that reflects not only the ex ante value of the technology compared to alternatives, but also the value associated with investments made to implement the standard. Accused infringers may pay royalties based on the costs of switching to another technology. Switching costs can be prohibitively high when an industry standard is involved. For instance, it is often difficult to modify a standard due to the need for newly manufactured products to be "backward-compatible" and interoperable with similar products already owned by consumers.[64] The industry may be locked-in to using the standard. Were patentees able to obtain the hold-up value, this overcompensation could raise prices for consumers while undermining efficient choices made among technologies competing for inclusion in a standard.[65]

Many SSOs attempt to address this problem through disclosure and licensing rules.[66] Disclosure rules typically require participants to disclose patents or patent applications during the standard setting process before a standard is chosen. Licensing rules typically require that participants agree to license disclosed patents on RAND (Reasonable and Non-Discriminatory) or FRAND (Fair, Reasonable and Non-Discriminatory) terms.[67] However, there is much debate over whether such RAND or FRAND commitments can effectively prevent patent owners from imposing excessive royalty obligations on licensees. Panelists complained that the terms RAND and FRAND are vague and ill-defined – particularly with regard to what royalty rate is

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[63]Broadcom Corp. v. Qualcomm, Inc., 501 F.3d 297, 314 (3d Cir. 2007). Sun Microsystems, Inc. Comment at 1 (2/5/09) ("[O]nce a patented technology is incorporated into an adopted standard, implementers of the standard . . . have no choice but to license the patented technology from the patent owner in order to conform to the standard"); *see also* ANTITRUST MODERNIZATION COMMISSION, REPORT AND RECOMMENDATIONS 119-20 (2007), *available at* http://govinfo.library.unt.edu/amc/report_recommendation/amc_final_report.pdf.

[64]U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, *supra* note 61, at 37-38 ("switching to an alternative standard would require significant additional costs" and could "delay the introduction of a new product"); Farrell et al., *supra* note 62, at 612, 616.

[65]Krall at 135 (3/18/09) ("Once you've got broad industry adoption of a standard, lock-in and investment, irreversible investments in developing products on that standard when somebody comes out and asserts patents against products to that standard, it causes quite a bit of disruption in the technology market and ultimately impacts the consumer."); *cf.* Graham at 140 (4/17/09) (reporting "research show[ing] that patents disclosed to standard setting organizations are much more likely to be litigated").

[66]U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, supra note 61, at 42.

[67]*Id*.

"reasonable."[68] More generally, these policies cannot constrain those patent holders not participating in the SSO's process.[69] Some SSOs have attempted to avoid these problems by requiring or allowing patentees to announce royalty rates during the standard setting process so that members can consider licensing costs in choosing technologies.[70]

Clarification of patent damages law, especially recognition of the role that the incremental value of patented technology over alternatives plays in capping licensing rates and setting the hypothetical negotiation at the time of design decisions, can help prevent or lessen hold-up of a standard. Were courts to adopt these recommendations, reasonable royalty damages for a patent asserted against a standard would consider alternatives available at the time of setting the standard.[71] Panelists recognized that the law of reasonable royalty damages has a significant effect on the ability of patentees to obtain hold-up value.[72] When a patentee and implementer of standardized technology bargain for a licensing rate, they do so within a framework defined by patent remedies law. That law sets the implementer's liability if negotiations break down and the parties enter patent litigation, and therefore heavily influences the negotiated amount.[73]

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[68]*Id*. at 45-47; *cf.* Van Pelt at 182 (5/4/09) ("one of the frustrations [with RAND requirements] is, well, what's discrimination, because all the companies are different that are getting licensed, so you're not discriminating against."); Layne-Farrar at 215 (5/26/10) (there is "a huge gray area over what licensing terms and conditions are" under RAND or FRAND); Melamed at 235 (5/26/10) ("even for those who participate in [SSO proceedings and] declared patents, we don't know what the FRAND terms will actually end up being").

[69]*See, e.g.*, Melamed at 230-31 (5/26/10); Farrell at 292 (5/26/10); Marasco at 227 (5/26/10).

[70]Business Review Letter from Thomas O. Barnett, Assistant Att'y Gen., U.S. Dep't of Justice, to Robert A. Skitol, Drinker Biddle & Reath, LLP (Oct. 30, 2006) (reviewing policy that required ex ante disclosures of maximum royalties and default license terms), *available at* http://www.usdoj.gov/atr/public/busreview/219380.pdf; Business Review Letter from Thomas O. Barnett, Assistant Att'y Gen., U.S. Dep't of Justice, to Michael A. Lindsay, Dorsey & Whitney, LLP (Apr. 30, 2007) (reviewing policy that permitted ex ante disclosures of maximum royalties and default license terms), *available at* http:// www.usdoj.gov/atr/public/busreview/222978.pdf.

[71]*See* Lemley at 182 (5/5/09) (placing the hypothetical negotiation at the time of standard setting decision could "solve a lot of the hold-up component of damages problems in multi-component industries"); Schlicher at 184-85 (5/5/09) (suggesting that the infringer's options should be assessed as of the date that the standard was set).

[72]Melamed at 211 (5/26/10) (arguing that "damages are not well cabined" and that since "potential damage exposure to the assertion of a patent is . . . very large, there's [] enormous incentive for hold-up); Chandler at 233 (5/26/10) (describing how patentees taking advantage of uncertainty and damages to leverage the system).

[73]Robert H. Mnookin & Lewis Kornhauser, *Bargaining in the Shadow of the the Law: the Case of Divorce*, 88 YALE L.J. 950, 997 (1979) ("[i]ndividuals in a wide variety of contexts bargain in the shadow of the law"). The availability of a permanent injunction will also affect a patentee's ability to demand the hold-up value, as discussed in Chapter 8.

Clarification of reasonable royalty damages law could also help support a definition of "reasonable" licensing fees under a RAND commitment that avoids hold-up. No court has yet directly addressed the definition of RAND, but a manufacturer that believes a patentee's license offer is unreasonable may raise the issue in a contract dispute.[74] In that case, a court may look to reasonable royalty damages law for guidance. Commentators have observed a close relationship between the "reasonable" prong of a RAND commitment and the legal rules for determining reasonable royalty damages.[75] A definition of RAND based on the ex ante value of the patented technology at the time the standard is set is necessary for consumers to benefit from competition among technologies to be incorporated into the standard – competition that the standard setting process itself otherwise displaces.

> ***Recommendation.*** Courts should apply the hypothetical negotiation framework to determine reasonable royalty damages for a patent subject to a RAND commitment. Courts should cap the royalty at the incremental value of the patented technology over alternatives available at the time the standard was defined.

IV. COURTS' GATEKEEPING ROLE IN REASONABLE ROYALTY DAMAGES CASES

Damages evidence in patent cases is frequently presented to the jury through an expert witness who offers opinion on the appropriate damage award. The court acts as a gatekeeper in determining whether that opinion testimony sufficiently satisfies the Federal Rules of Evidence (FRE) to be presented to the jury. Calls for more vigorous gatekeeping in damages cases have received heightened attention in the patent community recently and generated broad agreement among panelists.[76] Increased focus by courts on the need for experts to tie accepted

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[74] *See generally* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1923-27 (2002). More recently, the issue of alleged failure to adhere to RAND as a contract violation has been raised in *Nokia Corp. v. Apple, Inc*., C.A. 09-791-GMS (D. Del. filed Dec. 11, 2009) (Apple, Inc.'s Answer, Defenses and Counterclaims, at 45-46).

[75] One article has observed that the "fifteen factors in *Georgia-Pacific* that guide reasonable royalty determinations for patent infringement cases are the most obvious starting point for FRAND, and they appear to be readily applicable to reasonable royalties within SSOs." Anne Layne-Farrar, A. Jorge Padilla & Richard Schmalensee, *Pricing Patents for Licensing in Standard-Setting Organizations: Making Sense of FRAND Commitments*, 74 ANTITRUST L.J. 671, 705 (2007). One important distinction, however, is that a RAND royalty should not incorporate the knowledge that the patent is valid and infringed, as reasonable royalty damages following patent litigation do, since the RAND royalty assumes no infringement litigation.

[76] Loeb at 180 (2/11/09); Maghame at 258-59 (2/11/09) (endorsing gatekeeping while emphasizing the need for flexibility); Reines at 111 (2/11/09); Agisim at 256 (2/11/09); NERA Economic Consulting Comment at 23 (3/9/09).

methodologies to the facts of a particular case, as required by the FRE, would strengthen the reliability of damages evidence.

A. The Role of Judge as Gatekeeper for Expert Testimony

The district court judge in any federal trial must determine whether expert witness testimony is reliable under FRE 702.[77] The purpose of this requirement is to "make certain that an expert . . . employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field."[78] Expert testimony is subject to this judicial scrutiny because it "can be both powerful and quite misleading because of the difficulty in evaluating it."[79]

To meet the threshold of reliability, FRE 702 requires that expert testimony satisfy three criteria. It must be (1) based on sufficient facts or data, (2) the product of reliable principles and methods, and (3) result from reliable application of those principles and methods to the facts of the case.[80] If the testimony fails any of these conditions, the trial court must exclude it. In *Daubert v. Merrell Dow Pharmaceutical, Inc*., the Supreme Court set out a non-exclusive list of factors for evaluating the reliability of an expert's methodology.[81] In *Daubert*, the Court stated that the focus of the reliability review "must be solely on principles and methodology, [and] not on the conclusions they generate."[82] The Court clairified this statement in *General Electric v. Joiner*, however: "[C]onclusions and methodology are not entirely distinct from one another. . . . [N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert." A

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[77]Unlike fact witnesses, qualified expert witnesses may offer opinion on scientific, technical, and other specialized topics. Also unlike fact witnesses, expert witnesses may testify without personal knowledge and rely on otherwise inadmissible hearsay. Fed. R. Evid. 703.

[78]Kumho Tire Co., Ltd. v. Carmichael, 526 U.S. 137, 152 (1999).

[79]Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 595 (1993) (*quoting* Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 632 (1991)). United States v. Frazier, 387 F.3d 1244, 1263 (11th Cir. 2004) ("[E]xpert testimony may be assigned talismatic significance in the eyes of lay jurors, and, therefore, the district courts must take care to weigh the value of such evidence against its potential to mislead or confuse.").

[80]Fed. R. Evid. 702.

[81]The *Daubert* factors are: (1) whether the expert's theory has been tested; (2) whether the theory has been subject to peer review and publication; (3) the known or potential rate of error of a technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) the degree to which the technique or theory has been generally accepted in the scientific community. *See Daubert*, 509 U.S. at 594

[82]*Id*., 509 U.S. at 595.

court may conclude that "there is simply too great an analytical gap between the data and the [expert's] opinion proffered," and exclude the expert's evidence on that ground.[83]

The three requirements of FRE 702 reflect *Joiner's* clarification that an expert's testimony must meet standards beyond being the product of a reliable methodology.[84] Courts must also exclude expert testimony as unreliable when it is not based on sufficient facts or the methodology has not been reliably applied to the facts of the case.[85] Expert testimony that is unreliable for these reasons may also be unpersuasive, but a court should not abdicate its role in evaluating reliability on the grounds that it may not weigh the evidence.[86] The requirement of reliability establishes a threshold that evidence must meet, as determined by the judge, before a jury is allowed to weigh it.[87]

B. The Need to Apply Gatekeeping to Reasonable Royalty Evidence

The legal standards governing judicial gatekeeping against unreliable expert testimony apply in full measure to expert opinion testimony on patent damages.[88] Indeed, vigorous application is essential for achieving accurate damage awards. As a recent handbook for federal district court judges explains, "[n]o issue in a patent trial cries out for strict application of the gatekeeping tools of Federal Rule of Evidence 702 and the Supreme Court's *Daubert* decision

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[83]Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997) (upholding district court's decision to exclude expert testimony because animal and epidemiological studies upon which experts relied were not sufficient to support their conclusions, although neither court attacked reliance on such studies as an inappropriate methodology).

[84]*See* Fed. R. Evid. 702 Advisory Committee's Note (2000) ("[t]he trial court's gatekeeping function requires more than simply taking the expert's word for it").

[85]Naeem v. McKesson Drug Co., 444 F.3d 593 (7th Cir. 2006) (excluding testimony as unreliable where expert offered general observations about employment practices but did not base opinion on the controlling employment policy manual).

[86]Deputy v. Lehman Bros., Inc., 345 F.3d 494, 506 (7th Cir. 2003) (vacating district court decision to exclude expert witness testimony on credibility grounds, but remanding for consideration of whether expert's opinion was supported by sufficient data to be reliable).

[87]*See* Knight v. Kirby Inland Marine, Inc., 482 F.3d 347, 355 (5th Cir. 2007) ("hold[ing] that the district court did not abuse its discretion in excluding [] testimony upon reasonably concluding that the analytical gap between the studies on which he relied and his conclusions was simply too great and that his opinions were thus unreliable"); Moore v. Ashland Chem., Inc., 151 F.3d 269, 276 (5th Cir. 1998) (en banc).

[88]Micro Chem., Inc. v. Lextron, Inc., 317 F.3d 1387, 1391 (Fed. Cir. 2003). Lack of reliability has and should be used to exclude expert testimony on lost profits damages also. DSU Med. Corp. v. JMS Co., 471 F.3d 1293, 1309 (Fed. Cir. 2006). Expert testimony on lost profits has been subject to less recent controversy, and so this section focuses on reasonable royalties.

more than damages."[89] For reasonable royalty damages, the jury's difficult task of evaluating technical testimony is compounded by the need to weigh evidence in the context of a hypothetical legal construct, the willing licensor/willing licensee model.[90]

In spite of this, panelists reported that district courts rarely exercise their gatekeeping authority in patent damages matters.[91] According to one panelist, rather than exclude evidence on a *Daubert* motion, courts often prefer to admit the evidence and allow the jury to make a decision that will be subject to post-trial review.[92] Two recent contrasting decisions by the Federal Circuit illustrate a common rationale for admitting problematic expert damages testimony, and a better approach. Courts often admit testimony under *Daubert* that they deem to be based upon a common methodology, such as the hypothetical negotiation or *Georgia-Pacific* factors. But this analysis is insufficient to judge whether expert testimony can reliably assist the trier of fact in determining the royalty a willing licensee would pay and a willing licensor would accept for the patent at issue as used in the infringing device. That judgment requires careful consideration of whether the expert reliably applied the methodology to the facts of the case.

The Federal Circuit's December 2009 decision in *i4i v. Microsoft* provides an example of the courts' hesitancy to exclude expert damages testimony from trial. For an improvement to the XML editor of Microsoft Word, i4i's damages expert calculated reasonable royalty damages of

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[89]Compensatory Damages Issues in Patent Infringement Cases: A Handbook for Federal District Court Judges, at 21 (Jan. 2010), *available at* http://www.nationaljuryinstructions.org/documents/DamagesHandbookFinal.pdf

[90]*Id.* at 23. *See also* J. Robinson at 146 (2/11/09) (questioning whether the "artificial, legal construct" of the the hypothetical negotiation "really resonates to a typical juror" who knows little about the market apart from the case) Gilbert at 200-01 (5/5/09) (questioning "why we have juries doing" damage determinations in this and other contexts, in light of their lack of experience); Rooklidge at 156-57 (5/5/09) (discussing how results from mock trials suggested that juries take actions that "are wholly unrelated to the law" governing reasonable royalties).

[91]Leonard at 116 (2/11/09) (asking, "Why isn't *Daubert* used more in IP cases?"); Durie & Lemley, supra note 25, at 635 (reporting that a search of decisions had uncovered only about 40 district court opinions and 10 Federal Circuit court opinions ruling on *Daubert* motions regarding reasonable royalty determination); Reines at 110 (2/11/09) ("the stronger your [*Daubert*] motion, the more the judge looks at you and say[s]: 'Well, great, you'll have a great cross examination, that should be a lot of fun for you.'"). *But see* J. Robinson at 148-50 (2/11/09) (criticizing the excessive reliance on *Daubert* motions in IP cases).

[92]Reines at 116-17 (2/11/09). Judge Robinson noted, however, that many challenges to expert testimony are routine and not well-supported. J. Robinson at 149 (2/11/09). She also expressed concern that granting *Daubert* motions based on substantive differences in the expert's views can be "contrary to both [*Daubert*] itself and to the true economic realities that the parties have a right to present to a jury." *Id.* at 150.

$200 million.[93] Microsoft challenged the expert's testimony as unreliable, but the Federal Circuit affirmed the award, explaining that the testimony was based on a hypothetical negotiation and the *Georgia-Pacific* factors, which was recognized as an acceptable methodology.[94] The expert determined a royalty rate of $98 per unit by taking the price of a "high-end" XML product ($499) as a benchmark, multiplying by Microsoft's profit margin (76%), attributing 25% of that amount to i4i by invoking a rule of thumb, and adjusting upward based on the *Georgia-Pacific* factors.[95] The court did not analyze whether there was sufficient evidence tying the choice of benchmark and calculation steps to a hypothetical negotiation for incorporating the particular invention at issue into Microsoft Word. Instead, the court repeated i4i's assertions that the 25% rule was "'well-recognized' and 'widely used'" and that use of the "high-end" product's price was justified, among other reasons, due to a focus on customers "who 'really needed'" an XML editor.[96] In addition, the court cited "vigorous cross-examination" and "presentation of contrary evidence" as the means to attack "shaky" expert testimony.[97]

In contrast, the January 2011 Federal Circuit opinion, *Uniloc v. Microsoft*, discusses at length the need for courts to consider whether a damages expert reliably applied a common methodology to the facts of the case in assessing admissibility of expert testimony. As a consequence of carefully considering this requirement of FRE 702, the court found that testimony based upon a "25% rule of thumb," discussed below, was unreliable and inadmissible. The court relied on *Joiner* when explaining that "a major determinant of whether an expert should be excluded under *Daubert* is whether he has justified the application of a general theory to the facts of the case."[98] The court elaborated, "evidence purporting to apply [to any of the *Georgia-Pacific* factors] must be tied to the relevant facts and circumstances of the particular case at issue and the hypothetical negotiations that would have taken place in light of those facts and circumstances at the relevant time."[99]

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[93] i4i Ltd. P'ship v. Microsoft Corp., 598 F.3d 831, 853 (Fed. Cir. 2010), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010) (No. 10-290). The patent covered an improvement in a method of editing documents containing markup language such as XML that stems from storing a document's content and metacodes separately.

[94] *Id.* at 854. ("Microsoft's disagreements are with Wagner's conclusions, not his methodology.").

[95] *Id.* at 853-54. He then multiplied that rate times an estimated 2.1 million infringing uses of Word identified through a survey to reach $200 million in damages. *Id.* at 854-55. Word sold for between $97 and $299. Microsoft claimed that it charged at most $50 more for versions of Word that included an XML editor. *Id.*

[96] *Id.* at 853.

[97] *Id.* at 856 (*quoting Daubert*, 509 U.S. at 596).

[98] Uniloc USA, Inc. v. Microsoft Corp., Nos. 2010-1035, 2010-1055, 2011 WL 9738, at *20 (Fed. Cir. Jan. 4, 2011).

[99] *Id.* at *21.

Recommendation. In their gatekeeper role of enforcing FRE 702, courts should test the admissibility of expert testimony on damages by evaluating whether it will reliably assist the trier of fact in determining the amount a willing licensor and willing licensee would have agreed to as compensation for use of the patented invention in the infringing product.[100] Courts should not deem evidence as relevant, reliable and admissible solely because it falls within one of the *Georgia-Pacific* factors.

Recommendation. Consistent with FRE 702, courts should require a showing that a damages expert's methodology is reliable, that he reliably applies the methodology to the facts of the case, and that the testimony is based on sufficient data. Evidence based on a reliable methodology that does not satisfy the other two prongs should not establish admissibility.[101] Subjecting jury damage awards to post-trial review should complement, rather than substitute for, active gatekeeping because of the broad latitude that juries have to determine an award based on the evidence presented and the deferential standards for overturning a jury verdict.[102]

C. Applying FRE 702 to Two Methodologies of Damages Calculations

A review of the issues surrounding the admissibility of expert testimony on two common methodologies of damages calculations – royalty rates on licenses claimed to be comparable to the hypothetically negotiated license and the 25% rule of thumb – illustrates the importance of active gatekeeping through rigorous enforcement of FRE 702's requirements. One commentator, in urging courts to exclude testimony that was not consistent with economic principles, argued that "unreliab[ly] large reasonable royalty outcomes typically arise when a plaintiff's expert uses one of the unreliable approaches to determining the reasonable royalty, *e.g.*, blind application of

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[100]Expert testimony on damages must be based on "sound economic and factual predicates." Riles v. Shell Exploration & Prod. Co., 298 F.3d 1302, 1311 (Fed. Cir. 2002); *see* Cornell Univ. v. Hewlett-Packard Co., No. 01-CV-1974, 2008 WL 2222189, at *2 (N.D.N.Y. May 27, 2008) (Rader, J. sitting by designation) ("Where, as here, such sound economic and factual predicates are absent from a reasonable royalty analysis, a district court must exercise its discretion to exclude the proffered testimony.").

[101]Knight v. Kirby Inland Marine, Inc., 482 F.3d 347, 355 (5th Cir. 2007) ("[T]he expert's testimony must be reliable at each and every step or else it is inadmissible. 'The reliability analysis applies to all aspects of an expert's testimony: the methodology, the facts underlying the expert's opinion, the link between the facts and the conclusion, et alia.'") (*quoting* Heller v. Shaw Indus., Inc., 167 F.3d 146, 155 (3d Cir. 1999)).

[102]Generally a district court will review a verdict on a motion for JMOL under a "substantial evidence" test, Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1336 (Fed. Cir. 2009), and will grant a new trial "only if the verdict is against the clear weight of the evidence." *Id.* at 1309 (*quoting* Pavao v. Pagay, 307 F.3d 915, 918 (9th Cir. 2002)). *See infra*, Section VI.

rules of thumb or benchmarks, instead of the economic analysis of the hypothetical negotiation taking into consideration the defendant's alternatives and customer preferences."[103]

1. Comparable Licenses and Averages

Looking to patent licenses that are "comparable" to the license for the infringed patent that would result from the hypothetical negotiation is a common methodology for setting reasonable royalty damages.[104] *Georgia-Pacific* points to such evidence as helpful in factor two.[105] But such evidence can reliably assist the trier of fact only if the patented invention and its infringing use are sufficiently similar to those of the comparable license. Key attributes for evaluating similarity include the technology, the rights licensed (one patent or a portfolio), royalty type (running royalty or lump sum) and terms of the license (one product or many).[106]

Such truly "comparable" licenses are rare, according to panelists.[107] They criticized many uses of comparable licenses in damages litigation: "[a] lot of comparables just plain aren't comparable, but it's hard for a jury to really see that."[108] The district court decision reviewed by the Federal Circuit in *Lucent v. Gateway* illustrates the problematic way that allegedly comparable licenses are sometimes used to prove reasonable royalty damages.[109] The calendar function of Microsoft's email program, Outlook, was found to infringe a patent covering a date-picker function. The patented invention was "a tiny feature of one part of a much larger software

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[103]NERA Economic Consulting Comment at 20 (3/9/09); Rhodes at 239 (2/11/09) (agreeing "there is room for improvement" regarding use of comparable licenses and rules of thumb, but favoring common law development rather than legislation).

[104]*See, e.g.*, American Original Corp. v. Jenkins Food Corp., 774 F.2d 459, 462 (Fed. Cir. 1985) (using the rate in licenses granted for a patent on prior art alternative processes as a reasonable royalty for the process patent at issue).

[105]Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff'd*, 446 F.2d 295 (2d Cir. 1971).

[106]*Lucent Techs*., 580 F.3d at 1325 ("licenses relied on by the patentee" must be "sufficiently comparable to the hypothetical license at issue").

[107]Krall at 100 (3/18/09) ("There's no real comparable market data. You can't do a comparable analysis like when you're selling your home about what other prices are in your neighborhood."); Millien at 79 (12/5/08) (same).

[108]Burton at 94 (2/11/09) (explaining that juries "don't work with technologies day in and day out, and even judges often don't, and it's very challenging to understand when someone puts forward something that's a comparable, why it is and isn't").

[109]580 F.3d 1301 (Fed. Cir. 2009). The opinion considers whether a jury award of $358 million is supported by substantial evidence, not whether the licensing evidence and related expert testimony was properly introduced, because the defendants did not move to exclude that evidence. *Id*. at 1325.

program."[110] The patentee offered as a comparable license, among others, an agreement under which Dell licensed IBM's patent portfolio for the purpose of manufacturing a full line of personal computers.[111] The jury awarded damages that exceeded the payment under the Dell/IBM agreement and the district court upheld the award.[112]

The Federal Circuit has recently applied a more rigorous review of damage awards that considers whether licenses offered as "comparable" are sufficiently similar to support a jury verdict. The appellate court vacated the damage award in *Lucent v. Gateway* because the licenses offered as evidence were "vastly different" from the hypothetical license.[113] In *ResQnet.com. v. Lansa*, the court vacated a damage award based on testimony by the patentee's expert because the testimony did not "link" allegedly comparable licenses to the infringed patent.[114] The court vacated a third damage award based on inadequate comparable licenses in *Wordtech Systems v. Integrated Networks Solutions*.[115]

While the methodology of looking to comparable licenses may be generally sound, for an expert to reliably apply that methodology, he must explain the similarities between the licensed patent, the infringed patent, and their uses. Expert testimony that makes little attempt to explain why the comparable license serves as a good proxy for the hypothetical negotiation cannot meet the threshold of reliability under FRE 702.[116] For instance, allowing expert testimony based on

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[110]*Id*. at 1332.

[111]*Id*. at 1328.

[112]Lucent Techs., Inc. v. Gateway, Inc., 580 F. Supp. 2d 1016 (S.D. Cal. 2008), *aff'd in part, vacated in part and remanded*, 580 F.3d 1301 (Fed. Cir. 2009). Of the licenses relied upon by the patentee's damages expert, at $290 million the IBM/Dell agreement bore a lump-sum royalty closest to the $358 million jury award. *Id*. at 1328.

[113]*Id*. at 1328.

[114]ResQnet.com, Inc. v. Lansa, Inc., 594 F.3d 860, 869-70 (Fed. Cir. 2010) (explaining that "[t]his court has long required district courts performing reasonable royalty calculations to exercise vigilance when considering past licenses to technologies other than the patent in suit" while rejecting reliance on "licenses with no relationship to the claimed invention").

[115]609 F.3d 1308, 1320 (Fed. Cir. 2010). *Cf*. i4i Limited P'ship v. Microsoft Corp., 598 F.3d 831, 857 (Fed. Cir. 2010), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010 (No. 10-290) (refusing to overturn a damages award under the "highly deferential" standard applicable to a motion for a new trial).

[116]"[E]xperts' work is admissible only to the extent that it is reasoned, uses the methods of the discipline, and is founded on data. Talking off the cuff – deploying neither data nor analysis – is not an acceptable methodology." Lang v. Kohl's Food Stores, Inc., 217 F.3d 919, 924 (7th Cir. 2000); IP Innovation, LLC v. Red Hat, Inc. 705 F. Supp. 2d 687, 691 (E.D. Tex. 2010) (Rader, J. sitting by designation) (excluding expert testimony that relied on evidence of average royalties in various industries in part because the expert "offer[ed] no evidence that the alleged industry agreements are in any way comparable to the

patents or portfolios that cover whole products when the infringed patent covers only one feature of a complex product risks a jury award that overcompensates the patentee.[117] Indeed, the Federal Circuit recently suggested in *Uniloc* that expert testimony based on prior licenses is not admissible unless there is "a basis in fact to associate the royalty rates used in prior licenses to the particular hypothetical negotiation at issue."[118]

The use of average royalty rates as a proxy for the hypothetical negotiation amount suffers the same weaknesses as the use of comparable licenses. Without some demonstration of similarity between the infringed patent and the licensed patents represented in the sample, including the license terms and the circumstances in which they are used, the average royalty rate is not helpful in constructing the hypothetical negotiation. Panelists were critical of this approach.[119]

> ***Recommendation.*** Courts should admit expert testimony based on comparable licenses only upon a reliable showing of similarity between the licensed patent and the infringed patent, and between the non-price terms of the comparable license and hypothetical license. That showing should be sufficient to support an inference that the royalty rate for the comparable license provides a reliable indicator of the royalty that would be reached in the hypothetical negotiation.

2. Rule-of-Thumb Evidence

District courts also have allowed expert testimony based on "rule-of-thumb" evidence in which the reasonable royalty is set at 25% of the expected profit for the infringing product.[120] In doing so, courts have cited *Georgia-Pacific* factor 12 which considers "[t]he portion of the profit or of the selling price that may be customary in that particular business or in comparable

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patents-in-suit," and finding the evidence "irrelevant or unreliable").

[117]Burton at 94-95 (2/11/09) ("[T]hat can be an area of significant abuse, particularly if you haven't . . . matched your royalty base, with your rates, so you're seeing comparables at 5 percent when you should be 1/10th of 1 percent on this particular base.").

[118]Uniloc USA, Inc. v. Microsoft Corp., Nos. 2010-1035, 2010-1055, 2011 WL 9738, at *21 (Fed. Cir. Jan. 4, 2011).

[119]One described a "ludicrous" instance in which an expert relied on an average of licenses within the same four digit SIC code, and compared this approach with opening a store that sells only shoes of the average size. Leonard at 115-16 (2/11/09).

[120]Inline Connection Corp. v. AOL Time Warner, Inc., 470 F. Supp. 2d 424, 432 n.38 (D. Del. 2007); *see also* Civix v. Expedia, No. 03-C-3792, 2005 U.S. Dist. LEXIS 45948 (N.D. Ill. Oct. 25, 2005); Uniloc USA, Inc. v. Microsoft Corp., 632 F. Supp. 2d 147, 150 (D.R.I. 2009) ("Microsoft claims [the expert's] methodology for concocting the reasonable royalty is just not 'good science.' But this is like saying Alice did not serve Earl Gray at her tea party. Maybe so, but . . . it is close enough . . . ."), *vacated in part and remanded*, 2011 WL 9738 (Fed. Cir. Jan. 4, 2011).

businesses to allow for use of the invention or analogous inventions."[121] A proponent of the 25% rule explains that it is a tool that should not be used in all contexts, and when used, the percentage can be adjusted according to the facts: "Ultimate royalty rates often are higher or lower than 25 per cent of fully loaded profits, depending on a host of quantitative and qualitative factors that can and should affect a negotiation (or litigation)."[122]

Panelists roundly criticized the rule-of-thumb methodology.[123] Many challenged the rule's rigidity and lack of connection to the facts of a particular case: "it's only happenstance and luck if a rule of thumb is right in a particular circumstance, and yet people put rules of thumb forward as if they're gospel."[124] Another panelist explained, "it defies economic logic to claim that this 'rule' fits every set of facts. For example, the rule would apparently give the same answer for both a 'large' component and a 'small' component, which makes no economic sense."[125] One commentator calls the 25% rule "an exercise in arbitrary business analysis" because "it does not relate to the value and degree to which the patent can exclude substitute products and therefore command a patent profit."[126] Another explains that the rule is unreliable because "[n]o consideration is given to the number or value of economic alternatives or the incremental value of using the patented technology over other viable alternatives."[127]

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[121] *Georgia-Pacific Corp.*, 318 F. Supp. at 1120.

[122] Robert Goldscheider, John Jarosz & Carla Mulhern, *Use of the 25 Per Cent Rule in Valuing IP*, 37 LES NOUVELLES 123, 131 (Dec. 2002). The "25% rule" is based on a study of 18 commercial licenses in the late 1950s. These licenses "tended to generate profits of approximately 20 per cent of sales on which they paid royalties of 5 per cent of sales." Therefore, "the royalty rates were found to be 25 per cent of the licensee's profits on products embodying the patented technology." *Id.* at 123.

[123] Leonard at 116 (2/11/09) (suggesting that courts exclude rule of thumb evidence under *Daubert*); Burton at 95 (2/11/09); Johnson at 245-46 (2/11/09) ("[E]very invention is unique and every situation is unique so I have a lot of sympathy for people who are objecting to industry standard rates or rules of thumb or the like without an awful lot of foundation.").

[124] Burton at 95 (2/11/09).

[125] NERA Economic Consulting Comment at 19 (3/9/09).

[126] Paul E. Schaafsma, *An Economic Overview of Patents*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 241, 251-52 (1997).

[127] Mark Berkman, *Valuing Intellectual Property Assets for Licensing Transactions*, 22 LICENSING J. 16 (April 2002); *see also* Elizabeth M. Bailey, Alan Cox & Gregory K. Leonard, *Groundhog Day: Recurring Themes on Reasonable Royalties in Recent IP Damage Cases* 6 (NERA Econ. Consulting Dec. 7, 2009) (declaring that "[t]he 25% rule makes no economic sense"), *available at* http://www.nera.com/extImage/PUB_IP_Groundhog_Day_1209.pdf.

As recently as 2010, the Federal Circuit "passively tolerated" use of the 25% rule in upholding reasonable royalty determinations.[128] However, in 2011 it found, after a searching examination, that "the 25 percent rule is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation," and specifically held it to be "inadmissible under *Daubert* . . . because it fails to tie a reasonable royalty to the facts of the case at issue."[129] The court explained that the rule is "an abstract and largely theoretical construct" which "does not say anything about a particular hypothetical negotiation."[130]

The Commission applauds the Federal Circuit's decision to reject the 25% rule in reasonable royalty damages determinations. Its reasoning provides a particularly clear example of how application of the requirements of FRE 702 can significantly improve the assessment of damage awards.

V. CHOOSING THE ROYALTY BASE

The goal of the hypothetical negotiation is to mimic to the extent possible what the parties would have done if they willingly had entered negotiations at the time infringement began. Parties could approach the royalty calculation in one of three ways:[131]

- By identifying a relevant base product, calculating a dollar base such as total sales revenues, and multiplying that dollar base by a percentage royalty rate;
- By identifying a unit product, counting the number of infringing units sold and multiplying that number by a dollar figure per unit; or
- By agreeing to a lump-sum payment of a specific dollar amount.

Although the law allows other methods to be used in calculating reasonable royalty damages, courts frequently have applied the first method, multiplying a percentage royalty rate by

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[128] *Uniloc*, 2011 WL 9738, at *18 (explaining that this has occurred when the rule's "acceptability has not been the focus of the case" or when "the parties disputed only the percentage to be applied" and citing i4i Limited Partnership v. Microsoft Corp., 598 F.3d 831 (Fed. Cir. 2010); Fonar Corp. v. General Elec. Co., 107 F.3d 1543, 1553 (Fed. Cir. 1997); Finjan, Inc. v. Secure Computing Corp., 626 F.3d 1197, 1210-11 (Fed. Cir. 2010).

[129] *Uniloc*, 2011 WL 9738, at *19.

[130] *Id.* at *21.

[131] Leonard at 105 (2/11/09) (explaining that "in [the] real world, the parties negotiate . . . how the royalty will be paid, so they could decide to have a lump sum or a per unit or a percent times a base"); Levko at 107 (2/11/09) ("units or dollars or time" are all used in real-life negotiations).

total revenues for an infringing product.[132] Recent controversies in the patent community about the role of "apportionment" and the "entire market value rule" in calculating reasonable royalty damages have brought the legal rules for choosing a royalty base to the forefront of patent policy debate. Critics of the current approach argue that it overcompensates patentees when it allows damages for a small component, like an infringing windshield wiper, to be based on the price of a much larger product, like a car.[133] As explained below, courts should eliminate the entire market value rule from the determination of the appropriate base in a reasonable royalty damages calculation. The rule is irrelevant to identification of the base and it injects significant confusion that threatens to produce inaccurate awards.

A. The Entire Market Value Rule Applied to Reasonable Royalties

The choice of base may be uncontroversial where the patented invention corresponds to a product sold in the market or the industry practice is to identify a product's sales revenues as the base. In that situation, parties in patent litigation typically will focus the dispute on determining a royalty rate.[134] The choice of a base may be disputed and more difficult, however, where the inventive aspect of the patented technology is imbedded in one component of a complex product. Parties may dispute whether the appropriate base is the inventive technology, the component, or the larger product. Identifying a component or sub-component of a larger product as the base is sometimes discussed as one aspect of "apportionment."[135] As discussed in Chapters 2 and 3, this situation is especially prevalent in the IT industry, where products incorporate literally thousands of technologies.

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[132] Janicke at 96 (2/11/09) ("at the time we first got into [reasonable royalty awards], most licenses were – almost all I think were negotiated based on a base and a [percentage] rate"); JOHN W. SCHLICHER, PATENT LAW: LEGAL AND ECONOMIC PRINCIPLES § 9.44 at 9–06 (1992) ("The courts typically determine some royalty rate, such as X% of sales revenue or $Y per unit.")

[133] *See* Yen at 55 (12/5/08); Doyle at 223-24 (5/5/09). These concerns have led many IT companies to push for statutory changes to patent damages law – a move strongly opposed by other industries. *See Patent Reform Act of 2009: Hearing Before the S. Comm. on the Judiciary*, 111th Cong., 1st Sess. (2009) (testimony of David J. Kappos, Vice President and Ass't General Counsel, IBM), *available at* http://judiciary.senate.gov/pdf/09-03-10Kappostestimony.pdf; *Patent Reform Act of 2009: Hearing Before the S. Comm. on the Judiciary*, 111th Cong., 1st Sess. (2009) (testimony of Philip S. Johnson, Chief IP Counsel, Johnson and Johnson, Inc., on behalf of the Coalition for 21st Century Patent Reform), *available at* http://judiciary.senate.gov/pdf/09-03-10Johnsontestimony.pdf.

[134] This was the case in *Georgia-Pacific*, where the infringing product was striated fir plywood and the royalty rate was calculated as a dollar amount per thousand square feet of patented paper using a number of the *Georgia-Pacific* factors. *Georgia-Pacific Corp.*, 318 F. Supp. at 1123-43.

[135] Lemley at 216-17 (5/5/09).

The recent district court decision, *Cornell University v. Hewlett-Packard Co.*,[136] illustrates the difficulty. Cornell's patent read on one component of a computer processor. The court explained, "the claimed invention is a small part of the IRB [instruction reorder buffer], which is a part of a processor, which is part of a CPU [central processing unit] module, which is part of a 'brick,' which is itself only part of the larger server."[137] Hewlett-Packard purchased the CPUs and used them to build servers, which it sold. Cornell proffered expert testimony opining that the royalty base should include Hewlett-Packard's entire server and workstation systems, which the court excluded unreliable under FRE 702.[138] At trial, Cornell sought and received a jury damages award using the CPU brick as an appropriate base.[139] The court then granted judgment as a matter of law to the defendant, recalculating damages using the processor rather than the CPU brick as the appropriate base but keeping the royalty rate applied by the jury.[140]

In recent years, the case law of patent damages has analyzed this type of dispute by applying the "entire market value rule" in the reasonable royalty context, as did the court in *Cornell v. Hewlett-Packard*. In this context, the entire market value rule asks whether the patented feature is the "basis for customer demand" in deciding whether an entire product or a component should be used as the base.[141] This approach was first adopted in 1995, in *Rite-Hite Corp. v. Kelley Co.*,[142] where the Federal Circuit followed a long line of precedent in applying the entire market value rule in determining lost profits damages.[143] However, in dicta, the court also declared that the rule applied to reasonable royalty calculations.[144] Since *Rite-Hite*, courts have looked to the entire market value rule and considered whether the patented component is the

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[136]609 F. Supp. 2d. 279 (N.D.N.Y. 2009) (Rader, J. sitting by designation).

[137]*Id.* at 283.

[138]Cornell Univ. v. Hewlett-Packard Co., No. 01-CV-1974, 2008 WL 2222189 (N.D.N.Y. May 27, 2008).

[139]*Cornell*, 609 F. Supp. 2d. at 282.

[140]*Id.* at 293; *Uniloc*, 2011 WL 9738, at *24 (confirming that a plaintiff seeking to invoke the EMVR in the reasonable royalty context must show that the patented invention is "the basis for customer demand").

[141]Bose Corp. v. JBL, Inc., 274 F.3d 1354, 1361 (Fed. Cir. 2001).

[142]56 F.3d 1538 (Fed. Cir. 1995) (en banc).

[143]*Id.* at 1549.

[144]*Id*. ("When a patentee seeks damages on unpatented components sold with a patented apparatus, courts have applied a formulation known as the 'entire market value rule' to determine whether such components should be included in the damage computation, whether for reasonable royalty purposes, . . . or for lost profits purposes . . . .") (citations omitted). Moreover, Professor Lemley has noted the apparent lack of any prior precedent supporting the *Rite-Hite* dicta. Mark A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 662 n.34 (2009).

"basis for customer demand" for the larger product in both permitting[145] and rejecting[146] the use of a broad royalty base.

B. The EMVR is Irrelevant When Choosing a Base for Reasonable Royalty Damages

Panelists roundly condemned use of the entire market value rule in reasonable royalty damages determinations. One panelist called it a "complete category mistake to apply that in the reasonable royalty context."[147] Another stated that "the entire market value rule has no place whatsoever in reasonable royalty analysis," explaining that "it doesn't make any sense at all in a world in which there is not a plaintiff's product being sold."[148] One panelist expressed concern that the entire market value rule has "displaced or atrophied Federal Circuit law development" regarding how "we put some boundaries around the hypothetical negotiation" and left "an absence of law and guidance . . . on what the base should be."[149]

The entire market value rule, and its focus on whether a patented feature is "the basis of customer demand," arose in the context of calculating lost profits damages.[150] Understanding the role the rule plays in that context illuminates why it is irrelevant to the choice of base in a reasonable royalty calculation. When an invention is only one component of a product, not all of an infringer's profit or the patentee's lost profit is necessarily attributable to the patented invention. In that case, the law allows the patentee to recover lost profits damages based on the

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[145] *See, e.g.*, *Bose Corp.*, 274 F.3d at 1361 (affirming reasonable royalty award based on the value of loudspeakers, rather than the value of a patented port-tube component); Fonar Corp. v. Gen. Elec. Co., 107 F.3d 1543 (Fed. Cir. 1997) (using MRI machine as royalty base rather than patented imagining component based on infringer's marketing efforts praising the component).

[146] *See, e.g.*, Imonex Servs. v. W.H. Munzprufer Dietmar Trenner GmbH, 408 F.3d 1374, 1379-81 (Fed. Cir. 2005) (holding that washing machine was not the proper base where patented invention related to an attached coin sorting box); Lucent Techs. v. Microsoft Corp., 544 F. Supp. 2d 1080, 1106-07 (S.D. Cal. 2008) (refusing to grant summary judgment to plaintiff on contentions that the computer operating system, media player, or game console serve as the basis for consumer demand), *summary judgment granted in part, summary judgment denied in part*, 2008 U.S. Dist. LEXIS 99392 (S.D. Cal. Feb. 28, 2008).

[147] Cotter at 85 (2/11/09); O'Brien at 217 (5/4/09) (In "the reasonable royalty context if you start talking about the entire market value rule you've made a mistake right there").

[148] Lemley at 213 (5/5/09); Janicke at 63 (2/11/09) (the entire market value rule is "a meaningless cliché"); Verizon Communications, Inc. Comment at 17 (3/20/09) (suggesting that "apportionment and entire-market-value inquir[ies]" can confuse and distract fact-finders).

[149] Reines at 82 (2/11/09). *Cf.* Skenyon at 64 (2/11/09) (suggesting that the entire market value rule may not pose that "big a problem" since it is not used "in that many cases").

[150] Lemley, *supra* note 144, at 660-62.

entire market value of the product when the patented component is the "basis for customer demand."[151] If the patented invention is not the basis of demand, lost profits damages will be based only on the value of the patented component, or "apportioned."[152]

The entire market value rule as applied to lost profits has no corollary in the reasonable royalty context. There is no amount of potential damage funds, such as the profits lost on a product, to be entirely awarded or apportioned. Many reasonable royalty damage awards result from the multiplication of two inter-related variables, the base and the rate. Altering one variable, (the base), in response to a legal test like the entire market value rule requires recalibrating the other variable, (the rate), in order to accurately assess the value of the patent in the hypothetical negotiation. This is a very different process from calculating lost profits damages.

Moreover, a wide array of considerations apart from the entire market value rule influence parties' choice of a base in actual licensing negotiations, including convenience of the parties[153] and the practice in the industry.[154] Where the patented invention is only one component of a larger product, the product may be the only item that is priced and can be monitored.[155] For practical reasons, that product serves as the base even though the patented feature is not "the basis of customer demand."[156] In other cases, a patented component may easily serve as a base

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[151]State Indus., Inc., v. Mor-Flo Indus., Inc., 883 F.2d 1573, 1580 (Fed. Cir. 1989) (allowing lost profits damages based on entire water heater where invention related to foam insulation). Chapter 5 explains why the entire market value rule should be eliminated from lost profits analysis.

[152]ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 215-17 (2005). For cases applying the entire market value rule to lost profits, *see* Golden Blount, Inc. v. Robert H. Peterson Co., 438 F.3d 1354, 1371 (Fed. Cir. 2006) (allowing lost profits damages on an artificial fireplace consisting of a patented ember burner and unpatented artificial logs and grates).

[153]Johnson at 269 (2/11/09).

[154]*See, e.g.*, Leonard at 105-06 (2/11/09); O'Brien at 217-18 (5/5/09).

[155]SCHLICHER, *supra* note 132, § 9:37 at 9–97 (1992); Levko at 106 (2/11/09); Layne-Farrar at 92 (2/11/09); Maghame at 257 (2/11/09).

[156]In *Lucent Techs., Inc. v. Gateway*, 580 F.3d 1301, 1336 (Fed. Cir. 2009) the Federal Circuit recognized that parties choose the base of a royalty calculation for reasons other than whether the patented feature drives demand for the product, such as "when there is no established market value for the infringing component or feature." *Id.* at 1339. The court further recognized that an entire product rather than some component may be the most convenient base even where the entire market value rule is not satisfied. *Id.* at 1338-39. The court described its analysis as embracing the entire market value because it allowed the entire product to serve as the base. But actually the opinion is better understood as a repudiation of the rule because it recognizes that the base in a hypothetical negotiation is chosen for reasons other than whether the patented invention is the "basis of customer demand."

because it can be purchased separately. Because the choice of a base in actual licensing negotiations is not driven by whether the patented feature is the "basis for customer demand," that question should not drive the choice of base in a hypothetical negotiation. This rejection of the entire market value rule does not suggest that the concern of the rule – the extent to which a patented invention drives consumer demand – is irrelevant to the reasonable royalty calculation. On the contrary, this concern is one of the *Georgia-Pacific* factors[157] and crucial to identifying an appropriate royalty *rate*.

C. Practical Problems When the EMVR is Applied to Reasonable Royalties

Commentators and panelists raised practical concerns about the application of the entire market value rule to the choice of base when determining reasonable royalty damages. Some commentators and panelists from the IT industry argued that courts applied the entire market value rule too liberally, so that damages were too frequently based on a complex product when only a component was patented.[158] Others disagreed about the existence of the problem.[159] Panelists identified two consequences of patentees' attempts to set a large, complex product as the royalty base for an inventive feature in one component.

First, panelists described how patentees' hopes of establishing a large royalty base in order to garner large damage awards led patentees to sue manufacturers of complex consumer products, like personal computers and cell phones, rather than manufacturers of the components.[160] Patent suits threatened "up the value chain" in order to obtain a larger base

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[157] The 13th factor is "[t]he portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvement added by the infringer." *Georgia-Pacific Corp*., 318 F. Supp. at 1120.

[158] *The Patent Reform Act of 2007: Hearing on H.R. 1908 Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 110th Cong. 65 (2007) (testimony of Professor John R. Thomas), *available at* http://judiciary.house.gov/hearings/April2007/Thomas070426.pdf (arguing that the entire market value rule has been improperly expanded to "become[] the default damages principle" and been applied without factual support); Yen at 55 (12/5/08) (arguing that a car should not be used as the base to value a newly-invented tire); Levko at 71 (2/11/09); Doyle at 223-26 (5/5/09).

[159] C.J. Michel at 115 (12/5/08) (explaining that "windshield wiper" example may be an urban legend of patent damages, as he has been unable to find such a case); Detkin at 76-77 (12/5/08) (arguing that car may be the appropriate base where patented tire required redesign of the automobile, or provided increased gas mileage leading to increased demand);, William C. Rooklidge, "*Reform*" *of Patent Damages: S.1145 and H.R. 1908*, at 7, 11 (2007), *available at* http://www.patentsmatter.com/press/pdfs/Patent_Damages_Reform_Rooklidge.pdf (cases correctly state principles governing the entire market value rule, and Federal Circuit's affirmances of jury awards adopting a broad royalty base are unsurprising in light of the deferential standard of review).

[160] *See, e.g.*, Cornell Research Foundation, Inc. v. Hewlett Packard Co., No. 5:01-CV-1974, 2005 WL 5955715, at *3-4 (N.D.N.Y. Oct. 11, 2005) (identifying vendors from whom Hewlett-Packard purchased

presents a practical problem for accused infringers that may have insufficient knowledge of the technical issues surrounding infringement by a component manufactured elsewhere.[161] This makes licensing negotiations, patent litigation and settlement very difficult. But one panelist reports that patentees "resolutely refuse" to approach the manufacturers of components.[162]

Second, several panelists emphasized the need to properly identify the base in order to produce an accurate reasonable royalty award where the inventive feature is a small component in a complex product.[163] Although the royalty calculation can decrease the rate in response to a large base,[164] they expressed concern that a trier of fact, particularly a jury, may apply an insufficiently low royalty rate when the base is far larger than the inventive feature because an appropriate rate might be "minuscule."[165] If the invention is "the twig on the twig on the twig on the twig on the twig of a multi-featured box, it isn't realistic to expect the jury to recommend a ".00000001 rate."[166] In a similar vein, the Federal Circuit in *Uniloc* explained that the evidence of very large total product revenue calculated from a large base "cannot help but skew the damages horizon for the jury, regardless of the contribution of the patented component to this

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allegedly infringing CPUs); Lucent Techs., Inc. v. Gateway, Inc., 543 F.3d 710 (Fed. Cir. 2008); *Lucent Techs*., 580 F.3d at 1308-09 (plaintiff brought infringement suit against computer vendors based on a feature in software programs supplied to them by Microsoft).

[161]Agisim at 191 (2/11/09) (online banking system sued for third party-supplied products).

[162]Doyle at 225-26 (5/5/09).

[163]Reines at 87 (2/11/09) ("You have to control the base if you want a rational outcome" for a product with a large annual revenue."); Yen at 52 (12/5/08) ("[p]laintiffs regularly seek a percentage of the total value of the product that is allegedly infringing rather than the value of what was actually invented, which in many cases might be a minor feature of a particular product"); Doyle at 165 (5/5/09) ("if you assign the value to the actual component in question, you may then get a much more reasonable result").

[164]Layne-Farrar at 92-93 (2/11/09) (adjustment of rate in response to base can give accurate damages); *Lucent Techs.*, 580 F.3d at 1339 ("the base used in a running royalty calculation can always be the value of the entire commercial embodiment, as long as the magnitude of the rate is within an acceptable range").

[165]Simpson at 233-34 (5/5/09); Lemley at 234 (5/5/09) (a broad base favors the patentee, since "it's much easier to persuade somebody to give a very small percentage of a very large base"); Gilbert at 219-20, 238 (5/5/09) (acknowledging that choice of base should not "make a huge difference," although "in practice it very well may"); Cotter at 86 (2/11/09) ("The problem comes in the application where courts and juries are not exercising much judgment in determining what the royalty rate is.").

[166]Reines at 86-87 (2/11/09).

revenue."[167] One panelist pointed out that calculating damages by multiplying a dollar amount times units eliminates these problems.[168]

> ***Recommendation.*** Courts should eliminate the entire market value rule and the question of whether the patented feature was the "basis for customer demand" from the determination of the appropriate base in a reasonable royalty damages calculation. It is irrelevant and it risks injecting significant confusion that threatens to produce inaccurate awards.

D. Identifying the Base

Another artificial construct for identifying the base that courts should reject is always to equate it with the device recited in the infringed claim. In many cases, there will be an easy correspondence between the inventive feature, the device recited in the infringed claim, and the appropriate base. In other cases, the correspondence will not be so clear. For example, a software invention for rendering video images can be recited in a claim covering video software, or in a claim covering a standard personal computer running the video software.[169] Several panelists explained that in choosing a base "the real focus ought to be on the economic realities and not the vagaries of claim drafting," particularly because "the way claims are drafted [is] . . . so manipulable."[170]

Finally, courts should recognize that not all licenses, and therefore not all damage awards, should be calculated by multiplying a base times a rate. When the evidence indicates that the parties would have used another calculation method in the hypothetical negotiation, such as a lump-sum payment,[171] the finder-of-fact should apply that method.

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[167]Uniloc USA, Inc. v. Microsoft Corp., Nos. 2010-1035, 2010-1055, 2011 WL 9738, at *24 (Fed. Cir. Jan. 4, 2011).

[168]Janicke at 97 (2/11/09) ("Base only matters if you're going to do a rate times base calculation. If you're going to do it five cents a unit, there is no base. There is no rate. [The negotiating parties] agree on five cents a unit or $2 a unit, and base drops out of the calculation in the real license negotiation.").

[169]*See, e.g.,* Reines at 128 (2/11/09) (describing a case involving a patent claiming a local area network, when the key feature was one piece of a node).

[170]Cotter at 130-31 (2/11/09). *See also* Janicke at 128 (2/11/09) (where the patentee claims the "circuit connected to the module, connected to the computer, connected to a network . . . the claim really can't be the base"); Simon at 270 (2/11/09) ("There are articles written saying write claims to cover systems because you can claim a bigger royalty base. That makes no economic sense to me, that the patent attorney's decision on how to write the claim is what's going to determine what the royalty base is.").

[171]One panelist indicated that his company negotiates lump-sum license payments with many patentees. Simon at 222–23, 228 (2/11/09); *id.* at 222 ("[Base times rate is] not the way we negotiate licenses at Intel. Our view is it's an inappropriate way to deal with it in our business . . . it's a very different model. Yet everybody uses this as a vehicle to try to say it would have been a running royalty rate.").

Recommendation. Courts should identify as the appropriate base that which the parties would have chosen in the hypothetical negotiation as best suited for accurately valuing the invention. The practical difficulty of identifying a royalty rate that accurately reflects the invention's contribution to a much larger, complex product often counsels toward choosing the smallest priceable component that incorporates the inventive feature.[172]

VI. CONCLUSION

Although the willing licensor/willing licensee model is a useful tool for replicating the market reward for an invention in a reasonable royalty damages calculations, its hypothetical nature makes it difficult to apply accurately. The recommendations of this chapter, if vigorously applied, could help achieve damage awards that more accurately reflect the economic value of a patented invention. They can also play an important role in preventing "hold-up" of a standard. Both outcomes can encourage innovation and support competition among technologies that benefit consumers.

Courts have tools to implement these recommendations and to improve the accuracy of reasonable royalty awards. They can exclude expert testimony that is inconsistent with these recommendations as unreliable under FRE 702. Courts can also supervise jury damage awards through the grant of judgment as a matter of law (JMOL),[173] new trial,[174] and remittitur[175] when those awards are inconsistent with the economic principles underlying reasonable royalty awards.

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[172]Reines at 90 (2/11/09) (suggesting as the base "the closest unit that's priceable in the vicinity of the claimed invention"); Cornell Univ. v. Hewlett-Packard Co., 609 F. Supp. 2d. 279, 288 (N.D.N.Y. 2009) (choosing the processor as the base where it was the smallest priceable unit).

[173]Fed. Rule Civ. Proc. 50, 59. JMOL is available to a party that can establish that there is insufficient evidence to legally support the verdict. *See* 9B CHARLES ALAN WRIGHT & ARTHUR R. MILLER, FEDERAL PRACTICE & PROCEDURE §§ 2521-40 (3d ed. 2008). Under one formulation, "a district court grants JMOL only 'if the evidence, construed in the light most favorable to the nonmoving party, permits only one reasonable conclusion, and that conclusion is contrary to the jury's verdict.'" Lucent Techs., Inc. v. Gateway, Inc. 580 F.3d 1301, 1309 (Fed. Cir. 2009) (*quoting* Pavao v. Pagay, 307 F.3d 915, 918 (9th Cir. 2002)). Courts often describe this as the "substantial evidence" test. *Id*. at 1336.

[174]*See* 11 WRIGHT & MILLER §§ 2781-2821. Generally, a trial court "may grant a new trial only if the verdict is against the clear weight of the evidence." *Lucent Techs.*, 580 F.3d at 1309 (*quoting* Pavao v. Pagay, 307 F.3d 915, 918 (9th Cir. 2002)). The district court may consider credibility and weigh evidence in exercising its broad discretion on whether to grant a new trial. Unisplay, S.A. v. Am. Elec. Sign Co., 69 F.3d 512, 517 (Fed. Cir. 1995).

[175]It is within a trial court's discretion to deny a defendant's motion for new trial on condition that the plaintiff accept a reduction in the amount of the jury's award (called a remittitur). 11 WRIGHT & MILLER § 2815 at 160, 169; Shockley v. Arcan, 248 F.3d 1349, 1362 (Fed. Cir. 2001).

CHAPTER 8
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CHAPTER 8
PERMANENT INJUNCTIONS IN PATENT CASES

I. INTRODUCTION

In 2006, in *eBay v. MercExchange*,[1] a unanimous Supreme Court rejected both a "general rule" supporting the grant of a permanent injunction following a finding of patent infringement and "expansive principles" supporting denial for a patentee that did not practice its invention and was willing to license. Instead, the Court looked to "traditional equitable principles" and listed four factors that a patentee must satisfy to obtain an injunction.

The opinion of the full Court gave little guidance on how to apply the factors, however, raising concerns about the impact of *eBay* that often fall along industry lines. The life sciences industry and firms that primarily license out their technology generally favor predictable injunction grants. As described in Chapter 1, they rely on an injunction or the threat of an injunction to encourage innovation by protecting the exclusivity needed to recoup research and development (R&D) investments, deterring infringement, and encouraging licensing. But as discussed in Chapter 2, an injunction can also effectuate hold-up by allowing a patentee to extract a higher royalty in ex post licensing negotiations, after costs have been sunk, than it could have obtained when alternative technologies were available. Members of the information technology (IT) industries, who face difficulties identifying all patent rights relevant to a product prior to commercialization, worried about hold-up. They generally favored a more flexible approach to injunction grants.

Although the injunction analysis is equitable, to most benefit consumers it should be conducted in a manner that furthers the patent system's goal of promoting innovation and recognizes consumer interest in aligning the patent system and competition policy. A key challenge is to balance an injunction's ability to promote innovation and private contracting with its ability to generate hold-up that can distort competition among technologies, raise prices and deter innovation. One way to meet that challenge is to identify criteria that help determine when the harm to a patentee from denial of an injunction and ongoing infringement is small compared to the consumer harm from hold-up. This chapter identifies criteria helpful to that determination.

Economic concerns weighing the benefits of exclusivity against the harm of hold-up fit well within the equitable nature of the injunction remedy and *eBay's* four factor analysis. This chapter recommends how courts can incorporate these concerns into each of *eBay's* four factors. This chapter also discusses how remedies following denial of an injunction and remedies in the International Trade Commission can be sensitive to these issues.

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

II. CASE LAW ANALYZING PERMANENT INJUNCTIONS

A. The *eBay* Case

By looking "to the laws of property, of which the patent law partakes," the Federal Circuit had established a "general rule" in favor of granting injunctions based on a presumption of irreparable harm.[2] Overcoming this general rule required a showing of significant public harm in order to outweigh the irreparable harm presumed to be caused by infringement.[3] In 2006, in *eBay v. MercExchange*, a unanimous Supreme Court rejected both the Federal Circuit's general rule supporting the grant of an injunction and the district court's "expansive principles" suggesting that a patentee that did not practice its invention and was willing to license could not obtain an injunction.[4] Instead, relying on the express language of the Patent Act, which provides that district courts "may" issue injunctions "in accordance with the principles of equity,"[5] the Court looked to "traditional equitable principles." The Court listed the four equitable factors that a patentee must satisfy to obtain an injunction:

> 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.[6]

Chief Justice Roberts's concurring opinion, joined by Justices Scalia and Ginsburg, cautioned that a major departure from the long tradition of equity practice should not be lightly implied. Courts have granted injunctive relief in the vast majority of patent cases, they explained, due to the difficulty of protecting a patentee's right to exclude others from using the invention through monetary damages.[7]

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[2]Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1246-47 (Fed. Cir. 1989) (citations omitted).

[3]Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1547 (Fed. Cir. 1995) (en banc) ("Accordingly, courts have in rare instances exercised their discretion to deny injunctive relief in order to protect the public interest."); *see also* MercExchange, LLC v. eBay, Inc., 401 F.3d 1323, 1338-39 (Fed. Cir. 2005), *vacated*, 547 U.S. 388 (2006).

[4]*eBay*, 547 U.S. at 393.

[5]35 U.S.C. § 283.

[6]*eBay*, 547 U.S. at 391.

[7]*Id.* at 395 (Roberts, C.J., concurring) (the "long tradition of equity practice is not surprising, given the difficulty in protecting a right to *exclude* through monetary remedies that allow an infringer to *use* an invention against the patentee's wishes - a difficulty that often implicates the first two factors of the

Justice Kennedy's concurring opinion, joined by Justices Stevens, Souter and Breyer, however, did suggest situations in which district courts may find injunctive relief inappropriate. Citing the FTC's 2003 IP Report, Justice Kennedy noted the development of a business model in which non-practicing entities obtain patents primarily to garner license fees, not to practice the inventions. "For these firms, an 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."[8] In addition, Justice Kennedy suggested that situations in which the patented invention is "but a small component of the product the companies seek to produce" may also be inappropriate for injunctive relief because "the threat of an injunction is employed simply for undue leverage in negotiations."[9]

B. Post-*eBay* Cases

After enumerating the four equitable factors, the opinion of the full Court in *eBay* gave little guidance on their application. That, and the divergent emphasis of the two concurring opinions, created significant uncertainty concerning the circumstances under which courts would deny permanent injunctions following issuance of the decision in May 2006. Since that time, the district courts have decided numerous requests for permanent injunctions and the Federal Circuit also has addressed the four factors several times. Some trends have begun to emerge from this body of case law.

Surveys of post-*eBay* cases reveal that district courts have granted approximately 72%-77% of permanent injunction requests.[10] In the first year following *eBay*, courts awarded no injunctions in the four cases involving non-practicing patentees.[11] This result led many to worry that this category of patentees would no longer be able to obtain permanent injunctions. That concern is unwarranted, however. An updated review of the post-*eBay* case law through March 31, 2010, reveals that courts heard thirteen requests for permanent injunctions where the opinion

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traditional four factor test.") (emphasis in original).

[8] *Id.* at 396 (Kennedy, J., concurring) (*citing* FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 3, at 38-39 (Oct. 2003)).

[9] *Id.*

[10] Ernest Grumbles III *et al.*, *The Three Year Anniversary of eBay v. MercExchange: A Statistical Analysis of Permanent Injunctions*, IP TODAY (Nov. 2009) (72% of requests granted through May 1, 2009, based on review of decisions available through Lexis); Robert A. Cote, The State of Injunctions in a Post *eBay* World, Loyola IP Focus Series - Los Angeles, CA, at 4, June 15, 2007, *available at* http://www.lls.edu/ip/past-events/documents/Cote-Revised2.pdf (77% of requests granted in the first year following the *eBay* decision).

[11] Eric Keller, *Time Varying Compulsory License: Facilitating License Negotiation for Efficient Post-Verdict Patent Infringement,* 16 TEX. INTELL. PROP. L.J. 427, 434 (2008).

suggests that the patent owner is one of several types of non-practicing entities, including universities, research institutes and independent inventors. Of those thirteen cases, district courts granted an injunction seven times.[12] Appendix B presents the results of a survey by panelist Steve Malin that provides an informative picture of how different fact patterns may influence district courts' decisions to grant or deny injunctions. Appendix B also provides a descriptive summary of post-*eBay* cases.

III. INDUSTRY REACTIONS TO *eBAY*

Panelists' concerns about the effects of the *eBay* decision often fell along industry lines, with the life sciences industry generally favoring more predictable grants of injunctions and the information technology (IT) industry favoring a more flexible approach. This categorization is often not so simple, however, because a firm's views will also depend upon whether it seeks to license out its technology for others to produce.

A. The Life Sciences Industry

The research and development necessary to create new products in the life sciences industry is long, risky and expensive. One company reports that development of a biologic drug can cost from $800 million to $1.2 billion and take up to 15 years.[13] The research and development process often begins in a university, which then licenses the early-stage technology to a start-up or a large company that must make substantial investments to move the invention closer to a product. The start-up companies that develop early-stage technology generally engage in technology transfer as described in Chapter 1, licensing their technology or partnering with larger companies that have the resources to fund final-stage development and the clinical trials necessary for regulatory approval.[14] Life sciences companies and their investors depend on an exclusive market position for successful products in order to recoup the high levels of capital

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[12] *See* Appendix B, n.23 (listing cases).

[13] *The Patent Reform Act of 2007: Hearing on H.R. 1908 Before the Subcomm. On courts, the Internet and Intellectual Property of the H. Comm. on the Judiciary*, 110th Cong. 65 (2007) (testimony of Kevin Sharer, CEO & Chmn. of the Bd., Amgen, Inc.) Myers at 220-21 (3/18/09) ("typically . . . only one out of thousands of compounds will be proven to be both medically effective and safe enough to become an approved medicine"); Singer at 225 (3/18/09) ("Most promising drugs, as Jeff [Myers] said, fail along the way.").

[14] Shafmaster at 214 (3/18/09) ("Throughout our history we've partnered with universities, research institutions and private companies in order to find and develop products and bring them to market."); Myers at 221 (3/18/09) ("[Pfizer's] innovations come from a lot of sources: Internal research, contracts with third parties, collaborations with universities and biotech companies and with other pharmaceutical companies. We also seek out promising compounds and innovative technologies by third-parties to incorporate into our discovery and development processes as well as our product lines through acquisitions and other arrangements.").

they invest in research and development.[15] Panelists reported that for this reason, companies pursue early-stage research only in those areas where they can obtain patent protection for their own inventions and freedom-to-operate in the face of others' actual or potential rights.[16]

The importance of exclusivity supported by patents led many panelists from the life sciences industry to express concern about decreased predictability in injunction law following *eBay*. Panelists worried that if the ability of a successful patent litigant to obtain an injunction were in doubt, life sciences companies would have less incentive to invest in risky and expensive research or be less able to attract the capital needed to fund research.[17] The ability of start-up companies to attract investment after *eBay* presented a particular concern because of the perception that "non-practicing entities" are unable to obtain permanent injunctions.[18]

Panelists also discussed the extent to which the public interest factor of the *eBay* analysis might drive denial of injunctions in life sciences patent cases. They generally agreed that the public interest factor should focus on public health concerns and not encompass competition-related price effects because such an inquiry would be contrary to the Patent Act, which grants exclusive rights to avoid price competition.[19]

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[15]Singer at 223-25 (3/18/09) (investors in life sciences consider IP early); Ware at 144-48 (2/12/09) (university research and technology transfer require patents and patent licensing).

[16]Bellon at 225-29 (3/18/09) (biotechnology start-up began building patent estate based on early research to establish value of the company); Shafmaster at 240-41 (3/18/09) (discussing multiple reviews during development work to ensure freedom to operate).

[17]Armitage at 148-49 (2/12/09) (injunctions that preserve exclusivity critical to life sciences business model); Loeb at 189-90 (2/12/09) (discussing development cycle in the life sciences and indicating that certainty of 8-10 years exclusivity needed to induce investment).

[18]Ware at 148 (2/12/09) (expressing concern that "venture capitalists will take their funds elsewhere, and small biotech companies will shrink and die rather than grow"); Ware at 156 (2/12/09) (*eBay* could have an adverse effect on university licensing); Katznelson at 53-54 (3/18/09) (describing the effect of *eBay* on start-up licensing and business models). District courts have granted permanent injunctions to universities that were asserting life sciences patents in two recent cases, however. Emory Univ. v. Nova Biogenics, Inc., No. 1:06-CV-0141, 2008 WL 2945476 (N.D. Ga. 2008) (asserting patent on antimicrobial properties); Johns Hopkins Univ. v. Datascope Corp., 513 F. Supp. 2d 578 (D. Md. 2007) (asserting patent on methods for fragmenting clots within hemodialysis grafts), *rev'd and remanded*, 543 F.3d 1342 (Fed. Cir. 2008).

[19]Ware at 205 (2/12/09) (arguing "that the market will benefit from price competition and [*eBay* deprives] the patentee of its exclusive right"); Armitage at 205-07 (2/12/09) (public interest analysis should focus on public health exceptions); Bellon at 258 (3/18/09) (the *Amgen* case could have eroded the right to exclude inherent in the patent); Am. Intell. Property Law Ass'n Comment at 4 (5/18/09) (including price competition in the public interest analysis undermines the right to foreclose competition inherent in a patent grant).

B. Firms that Primarily License Out Patents

As discussed in Chapter 1, firms and individuals who invent and license patented technology but do not manufacture a product can be an important source of new invention that drives the creation of new products. The start-up companies of the life sciences industry fall within this category, but it reaches into all technology sectors, including IT. Some develop early stage technology, hoping eventually to partner with or be acquired by a larger company with the resources to bring a product to market. Others act as design houses, developing inventive technology that they then license to manufacturing companies for their ongoing use.[20] As discussed in Chapter 2, patent assertion entities (PAEs) also license patents without manufacturing, but those transactions do not typically involve technology transfer for the creation of new products.[21]

Non-practicing patentees of all types – developers of early stage technology, design-houses and patent assertion entities – worried that they could no longer obtain a permanent injunction after winning patent litigation.[22] One panelist asserted that there remains significant uncertainty about how courts will analyze the irreparable harm factor when the patentee is a licensing entity and the harm can be characterized as a lost royalty.[23] Several panelists described a dynamic that one called "infringer hold-out."[24] They asserted that manufacturers will be less willing to license and more willing to litigate if the consequence of lost litigation is only a compulsory license and not an injunction. They also argued that a manufacturing company may take advantage of the fact that a smaller licensing entity does not have the resources to fund expensive patent litigation by refusing to license.[25]

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[20]*See* Chapter 1.

[21]This report uses the term "patent assertion entity" rather than the more common "non-practicing entity" (NPE) to refer to firms whose business model focuses on purchasing and asserting patents. Taken literally, the term NPE encompasses patent owners that primarily seek to develop and transfer technology, such as universities and semiconductor design houses. Patent assertion entities do not include this latter group. *See* Chapter 2, at 51 n.2.

[22]As discussed in Appendix B, Sections II, III.A.2, III.A.3, district courts have granted injunctions to non-practicing entities about 50% of the time. Where an injunction has been denied, the denial seldom turned solely on the fact that the patent holder did not practice the patent.

[23]Ware at 156-57 (2/12/09).

[24]Cassidy at 165-67 (2/12/09).

[25]Cassidy at 166-67 (2/12/09) (*eBay* may decrease incentives for manufacturing companies to bargain with non-practicing patentees); Ware at 144-48 (2/12/09) (lack of a certain exclusive license in the wake of *eBay* may diminish the value of IP for non-practicing universities and start-up companies); *Patent Law Reform: Injunctions and Damages: Before the Subcomm. on the Judiciary Patent Law Reform of the S. Comm. on the Judiciary*, 109th Cong. 984 (2005) (testimony of Carl Gulbrandsen, Managing Director,

Panelists identified several ways in which changed injunction law might affect inventive activities. Patentees that seek to recoup investment in risky R&D through exclusive licensing may invest less if they cannot be assured of a patent-protected exclusive market position in the future, they said.[26] Rigid rules denying injunctions to licensing entities, such as design houses, may prevent them from effectively monetizing their intellectual property, causing them to forgo design projects or move away from a business model that relies on licensing, and move toward a potentially less efficient manufacturing scheme.[27] Another panelist was concerned that the lower value of patents in the hands of licensing companies means that independent inventors and start-ups would be less able to attract capital because investors sometimes look to the sale of patent assets to recoup investment when the company's original business plan fails.[28] Not all agreed with this latter point, however.[29]

C. IT Manufacturers

Panelists from the IT industry discussed how a complex patent landscape and the shortcomings of the patent system's notice function could lead to patent hold-up from the threat of an injunction. IT products typically comprise hundreds or thousands of patented components, with no one company holding all the rights necessary to manufacture a product.[30] In addition, many IT products use industry standards to ensure interoperability, necessitating that manufacturers

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Wisconsin Alumni Research Foundation (WARF)) ("limits to injunctive relief simply create incentives to infringe and to prolong litigation and, in fact, will potentially spawn additional litigation because companies will choose to forego up-front licensing and instead wait for a lawsuit to create what would be, in effect, a compulsory license . . . . Consequently, investors will have less incentive to fund such innovative companies.").

[26]Ware at 148 (2/12/09) ("To the extent that changes in the patent system call into question the ability to enforce the right of exclusivity through injunctive relief, venture capitalists will take their funds elsewhere, and small biotech companies will shrink and die rather than grow.").

[27]Rhodes at 167-68 (2/12/09) (*eBay* factors may reduce to rigid tests that require patentees to commercialize their IP immediately); Katznelson at 52-53 (3/18/09) (arguing that start-ups may need to manufacture to obtain an injunction).

[28]Katznelson at 60-61 (3/18/09).

[29]Kiani at 63-64 (3/18/09) (arguing salvage value of patents did not incentivize investment in start-ups).

[30]Thorne at 117 (3/18/09) ("product can have a thousand or more patents [read] on it"); Cockburn at 232-33 (4/17/09) (IT patent thicket includes "a large number of patents . . . potentially overlapping, held by numerous people"); *see also* FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 3, at 34, 52 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

license technology that is essential to the standard.[31] Panelists reported that the notice problems described in Chapters 2 and 3 – the large number of patents, the uncertainty of patent scope and late issuing patents – make identifying all patents that might be asserted against an IT product prohibitively expensive and sometimes impossible.[32]

For these reasons, a manufacturer may face allegations of patent infringement after incurring significant sunk costs to produce and distribute an infringing product. At that time, the cost of switching to an alternative technology may be high compared to the cost of choosing an alternative prior to incurring sunk costs. Because the manufacturer risks its investment if it cannot obtain a license, the threat of an injunction allows a patentee to demand and obtain a higher royalty payment than it could have obtained prior to costs being sunk, when alternatives were available.[33] That dynamic, often called hold-up, will be especially strong when the patent is asserted against standardized technology and the industry is "locked-in."[34]

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[31]Krall at 134-35 (3/18/09) (standard setting is critical to product development to ensure interoperability and interchangeable products).

[32]Krall at 114-15 (3/1809) ("in the tech industry doing [patent clearance] searches is almost cost-prohibitive"); Sarboraria at 120 (3/18/09) (sheer number of patents and the uncertainty of claim scope make clearance searches in the software industry costly and inadequate); Harris at 123 (3/18/09) (searches unlikely to identify patents that might be asserted, since claim scope is often stretched unpredictably); Phelps at 261-63 (5/4/09) (doing a patent clearance "up front" is "pretty ineffective" due to the number of patents and many different entities who might have relevant patents); Luftman at 209-10 (2/12/09) (low margins in the IT industry may not support the costs of conducting such a large search); Slifer at 125 (3/18/09) ("The uncertainty in unpublished applications, in pending applications, in claim scope and damages, the sheer number of possible areas that technology could be relevant to a new product, have . . . taught us . . . [that] expending a lot of energy and resources" in freedom to operate searches is usually "futile.").

[33]Massaroni at 192-93 (2/12/09) (describing hold-up as assertion of a poor quality patent, often issued after commercialization of the accused product, when costs have been sunk); Badenoch at 79-80 (2/12/09) ("[T]he claims often come out way after the competitors have gone into the marketplace with a lot of related technology. And so then you really have the sunk cost problem, and you have this issue that suddenly injunctions might have an impact way beyond the invention that is the subject of the patent."). *See also* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking,* 85 TEX. L. REV. 1991 (2007).

[34]Luftman at 195-97 (2/12/09) (hold-up is especially problematic in standards-based technology when companies have no choice but to use the patented standard); Thorne at 79 (3/18/09) (describing hold-up in standard setting scenarios); Krall at 134-35 (3/18/09) (describing impact when successor patentees do not honor licensing commitments made to standard setting organizations).

The potential for hold-up caused by an injunction led most panelists and commentators representing IT manufacturers to favor a flexible approach for awarding permanent injunctions.[35] This was especially true regarding patentees that are patent assertion entities (PAEs). When facing infringement allegations brought by another manufacturer, an IT firm can often countersue, a scenario that frequently results in cross-licensing. But this strategy is ineffective when the patent owner is a patent assertion entity.[36] As one panelist explained, however, since the *eBay* decision, settlement negotiations between manufacturers and patent assertion entities focus less on mitigating the risk of an automatic injunction.[37] Panelists reported that manufacturing companies are now sometimes more willing to litigate against weak claims, and cases brought by assertion entities will settle for lower amounts due to a decreased threat of an injunction.[38] Panelists did not report a decrease in litigation, however.[39]

IV. AN ECONOMIC VIEW OF THE PERMANENT INJUNCTION ANALYSIS

Consistent with the goals of the patent system, the principles for structuring and conducting the injunction analysis should seek to promote innovation. As courts and commentators have argued, this goal is best served by awarding a permanent injunction in the large majority of cases.[40] Indeed, courts applying *eBay* have continued to award injunctions in most instances. One panelist explained that *eBay* did not make a fundamental change, but merely shifted the availability of injunctions on the margins.[41] However, *eBay* does allow a more nuanced analysis that can recognize the ability of injunctions in some situations to unnecessarily

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[35]*See, e.g.,* Massaroni at 151-53 (2/12/09) (flexible injunction standards have had an impact on non-practicing entities); Luftman at 153-54 (2/12/09) (flexible standards for injunction grants limit patent holding companies from skewing licensing negotiations).

[36]Slifer at 82 (3/18/09) (Micron developed patent portfolio in part to cross license or defend against suits from other companies); Harris at 87 (3/18/09) (AOL uses patents defensively); Thorne at 87-88 (3/18/09) (Verizon, same); *see also* 2003 FTC IP Report, ch. 2, at 30-31; ch. 3, at 38-39, 52-53.

[37]Luftman at 142-44 (2/12/09) (parties are more likely to focus on whether patent is valid and infringed in settlement discussions rather than only avoiding the risk of injunction).

[38]Jensen at 249 (3/18/09) (since *eBay*, more companies are willing to stand up to weak patent suits).

[39]Luftman at 154-56 (2/12/09) (patent suits against Palm more than doubled since 2004); Krall at 131 (3/18/09) (increase in patent cases against Sun); Thorne at 133-34 (3/18/09) (Verizon faces more patent suits following *eBay* than before); Delgado at 75 (4/17/09) (increase in patent litigation by patent holding companies); Quatela at 74 (4/17/09) (Kodak faces sharp increase in patent assertions).

[40]*See, e.g.*, *eBay*, 547 U.S. at 395 (Roberts, C.J., concurring) (difficulty of protecting right to exclude with money damages supports history of issuing injunctions in vast majority of cases); Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, 34 J. CORP. L. 1151, 1175 (2009).

[41]Sprigman at 45 (2/12/09).

raise costs and deter innovation. The challenge courts now face is how to approach that analysis in a manner that furthers the goals of the patent system while aligning it with competition policy so that consumers benefit from both innovation and competition among technologies.[42] This section identifies characteristics of injunctions that must be balanced to meet that challenge.

A. Reasons Supporting the Grant of an Injunction

The first three characteristics of injunctions that should inform the *eBay* analysis generally support granting an injunction. Of those, the first and most fundamental is that an injunction preserves the exclusivity that provides the foundation of the patent system's incentives to innovate. Altering that exclusivity must be undertaken with significant care not to undermine those incentives. Numerous panelists and commentators discussed the importance of maintaining a patent's exclusivity to support the patent system's ability to spur research and development.[43]

Second, the credible threat of an injunction provides a significant deterrent to infringement in the first place. That deterrent, which is critical to many patentees when investing in R&D,[44] stems from the serious consequences to an infringer from an injunction. If an adjudged infringer has sunk costs into R&D or a plant and equipment to produce the infringing product, it risks losing that investment when faced with an injunction. The injunction may render the infringer's inventory valueless, and redesign of the product may be expensive or impossible.[45] Companies that are loathe to incur substantial costs where an injunction would make the product unmarketable often devote substantial effort to ensuring freedom to operate.[46] One panelist from the biotech industry explained, "[w]e take great care in our freedom to operate

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[42]Su at 67-68 (2/12/09) (injunction analysis must consider what conduct to encourage).

[43]Section III.A. & B., *supra*; *see, e.g.*, F. Scott Kieff & Henry E. Smith, *How Not to Invent a Patent Crisis*, *in* REACTING TO THE SPENDING SPREE: POLICY CHANGES WE CAN AFFORD 62-63 (2009) (expectation of exclusion and credible threats of enforcement spur R&D).

[44]*See, e.g.*, Bellon at 227-28 (3/18/09) (a strong IP portfolio is critical to Hydra's ability to grow its business); Singer at 223-25 (3/18/09) (without strong IP enforcement, investors would not invest in new products).

[45]*See, e.g.*, Vincent E. O'Brien, *Economics and Key Patent Damages Cases*, 9 U. BALT. INTELL. PROP. L.J. 1 (2000) (discussing consequences of injunction); ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 231 (2005) (discussing consequences of injunction).

[46]*See, e.g.*, Bellon at 229-30 (3/18/09) ("If we thought there was going to be [a freedom to operate] problem, we would not go into that area or we would try to license."); Myers at 233-34 (3/18/09) (ensuring freedom to operate before entering a product space is important); Jensen at 217-18 (3/18/09) (companies start to search IP early in order to ensure freedom to operate as investment in technology increases).

searches. We thoroughly analyze all of the patents out there. We keep an eye on third-party patents and what's happening with them, and we make sure before embarking on development pathways that we will have all the rights we need."[47] Concern over the risk of an injunction after a company has sunk substantial costs into a project is not unique to the biotech industry, however.[48]

Third, a predictable injunction threat will encourage private ordering, and in particular, licensing by the parties. An alleged infringer, knowing it faces an injunction if unsuccessful in litigation, has an incentive to enter into a presumably more efficient private transaction. Commentators explain that this outcome is preferable to a compulsory licensing regime because the patentee and infringer generally have better information about the appropriate terms of a license than would a court, leading to lower administration costs and error rates. The parties also have a significant advantage in developing efficient agreements, such as cross licensing arrangements, that can reduce transactions costs.[49]

B. An Injunction's Ability to Cause Hold-Up

The fourth characteristic of an injunction is its ability to cause patent hold-up in some situations. The threat of an injunction will lead the manufacturer to pay royalties up to its switching costs,[50] which may be higher than the cost at the time of product design. Commentators explain that the threat of hold-up gives patent holders excessive bargaining power in component-based industries that allows the "patent owner to capture value that has nothing to do with its invention, merely because the infringer cannot separate the infringing component

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[47]Shafmeister at 216 (3/18/09).

[48]Horton at 172-73 (3/18/09) (GE will acquire patents to ensure freedom to operate when pursuing multiple research paths); Miller at 188 (3/18/09) (P&G has a policy of not infringing patents to avoid risk); Griswold at 197 (3/18/09) (3M, same).

[49]Cotter, *supra* note 40, at 1175-76. *See also* John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 564-66 (2010) (identifying "devolution" as an important principle in structuring patent remedies); Golden at 61 (2/12/09) (parties are closer to the changing facts); Sprigman at 66-67 (2/12/09) (need to structure remedies to get information from the party in the best position to provide it); John Schlicher Comment at 10-11 (5/15/09) (injunction is critical to functioning of the patent system in which use and pricing decisions are made by private ordering); Smith at 84-85 (2/12/09) (threat of injunction prevents potential infringers from engaging in hold-out to obtain lower royalties).

[50]The term "switching costs" is used throughout this chapter to refer to all the costs associated with switching from the current design to an alternative, including the expense of retooling and ensuring compatibility with other components and products and the higher cost associated with using the alternative.

from the non-infringing ones" after it has sunk costs into the design and marketing of a product.[51] The implementers of the patented technology do not receive the price benefits that competition among technologies can provide, and they may pass those higher costs on to consumers. Moreover, hold-up and the threat of hold-up can discourage innovation by increasing costs and uncertainty.

Critics of allowing concerns about hold-up to inform post-*eBay* injunction analysis primarily raise two points. First, they argue that decreasing the likelihood of a patentee receiving an injunction will lead manufacturers to choose infringement rather than licensing. This argument assumes that a manufacturer "chooses" to infringe because either (1) it has notice of the patent and a clear understanding of its boundaries when designing the infringing product; or (2) it can easily redesign its product to exclude the patented technology after it has begun manufacturing.[52] The assumption about notice is generally not the case, however, especially in the IT industries.[53] The assumption about redesign ignores the problems of lock-in and high switching costs. When either assumption is correct, the injunction analysis should take those facts into account, as discussed below, but the analysis should not accept those assumptions as universally true in the first instance.

The critics' second point is that structuring the injunction analysis to avoid hold-up will result in lower royalties that provide insufficient incentives to inventors to invest in optimal levels of research and development.[54] Consumers would be harmed by lower levels of innovation. As other commentators have argued, however, the effect on innovation of lower royalties resulting from the avoidance of hold-up is not so straightforward. Hold-up gives the patentee more compensation than it could have earned through competition in the technology market. The hold-up value can be seen as a windfall to a patentee that seeks to develop or sell its technology for further development in a competitive technology market. That windfall cannot be

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[51]Lemley & Shapiro, *supra* note 33, at 2010. As an example, they cite the Blackberry case, *NTP v. Research in Motion*, which settled for $612.5 million to avoid a potential injunction after a jury had awarded reasonable royalty damages of $33.5 million. *Id*. at 2049 n.36. *See also* Cotter, *supra* note 40, at 1160; Vincenzo Denicolò, Damien Geradin, Anne Layne-Farrar & A. Jorge Padilla, *Revisiting Injunctive Relief: Interpreting* eBay *in High-Tech Industries with Non-Practicing Patent Holders*, 4 J. COMPETITION L. & ECON. 571, 573 (2008).

[52]J. Gregory Sidak, *Holdup, Royalty Stacking and the Presumption of Injunctive Relief for Patent Infringement: A Reply to Lemley and Shapiro*, 92 MINN. L. REV. 714, 717, 736-43 (2008) (not accounting for the potential welfare effects from lock-in); Einer Elhauge, *Patent Holdup and Royalty Stacking*, 4 J. COMPETITION L. & ECON. 535, 565-66 (2008) (assuming infringer can "simply decline to use the overpriced technologies").

[53]*See* Chapter 3.

[54]Elhauge, *supra* note 52, at 535-36; John Golden, "*Patent Trolls*" *and Patent Remedies*, 85 TEX. L. REV. 2111 (2007); Sidak, *supra* note 52, at 714.

understood to provide ex ante incentives to undertake innovative activity to generate new products, but it can create the problems of overcompensation described in Chapters 2 and 4. Those problems include encouraging lie-in-wait behavior – ex post licensing and litigation by patentees rather than ex ante efforts at technology transfer and the creation of new products.[55]

The availability of hold-up value to patentees may indeed encourage invention and patenting activity, but that is not the same thing as encouraging the innovation necessary to bring new products to market. Invention is the first step of innovation, but innovation often requires significant additional development activity beyond that first step in order to get new products and services to consumers.[56] While increased invention and patenting activity will lead to increased innovation in many contexts, it can decrease innovation in others. The risk that patentees that have made no technical contribution to a product can extract hold-up value from manufacturers increases uncertainty and costs and discourages innovation by those manufacturers.[57]

C. Balancing Reasons for Granting and Denying Injunctions

These reasons for granting and denying injunctions should be balanced for the patent system to promote innovation while maintaining alignment with competition policy. Although the potential costs from hold-up should be considered, not all hold-up warrants denial of an injunction. Denying an injunction every time an infringer's switching costs exceed the value of the invention ex ante would dramatically undermine the ability of an injunction threat to deter infringement, protect a patentee's exclusivity, and encourage licensing. An important step in balancing these concerns is to set forth criteria that would help identify those situations in which the costs of hold-up resulting from an injunction exceed the benefits of exclusivity due to the patent grant.

A first criterion considers whether the patented technology is a minor component of a complex product that would have been easy to design around ex ante.[58] When true, these are the cases in which the ex ante value of the patented technology is most likely to be small relative to the cost of hold-up based on the value of the entire product. In contrast, depriving a patentee of

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[55]Cotter, *supra* note 40, at 1168-69, 1179; Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-up*, 74 ANTITRUST L.J. 603, 622-23 (2007).

[56]*See* Chapter 1.

[57]*See* Chapter 2; Meyer at 69-70 (2/12/09). *See also* John Johnson, Gregory K. Leonard, Christine Meyer & Ken Serwin, *Don't Feed the Trolls?*, 42 LES NOUVELLES 487, 488 (Sept. 2007); Mark A. Lemley & Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 TEX. L. REV. 783, 786-88 (2007).

[58]Cotter, *supra* note 40, at 1171; Layne-Farrar at 82-83 (2/12/09) (requiring that infringement have been easy to avoid ex ante had the infringer known of the patent).

exclusive control over an invention that provides the majority of value to a product risks undermining the patent system's incentives to make and develop significant advances.

A second criterion considers whether the infringer uses the patented technology to compete against the patentee and the effect of the infringement on that competition. The patentee's ability to compete in both product and technology markets is important. A lack of competition is more likely to support a conclusion of problematic hold-up, although that analysis involves important subtleties discussed below. A third criterion is the absence or presence of copying.[59] This consideration is needed to support the ability of an injunction threat to deter infringement and encourage parties to negotiate a license.

V. ANALYZING EBAY'S FOUR FACTORS

Although the criteria discussed above can help assess whether the harm from hold-up might outweigh the benefits from exclusivity for a particular invention, a court's analysis and the parties' arguments will be structured according to the four equitable factors set out in the Supreme Court's *eBay* decision. In fact, concerns about balancing the harms and benefits of injunctions to innovation and competition fit well within the *eBay* framework.

A. Irreparable Harm/Inadequacy of Money Damages[60]

Much of the discussion on the state of injunction law post-*eBay* has focused on whether the patentee and infringer compete in a goods market. Conventional wisdom assumes that non-practicing patentees, meaning those who do not compete in sales of a product, cannot obtain injunctions because money damages will adequately compensate any harm they may suffer from infringement. Conventional wisdom also assumes that a patent owner practicing the patent can and should always be granted an injunction. The case law review in Appendix B demonstrates that neither assumption is accurate or consistent with the Supreme Court's explicit warning against categorical rules in the injunction analysis.[61]

Moreover, assumptions about irreparable harm based solely on whether the patentee practices the invention do not achieve the balance described above. On the one hand, the class of non-practicing patent owners is too diverse to be subject to a simple rule. It includes universities,

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[59] *See* Denicolò et al., *supra* note 51, at 573, 590-91 (requiring that infringement be inadvertent); Lemley & Shapiro, *supra* note 33, at 2036-37 (requiring that infringer have independently developed the technology and not copied it).

[60] As discussed in Appendix B, Section III.A, courts and commentators often analyze the first two *eBay* factors as one.

[61] *eBay*, 547 U.S. at 393.

start-ups, semiconductor design houses and patent assertion entities, to name a few.[62] On the other hand, a practicing patentee's assertion of a narrow patent on a minor component can generate the negative consequences of hold-up in the same way that a non-practicing patentee's can. Fortunately, the equitable test that governs the injunction analysis empowers courts to apply a flexible, fact-specific approach to decision making.

A patentee that licenses as part of a technology transfer program, such as a university or semiconductor design house, can suffer harm from infringement that is more akin to that suffered by a manufacturing patentee. Although this category of non-practicing patentees does not compete in a goods market, it does compete in a technology market[63] to have its technology purchased for incorporation into new products. As one court explained, such patentees compete for "design wins."[64] The harm suffered by these patentees as a result of infringement can be analogous to that suffered by manufacturing patentees, including loss of a customer base, industry disregard of its patent rights, and harm to reputation as an innovator.[65] Where a patentee wishes to exclusively license, infringement can destroy its ability to do so. The availability of an injunction is important to such patentees, who rely on the threat to deter infringement, encourage ex ante licensing, and prevent infringer hold-out.[66]

However, when a non-practicing patentee seeks to license broadly, denial of an injunction in the interest of avoiding hold-up and overcompensation may not prevent the patentee from receiving the full value of the invention. This is more likely to be true when the patentee is a PAE seeking to license companies that had independently created and marketed the technology. A PAE will not have the same concerns about deterring future infringement and protecting its reputation as an innovator that other patentees may have.[67]

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[62]*See* Chapter 1.

[63]U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 3.2.2 (1995) ("Technology markets consist of the intellectual property that is licensed . . . and its close substitutes . . . .").

[64]Broadcom Corp. v. Qualcomm, Inc., 543 F.3d 683, 702 (Fed. Cir. 2008).

[65]Commonwealth Scientific and Indus. Research Org. v. Buffalo Tech., Inc., 492 F. Supp. 2d 600, 604-05 (E.D. Tex. 2007) (explaining that infringement can harm reputation and a research institution's ability to obtain funding and recruit scientists just as it can harm brand name or goodwill to a manufacturing company); *see also* Emory Univ. v. Nova Biogenics, Inc., No. 1:06-CV-0141, 2008 WL 2945476, at *5 (N.D. Ga. 2008) (stating that negative effects from infringement on goodwill and prestige are real).

[66]Sections III.A and B, *supra*.

[67]*See, e.g.*, z4 Techs., Inc. v. Microsoft Corp., 434 F. Supp. 2d 437, 440-41 (E.D. Tex. 2006). The patented technology was a small component of the infringing product and unrelated to the product's core functionality. The court concluded that the patent holding company patentee would not suffer irreparable harm because the only entity it was prevented from licensing in the future was the defendant. *Id. See*

This is not to say, however, that courts should assume all manufacturing patentees will suffer irreparable harm from infringement. While that might often be the case, the analysis must consider other facts, including the relationship of the patented invention to the infringing product and the structure of the relevant market.[68] Some courts have assumed that where parties compete, infringement necessarily erodes market price and causes the patentee to lose market share.[69] If there are only two competitors in a market, then infringement is more likely to lead to price and market effects. However, the patent may cover a minor component of the infringing product, and competing products may include non-infringing alternatives that are acceptable to customers. In that case, it is less likely that the infringement (as opposed to competition generally provided by the infringer) is harming the patentee.[70]

The variety and complexity of factual scenarios discussed here caution against creating any assumptions of irreparable harm based on a finding of infringement,[71] a patentee's use of the patent, or its willingness to license. A careful consideration of the nature of the patented invention, the infringing use, and competition in the relevant market may be required.

> ***Recommendation.*** Courts should not presume irreparable harm based on a finding of infringement or the patentee's use of the patent. Conversely, courts should recognize that infringement can irreparably harm the ability of patentees

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also Paice, LLC v. Toyota Motor Corp., No. 2:04-CV-211, 2006 WL 2385139, at *5 (E.D. Tex. 2006) (injunction denied to licensing company plaintiff where the patented product was a small component of the infringing device), *aff'd in part, vacated in part and remanded*, 504 F.3d 1293 (Fed. Cir. 2007).

[68]IGT v. Bally Gaming Int'l, Inc., 675 F. Supp. 2d 487, 489-90 (D. Del. 2009) (injunction denied where market contained more than two competitors and court required more than a summary overview of the competitive landscape to find irreparable harm), *aff'd in part, vacated in part and remanded*, 508 F.3d 1293 (Fed. Cir. 2007).

[69]Sprigman at 35 (2/12/09); Malin at 12-13 (2/12/09). *See, e.g.*, Brooktrout, Inc. v. Eicon Networks Corp., No. 2:03-CV-59, 2007 WL 1730112, at *1 (E.D. Tex. 2007) ("intellectual property is quite valuable when it is asserted against a competitor in the plaintiff's market").

[70]*See, e.g.*, Sundance, Inc. v. DeMonte Fabricating, Ltd., No. 02-73543, 2007 WL 37742, at *2 (E.D. Mich. Jan. 4, 2007) (injunction denied where court did not find irreparable harm because the market included many competitors who produced products that did not contain the patented feature). See Chapter 5 for a discussion of the effect of non-infringing alternatives on market analysis.

[71]*eBay*, 547 U.S. at 391 ("plaintiff must demonstrate: (1) that it has suffered an irreparable injury . . . ."). Moreover, equity places the burden of proving irreparable harm on the party seeking an injunction as the one with easiest access to the relevant information. *See* Sprigman at 121 (2/12/09) (evidence of irreparable harm is typically in the hands of the patentee and presumptions should be structured to encourage disclosure).

that primarily engage in technology transfer through licensing to compete in a technology market.

B. Balance of the Equities and Hardships Between the Parties

Under this factor, courts must consider the effect of an injunction on an infringer and balance it against the harm that infringement imposes on the patentee.[72] Commentators have stated that, "the equitable approach is a safety valve for those situations in which someone who is otherwise a good candidate for getting an injunction – such as a patentee whose patent has been infringed – should not get one because of some glaring injustice."[73] But this factor also allows courts to consider whether an injunction would subject the infringer to hold-up because it is "locked-in" to using the patented technology due to high switching costs or compatibility concerns.[74] The expense and harm to an infringer facing hold-up can be weighed against the harm to the patentee by considering the criteria discussed above. The balance will tend to tip toward the infringer when the invention is a component of a downstream product accounting for a relatively small portion of the product's value, and when designing around the infringing product ex post is more costly than it would have been ex ante. In addition, the infringer must not have copied the invention.[75]

Some courts have dismissed infringers' complaints of hardship by stating that "[o]ne who elects to build a business on a product found to infringe cannot be heard to complain if an injunction against continuing infringement destroys the business."[76] The quote originates from a

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[72] *eBay*, 547 U.S. at 391 ("plaintiff must demonstrate . . . (3) that considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted"); *cf.* Acumed, LLC v. Stryker Corp., 551 F.3d 1323, 1330 (Fed. Cir. 2008) ("[a]s a preliminary matter, the balance considered is only between a plaintiff and a defendant").

[73] Kieff & Smith, *supra* note 43, at 68-69 (requiring a "grossly disproportionate hardship on the defendant" to deny an injunction); *see also* Smith at 106 (2/12/09) (balance of hardships and public interest factors are equitable safety valves).

[74] Hynix Semiconductor, Inc. v. Rambus, Inc., 609 F. Supp. 2d 951, 984-85 (N.D. Cal. 2009) (denying injunction, in part due to lock-in); Badenoch at 88 (2/12/09) (courts should evaluate the impact of an injunction due to the defendant's sunk costs); Su at 118 (2/12/09) (courts should require greater impact on the infringer's business than merely that which remedies the infringement, such as hold-up).

[75] *See, e.g.,* Schlicher Comment at 34 (5/15/09) (One criteria necessary for denying an injunction is that "the infringer has made large investments . . . necessary to produce any product . . . and those investments . . . are large relative to the value of the patented invention.").

[76] 3M Innovative Properties Co. v. Avery Dennison Corp., No. 01-1781, 2006 WL 2735499, at *2 (D. Minn. 2006); *Johns Hopkins*, 513 F. Supp. 2d at 586 ("the hardship for loss of sales and for ceasing operations is not sufficient because they are direct consequences of the illegal patent infringement"); Smith & Nephew, Inc. v. Synthes, 466 F. Supp. 2d 978, 983 (W.D. Tenn. 2006) ("Although Synthes'

1986 Federal Circuit case that predates *eBay*.[77] As one district court recently explained, reliance on the quote in modern injunction analysis is inappropriate: "[t]o ignore harm to the infringer because it cannot be heard to complain runs contrary to *eBay's* mandate to consider the balance of hardships between the plaintiff and defendant."[78] In the interest of equity, courts should limit the quotation's relevance to those instances where an infringer truly "elects" to infringe by copying patented technology with knowledge of the patent.[79] Given the notice problems and uncertainty endemic in some sectors of the patent system, it is inaccurate to assume that many infringers "elect" to infringe, and formulating injunction policy on the assumption that they do threatens to make the remedy punitive rather than equitable.[80] Doing so can lead to hold-up, overcompensate patentees and harm consumers through higher prices and decreased innovation.

> ***Recommendation.*** Courts should consider the hardship of an infringer facing hold-up under this prong. Courts should reject the statement that an infringer "cannot be heard to complain if an injunction against continuing infringement destroys the business,"[81] except in those instances where an infringer "elects" to infringe by copying a patented invention with knowledge of the patent.

C. Public Interest

Under the public interest factor, courts must examine the effect an injunction would have on third parties, including the public at large.[82] In the past, courts denied injunctions "in rare instances" to protect the public interest where an injunction would have serious consequences for

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effort, time, and expense in redesigning [the infringing product] might be significant, that is the consequence of patent infringement."); *see also* Su at 86 (2/12/09) (courts not sympathetic to arguments that equity should save people from hardship they have created).

[77]Windsurfing Int'l, Inc. v. AMF, Inc., 782 F.2d 995, 1003 n.12 (Fed. Cir. 1986) ("One who elects to build a business on a product found to infringe cannot be heard to complain if an injunction against continuing infringement destroys the business so elected.").

[78]*Hynix*, 609 F. Supp. 2d at 970.

[79]*Id.*

[80]*See* Badenoch at 79-80 (2/12/09) (arguing that boundaries of patents are uncertain, making injunction punitive where defendants independently developed product and incurred sunk costs).

[81]*E.g.,* 3M Innovative Properties Co. v. Avery Dennison Corp., No. 01-1781, 2006 WL 2735499, at *2 (D. Minn. Sept. 25, 2006).

[82]*eBay*, 547 U.S. at 391 ("plaintiff must demonstrate . . . (4) that the public interest would not be disserved by a permanent injunction").

public health and safety.[83] Since *eBay*, a few courts have appropriately broadened the scope of the public interest concerns to include computer security and other burdens that would be borne by the broader public.[84]

Courts often cite the public's interest in "a strong patent system" as supporting an injunction,[85] but a more nuanced approach recognizing that the public has a strong interest in a patent system that best promotes innovation is needed. As discussed above, such a patent system will very often award injunctions to patentees. But in some circumstances, including those involving hold-up based on a patent for a minor component, an injunction could distort competition with unpatented technology, overcompensate the patentee, unduly raise prices to consumers and undermine rather than promote innovation.

> ***Recommendation.*** When warranted by the facts, courts should consider the public's interest in avoiding patent hold-up, which can increase costs and deter innovation.

Panelists and commentators worried that courts might expand the notion of public interest to include the benefit of lower prices, especially for medicines.[86] For instance, one panelist described the public interest factor as a "wild card" that could raise a series of welfare balancing

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[83]Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1547 (Fed. Cir. 1995) ("courts have in rare instances exercised their discretion to deny injunctive relief in order to protect the public interest."); City of Milwaukee v. Activated Sludge, Inc., 69 F.2d 577 (7th Cir. 1934) (overturning permanent injunction on operation of sewage plant based on public health concerns).

[84]*See, e.g.* Broadcom v. Qualcomm, Inc., 543 F.3d 683, 704 (Fed. Cir. 2008) (delaying start of injunction on cell phone because immediate injunction would adversely affect public, network carriers and handset manufacturers); Finjan Software, Ltd. v. Secure Computing Corp., No. 06-369, 2009 WL 2524495, at *11 (D. Del. Aug. 18, 2009) (considering effect of injunction on computer security and service disruptions but finding insufficient evidence to outweigh public interest in a strong patent system), *aff'd in part, rev'd in part and remanded*, 626 F.3d 1197 (Fed. Cir. 2010); Amgen, Inc. v. F. Hoffman-La Roche, Ltd., 581 F. Supp. 2d 160, 212-26 (D. Mass. 2008), *aff'd in part*, 580 F.3d 1340 (Fed. Cir. 2009) (evaluating whether injunction could increase drug prices for government health programs).

[85]Appendix B, Section III.C; *see also*, Telequip Corp. v. Change Exchange, No. 5:01-CV-1748, 2006 WL 2385425, at *2 (N.D.N.Y. Aug. 15, 2006) ("without the right to obtain an injunction, the right to exclude granted to the patentee would have only a fraction of the value it was intended to have, and would no longer be as great an incentive to engage in the toils of scientific and technological research"); Zen Design Group, Ltd. v. Clint, No. 08-cv-14309, 2009 WL 4050247 (E.D. Mich. Nov. 23, 2009) (denial of injunction would disincentivize scientific progress).

[86]Ware at 199-200 (evaluating price competition under the public interest prong is contrary to the grant of exclusivity inherent in the patent); Am. Intell. Property Law Ass'n Comment at 4 (5/18/09).

decisions, comparing the benefits of patent exclusivity versus cheaper drugs.[87] Beyond the circumstances of hold-up that can raise prices by distorting competition with unpatented technology, or extreme circumstances where pricing affects public safety, the public's interest in lower-priced goods generally should not influence the injunction analysis. In enacting the Patent Act, Congress made the judgment that an exclusive right, through its ability to allow patentees to charge higher prices, encourages innovation to the public benefit. Courts should not second-guess that judgment as a general matter.[88]

D. Injunction Analysis in the Standard Setting Context

Hold-up in the standard setting context can be particularly acute. Standards often are adopted to make products compatible and interoperable with other products in the industry.[89] "Lock-in" can make an entire industry susceptible to hold-up. In addition to higher prices and other economic harms, hold-up in standards-based industries may discourage standard setting activities and collaboration, which can delay innovation.[90]

eBay provides a framework for evaluating whether to issue an injunction in the standard setting context. The balance of hardships and public interest factors of the injunction analysis allows district courts to consider the effects of hold-up resulting from assertion of a patent against a standard. The infringer may face significant hardship as a result of an injunction if it is impossible to participate effectively in the market without complying with the standard. Design-around, at any cost, may not be an option. In that case, and where the patent covers a minor feature of the product for which alternatives existed at the time the standard was set, the balance

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[87]Sprigman at 121-24 (2/12/09).

[88]*See* U.S. CONST. art. I, § 8; Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 150-51 (1989) (the patent system embodies a carefully crafted bargain for encouraging new and non-obvious advances in technology in return for exclusive rights for a period of years).

[89]Krall at 134-35 (3/18/09) (standard setting is critical to ensure interoperability and interchangeable products); *see* Chapter 7, Section III.C.

[90]U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION at 35 (2007); Farrell *et al.*, *supra* note 55, at 616.

of hardships may support denial of the injunction.[91] A prior RAND[92] commitment can provide strong evidence that denial of the injunction and ongoing royalties will not irreparably harm the patentee.[93] The public interest factor may also consider whether grant of an injunction would deprive consumers of interoperable products and threaten to undermine the collaborative innovation that can result from the standard setting process.[94]

> ***Recommendation.*** Courts should give careful consideration under each of *eBay's* four factors to the consequences of issuing an injunction prohibiting use of patented technology incorporated into an industry standard. Whether the patent owner made a RAND commitment will also be relevant to the injunction analysis.

VI. REMEDIES FOLLOWING DENIAL OF AN INJUNCTION

A. Ongoing Royalties

When the *eBay* analysis leads a court to deny an injunction, the question naturally arises of what remedy to apply. The court opinions that address the question most commonly require ongoing royalties that allow the manufacturer to continue making the infringing product. The Federal Circuit has held that this remedy can be appropriate in lieu of an injunction. In doing so, the court distinguished ongoing royalties from a compulsory license: "[t]he term 'compulsory license' implies that anyone who meets certain criteria has congressional authority to use that

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[91]Hynix Semiconductor, Inc. v. Rambus, Inc., 609 F. Supp. 2d 951, 984-85 (N.D. Cal. 2009) (finding balance of hardships favored infringer where injunction on patent asserted against semiconductor memory standard would "decimate" infringer's business); *but see* TruePosition, Inc. v. Andrew Corp., 568 F. Supp. 2d 500, 532-33 (D. Del. 2008) (evaluating harm to infringer due to standard lock-in, but declining to find balance of hardship favored infringer because of lack of evidence), *aff'd*, 389 Fed. Appx. 1000 (Fed. Cir. 2010).

[92]Many standard setting organizations require that participants agree to license patents on RAND (Reasonable and Non-Discriminatory) terms. *See* Chapter 7, Section III.C.

[93]Some have argued that the RAND commitment should bar the patentee from seeking an injunction and that disputes over licensing rates should be resolved through contract litigation over the RAND amount. Joseph Miller, *Standard Setting, Patents and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 INDIANA L. REV. 351, 358 (2007); Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1902, 1925 (2002).

[94]Concerns that industry members will litigate rather than license absent a credible injunction threat diminish with the realization that past and ongoing damages following litigation will be based on a patent known to be valid and infringed, and therefore higher than pre-litigation royalties. *See* Chapter 6, Section IV.B and Chapter 8, Section VI.

which is licensed . . . By contrast, the ongoing royalty order at issue here is limited to one particular set of defendants."[95]

No consensus on how to set the royalty rate has emerged from the case law, however. The Federal Circuit has stated that district courts must articulate a reasonable basis for determining the amount, and that the award should account for the changed relationship of the parties resulting from an adjudicated finding of infringement of a valid patent.[96] In most cases, the judge rather than the jury has determined the rate because the relief is equitable rather than legal.[97] In some cases, district courts have used the royalty rate for past damages as the royalty rate for ongoing damages.[98] In others, courts have set different royalties, at times based in part on the jury's award.[99]

The Federal Circuit has encouraged district courts to allow parties to negotiate a license themselves before imposing one.[100] Although this approach may be a wise use of judicial resources, parties are more likely to have similar expectations that allow them to reach agreement if the legal rules for calculating the ongoing royalty are clear. The lack of clarity regarding

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[95]Paice, LLC v. Toyota Motor Corp., 504 F.3d 1293, 1313 n.13 (Fed. Cir. 2007), *remanded*, 609 F. Supp. 2d 620 (E.D. Tex. 2009).

[96]*Id*. at 1314-15 ("court may want to take additional evidence . . . to account for any additional economic factors"); *see also* Amado v. Microsoft Corp., 517 F.3d 1353, 1362 (Fed. Cir. 2008) (considering damages for infringement during stay of injunction pending appeal).

[97]*Id*. at 1315-16 (Seventh Amendment does not require jury to determine ongoing royalty); Cummins-Allison Corp. v. SBM Co., Ltd., No. 9:07CV196, 2008 WL 4768028 (E.D. Tex. Nov. 3, 2008) (court calculated royalty for post-verdict infringement); *but cf.* Ariba, Inc. v. Emptoris, Inc., 567 F. Supp. 2d 914 (E.D. Tex. 2008) (court issued pre-trial order stating it would consider sending the question of future damages to the jury).

[98]Voda v. Cordis Corp., No. 03-1512, 2006 WL 2570614, at *6 (W.D. Okla. Sept. 5, 2006), *aff'd*, 536 F.3d 1311 (Fed. Cir. 2008) (judge imposed same royalty rate for future infringement as for past damages); Finisar Corp. v. DirecTV Group, No. 1:05-CV-264, 2006 U.S. Dist. LEXIS 76380, at *5 (E.D. Tex. July 7, 2006) (same), *aff'd in part, rev'd in part*, 523 F.3d 1323 (Fed. Cir. 2008).

[99]Paice, LLC v. Toyota Motor Corp., 609 F. Supp. 2d, 620, 623-24 (E.D. Tex. 2009) (on remand, recalculated ongoing royalty using *Georgia-Pacific* factors); Creative Internet Advertising Corp. v. Yahoo!, Inc., 674 F. Supp. 2d 847, 861 (E.D. Tex. 2009) (judge calculated royalty based on increase over jury determined rate); Boston Scientific Corp. v. Johnson & Johnson, No. 02-00790, 2009 WL 975424, at *5-7 (N.D. Cal. April 9, 2009); (court reapplied *Georgia-Pacific* factors with different weights when calculating the ongoing royalty).

[100]*Paice*, 504 F.3d at 1314-15. *See also* Telcordia Tech., Inc. v. Cisco Systems, Inc., 592 F. Supp. 2d 727, 748 (D. Del. 2009) (ordering parties to negotiate a license); *Hynix*, 609 F. Supp. 2d at 986-87 (same).

ongoing royalty determinations impedes the efficiency of the voluntary settlements that the Federal Circuit seeks to promote.[101]

To form a coherent remedies system, the legal rules governing ongoing royalties must be consistent with the rationale that supported denying the injunction in the first place. As discussed above, that rationale may consider problems of hold-up that enable patentees that assert patents ex post to extract royalties based on the sunk investment of the infringer. When a court denies an injunction to ensure that the patentee cannot use the threat of injunction to extract more than the market reward for its inventive contribution,[102] it stands to reason that the ongoing royalty should align with that market reward. Although the ongoing royalty need not be identical to the royalty awarded for past damages,[103] like reasonable royalty damages, it should be based on a willing licensor/willing licensee model, with the assumption that the patent is valid and infringed.[104] Royalties incorporating the knowledge that a patent is valid and infringed account for the changed relationship of the parties following litigation.

Some commentators and panelists advocated that courts not grant the infringer an ongoing license and royalty after denying an injunction, but instead treat the infringer's future use of the invention as willful infringement, subject to treble damages.[105] Others suggested that ongoing royalties must be very high compared to damages for past infringement. They explained that this would serve as a deterrent to future infringement and provide the patentee with greater

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[101]Meyer at 107-08 (2/12/09) (calculation of ongoing royalties is "an open question"); O'Brien at 258 (5/5/09).

[102]*See* Chapter 4, at 142 n.3 and accompanying text (defining market reward as amount the invention could command when competing with alternative technologies prior to costs being sunk).

[103]Some panelists suggested that the hypothetical negotiation for determining ongoing royalties take into account the known commercial success of the invention at the time of trial. A hypothetical negotiation for calculating past damages is conducted at the time infringement began and would not necessarily incorporate this knowledge. Rhodes at 223-25 (2/12/09); Layne-Farrar at 132 (2/12/09) (courts should not entrench hold-up, but should also take into account the risk of commercial success that may have existed at different points in time).

[104]Chapter 6, Section IV (discussing how the hypothetical negotiation model seeks to replicate the market reward for the invention); *see also* Badenoch at 130-31 (2/12/09) (supporting use of the royalty for past damages as the ongoing royalty); Lemley at 253 (5/5/09) ("It seems to me if we get the damages rules right for retrospective damages, those damages rules are just right as prospectively if we've decided that injunctive relief is not appropriate.").

[105]Ware at 225-26 (2/12/09); Bernard H. Chao, *After eBay Inc. v. MercExchange: The Changing Landscape for Patent Remedies*, 9 MINN. J.L. SCI. & TECH. 543, 568-69 (2008).

leverage in post-verdict licensing negotiations.[106] But such an approach would only recreate the hold-up problem that denial of the injunction was meant to avoid.[107] Concerns about preserving the deterrent value of injunctions and the patentees' incentives to innovate are best addressed by carefully defining and limiting the circumstances under which injunctions are denied.

> ***Recommendation.*** The Commission recommends that to fully compensate patentees but avoid creating hold-up, courts base awards of ongoing royalties following denial of an injunction on the willing licensor/willing licensee model, assuming the patent is valid and infringed.

B. Delaying the Injunction

Courts do not always award ongoing royalties for the life of the patent. In several instances, courts have granted the permanent injunction but delayed its start in order to give the infringer time to design around the patent, or the parties time to reach a licensing agreement. An ongoing royalty will generally run until the injunction takes effect. For instance, the Federal Circuit recently affirmed a district court's grant of an injunction but extended the delay for its start from sixty days to five months.[108] The Federal Circuit has also indicated that a delayed injunction can be an appropriate method to mitigate harm to the defendant and the public.[109]

Where a design-around option is feasible and the infringer is afforded sufficient time to implement it, a delayed injunction can be a useful tool to prevent hold-up while avoiding the concerns associated with denying injunctions for the life of the patent. In addition to giving the infringer an opportunity to design around the patent, which promotes innovation, a delayed-start injunction allows the parties to bargain in light of the design-around alternative and reach a royalty that reflects competition. This can enable inadvertent infringers to minimize some of the potentially most serious costs associated with ex post patent assertions described in Chapter 2.

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[106]Golden at 110-11 (2/12/09) ("if you crank up the damages high enough or multiply it high enough, it effectively works in many ways like an injunction").

[107]*See* Lemley at 270 (5/5/09).

[108]i4i Ltd. Partnership v. Microsoft Corp., 598 F.3d 831, 863-64, 1276-78 (Fed. Cir.), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010) (No. 10-290).

[109]Verizon Servs. Corp. v. Vonage Holdings Corp., 503 F.3d 1295, 1311 n.12 (Fed. Cir. 2007) ("One factor that is relevant to the balance of the hardships required by the Supreme Court's decision in *eBay* was not considered by the district court, namely whether the district court should have allowed time for Vonage to implement a workaround that would avoid continued infringement . . . .").

VII. REMEDIES IN THE INTERNATIONAL TRADE COMMISSION

Although all federal district courts must follow the injunction analysis provided by the Supreme Court in *eBay*, the International Trade Commission ("ITC"), another venue in which patentees may litigate, does not. That discrepancy has generated some concern that the ITC may attract suits by patentees that are less likely to obtain injunctions in district court, potentially leading to hold-up and the resulting consumer harm described above.

Patent holders that believe that imported products infringe their patents may file a complaint with the ITC under Section 337 of the Tariff Act of 1930. That statute prohibits methods of unfair competition from imported goods, including patent infringement.[110] Jurisdiction is *in rem* over the imported goods, which allows patentees to bring cases against foreign defendants who might otherwise be outside the jurisdiction of U.S. district courts.[111] After finding patent infringement, the ITC may issue a cease and desist order and an exclusion order. A cease and desist order prohibits a defendant from selling infringing imported articles out of U.S. inventory.[112] An exclusion order, which can be either general or limited, directs the U.S. Customs service to bar articles from entry into the United States.[113] The ITC cannot award monetary damages for past infringement.

Use of the ITC as a venue for patent challenges has tripled in the last ten years.[114] Sixty-five percent of those cases proceed simultaneously in federal district court. Expanded use of the ITC and the parallel proceedings in the district courts have led some commentators to raise concerns about inconsistent results in individual cases and incoherent development of patent policy.[115] One area of particular interest is the different remedial standards applied in the ITC

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[110] 19 U.S.C. § 1337(a)(1)(A)-(B).

[111] Donald K. Duvall *et al.*, UNFAIR COMPETITION AND THE ITC: ACTIONS BEFORE THE INTERNATIONAL TRADE COMMISSION UNDER SECTION 337 OF THE TARIFF ACT OF 1930 § 2:20 (Philip J. McCabe & John W. Bateman eds., 2007).

[112] 19 U.S.C. § 1337(f).

[113] Limited exclusion orders block importation of infringing articles by "persons determined by the Commission to be violating" Section 337. General exclusion orders ban the importation of any infringing goods, but they are available only in narrow circumstances. 19 U.S.C. § 1337(d)(1), (2); Kyocera Wireless Corp. v. Int'l Trade Comm'n, 545 F.3d 1340, 1356-58 (Fed. Cir. 2008).

[114] Colleen V. Chien, *Patently Protectionist? An Empirical Analysis of Patent Cases at the International Trade Commission*, 50 WM. & MARY L. REV. 63, 68 (2008).

[115] Sapna Kumar, *The Other Patent Agency: Congressional Regulation of the ITC,* 61 FLA. L. REV. 529 (2009) (describing inconsistencies between federal court decisions and ITC decisions); 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 (2008) (assessing benefits of ITC's 337 process and

(exclusion orders) and district courts (injunctions). The ITC has held that it may not apply *eBay's* equitable test when deciding whether to issue an exclusion order because Section 337 "represents a legislative modification of the traditional test in equity . . . [and] it is unnecessary to show irreparable harm to the patentee in the case of infringement by importation."[116] The Federal Circuit affirmed the ITC's conclusion that its remedies are governed by statute, and in particular the dictate that it "shall" enter exclusion orders,[117] and not by equitable principles.[118] Thus, unlike the situation in district court, a finding of infringement in the ITC leads to a nearly automatic exclusion order.[119]

It is not clear how much of the rise in ITC litigation is caused by patentees seeking to avoid the *eBay* analysis, however. ITC litigation had been increasing prior to that 2006 decision.[120] Moreover, patentees often choose to file in the ITC because of the agency's accelerated litigation timetable compared to that of many district courts and the availability of administrative law judges with patent expertise.[121] Nevertheless, panelists worried that patentees might bring suit in the ITC more frequently in the future[122] in the hope of obtaining exclusion orders in circumstances where injunctions might not have been granted in federal district court.[123]

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bias at the ITC in favor of complainants); Sprigman at 44-45 (2/12/09) (system gives plaintiffs "two bites at the apple"). *But see* Rhodes at 227 (2/12/09) (explaining that parallel district court cases were filed to avoid declaratory judgment actions and were often stayed so that few cases are fully adjudicated in both venues); Chien, *supra* note 114, at 92-95 (reporting that 65% of ITC patent cases had parallel district court cases, but finding very few inconsistent decisions).

[116]Certain Baseband Processor Chips and Chipsets, No. 337-TA-543, slip op. at 62-3 n.230 (Int'l Trade Comm'n, June 19, 2007).

[117]19 U.S.C. 1337(d) (stating that if the ITC finds a violation of the statute, "it shall direct that the articles concerned . . . be excluded from entry into the United States" subject to certain public interest analyses).

[118]Spansion, Inc. v. Int'l Trade Comm'n, Nos. 2009-1460, 2009-1461, 2009-1462, 2009-1465, 2010 WL 5156992, at *20-22 (Fed. Cir. Dec. 21, 2010) ("Given the different statutory underpinnings for relief before the Commission in Section 337 actions and before the district courts in suits for patent infringement, this court holds that *eBay* does not apply to Commission remedy determinations under Section 337. ").

[119]A survey of ITC patent investigations filed between 1995 and 2007 found that the ITC awarded an exclusion order in 100% of the cases in which it found a violation. Chien, *supra* note 114, at 99.

[120]McDaniel at 119 (5/26/10).

[121]*Id*. at 115, 118-19 (5/26/10).

[122]Doyle at 254 (5/5/09); Chaikovsky at 254 (5/5/09); Luftman at 227 (2/12/09); Barr at 123 (5/26/10).

[123]Administrative law judges of the ITC have issued few opinions that appear to involve patent holding companies since the 2006 *eBay* decision, although more complaints may have been filed. *See* Certain

The 2009 Saxon case, in which a patent assertion entity asserted three patents that it had purchased against several mobile phone manufacturers, raised the specter of "patent troll" suits in the ITC.[124] Patentees have also asserted patents that are subject to RAND commitments against standardized products in the ITC.[125]

An injunction or exclusion order granted to a patent assertion entity based on infringement of a patent covering a minor component of a complex product poses the risk of generating hold-up that can harm consumers. An injunction or exclusion order against standardized technology also poses a significant risk of hold-up and consumer harm. Although *eBay* provides an important tool for avoiding these outcomes, automatic exclusion orders awarded by the ITC could undermine *eBay's* value in this regard.[126]

Section 337 provides two mechanisms through which the ITC can limit the incidence of hold-up generated by an exclusion order and the resulting harm to consumers. The first relates to matters brought by patent assertion entities. To file suit in the ITC, a patent owner must establish that "an industry in the United States, relating to the articles protected by the patent . . . exists or is in the process of being established." That domestic industry requirement can be satisfied by showing "substantial investment in [the patent's] exploitation, including engineering, research and development or licensing."[127] When Congress added this provision to Section 337 in 1988, it explained, "[t]he definition could . . . encompass universities and other intellectual property owners who engage in extensive licensing of their rights to manufacturers . . . . The owner of the property right must be actively engaged in steps leading to the exploitation of the intellectual property, including application engineering, design work, or other such activities."[128]

Electronic Devices, including Handheld Wireless Communications Devices, Nos. 337-TA-673 & 337-TA-667, slip op. at 3 (Int'l Trade Comm'n, October 15, 2009) ("Saxon Case").

[124]Joe Mullin, *Will the ITC Become the New Troll Hangout?*, THE AM LAW DAILY (January 13, 2009) *available at* http://amlawdaily.typepad.com/amlawdaily/2009/01/a-new-troll-hangout.html. Saxon is an intellectual property licensing company with a portfolio of 180 patents focused on consumer electronics. http://www.saxoninnovations.com/About.html. The litigants settled the case. In the Matter of Certain Electronic Devices, including Handheld Wireless Communications Devices, Nos. 337-TA-673 & 337-TA-667, slip op. (Int'l Trade Comm'n, Feb. 12, 2010).

[125]*E.g.* Certain Gaming and Entertainment Consoles, Related Software, and Components Thereof, USITC Inv. No. 337-TA-752 (Answer of Respondent Microsoft Corp., filed Jan. 26, 2011, at 31-32).

[126]Commentators have highlighted the need to harmonize the remedial standards in the two venues. *See* Chien, *supra* note 114, at 109; Hahn & Singer, *supra* note 115, at 486-90; Kumar, *supra* note 115, at 574-78.

[127]19 U.S.C. § 1337(a)(3). *See also* Duvall et al., *supra* note 111, § 3:16 at 79; § 13.17 at 80.

[128]S. REP. No. 71, 100th Cong., 1st Sess., at 129-30 (1987).

The FTC suggests that the ITC consider interpreting the domestic industry requirement as not satisfied by ex post licensing activity solely focused on extracting rents from manufacturers based on products already on the market. As discussed in Chapters 1 and 2, the differences between the economic consequences of ex ante licensing, which strives for technology transfer and the creation of new products, and ex post licensing, which seeks payment from manufacturers already using the technology, are significant. Section 337 requires an "industry" based on "substantial investment" in "exploitation" of the patent through "licensing." This language can be interpreted as encompassing ex ante but not ex post licensing because only the former seeks to "exploit" the patent by putting it into productive use to create an industry.[129] This interpretation of the statute is consistent with the legislative history's concern with promoting innovation in the United States. Importantly, it will limit access to the ITC of those patent owners most likely to be denied an injunction under the *eBay* analysis propounded above, while allowing access to firms engaged in invention and technology transfer.

Second, Section 337 allows the ITC to consider "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" in deciding whether to grant an exclusion order.[130] The ITC has rarely used this provision to deny an exclusion order,[131]

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[129]In *Certain Coaxial Cable Connectors and Components Thereof and Products Containing the Same*, the ITC held that ex post and ex ante licensing activity "exploited" the patent and could support a domestic industry. The opinion explains that "licensing activities that 'put [the patent] to productive use,' i.e., bring a patented technology to market, as well as licensing activities that 'take advantage of' the patent, i.e., solely derive revenue," both qualified as "exploitation" of the patent that could satisfy the domestic industry requirement. Certain Coaxial Cable Connectors and Components Thereof and Products Containing the Same, No. 337-TA-650, slip op. at 49-50 (Int'l Trade Comm'n, Apr. 14, 2010) The ITC arrived at this position by relying on the "plain language" of the domestic industry requirement and applying both of two dictionary definitions for "exploit" to the statute: (1) "to put a product to use" and (2) "to take advantage of." *Id*. at 49 (*quoting* Webster's Ninth at 438). However, the availability of multiple dictionary definitions for the statutory term "exploit" could equally well support the reasonableness under *Chevron* of an interpretation based only on the first definition. *See* Smiley v. Citibank (South Dakota), 517 U.S. 735, 740-47 (1996) (describing different definitions of "interest" and "rate" and finding agency's interpretation reasonable under *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc*., 467 U.S. 837 (1984)).

[130]19 U.S.C. § 1337(d)(1).

[131]The ITC has used this provision to deny an injunction only three times. Kumar, *supra* note 115, at 567-68. Those cases involved issues of public health or broad public interest. *See* Fluidized Supporting Apparatus, USITC Pub. 1967, Inv. No. 337-TA-182 (Oct. 1984) (patents covered beds for burn victims and patentee was unable to meet demand); Inclined-Field Acceleration Tubes, USITC Pub. 1119, Inv. No. 337-TA-067 (Dec. 1980) (patents covered devices used in nuclear physics research, including weapons development and other applications funded by the federal government, for which there were no cost effective replacements); Automatic Crankpin Grinders, USITC Pub. 1022, Inv. No. 337-TA-060 (Dec. 1979) (patent covered automobile part that was in short supply and that improved fuel efficiency

but its language should allow consideration of how an exclusion order can cause hold-up, raise prices and decrease innovation as the basis for denial. These economic concepts consider "competitive conditions" by comparing the ex ante value of the patented technology in a competitive technology market to the ex post value due to high switching costs, and the impact of those "competitive conditions" on "United States consumers." Assertion of a patent against a standard, especially a patent subject to a RAND commitment, creates a particularly important scenario for considering the public interest in deciding whether to grant an exclusion order.[132] By incorporating these economic concepts into its remedy analysis, the ITC would move that analysis closer to that required in district courts by *eBay*.[133]

> ***Recommendation*** The FTC recommends that the ITC consider whether only those licensing activities that promote technology transfer "exploit" patented technology within the meaning of Section 337, and therefore satisfy the domestic industry requirement. The FTC also recommends that the ITC incorporate concerns about patent hold-up, especially of standards, into the decision of whether to grant an exclusion order in accordance with the public interest elements of Section 337.

The instances in which the ITC would deny an exclusion order based on these considerations would be rare, especially if it interpreted the domestic industry requirement as described here. However, that denial would leave the patent holder without an infringement remedy in the ITC because that agency lacks the power to award damages for past infringement or an ongoing royalty for future infringement. Of course, patentees can always seek relief in district court, but this would require relitigation of the liability issues because ITC decisions are not accorded *res judicata* effect in district court.[134] Potential solutions deserve further study.[135]

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during energy crisis).

[132]Section V.D, *infra*.

[133]The decisions of the ITC are subject to Presidential review and veto for "policy reasons." 19 U.S.C. § 1337(j)(2). This presents another mechanism for considering when hold-up and consumer harm warrant denial of an injunction in the ITC.

[134]Tandon Corp. v. Int'l Trade Comm'n, 831 F.2d 1017 (Fed. Cir. 1987); Texas Instr. v. Cypress, 90 F.3d 1558 (Fed. Cir. 1996).

[135]Commentators have also proposed broader statutory changes to further harmonize patent litigation in the ITC and district courts. Chien, *supra* note 114, at 106-11; Hahn & Singer, *supra* note 115, at 486-90 (2008).

VIII. CONCLUSION

The *eBay* injunction analysis is grounded in equity. As such, it allows for a balancing of harms to the patentee, the infringer and the public. That balancing must be undertaken with a full appreciation of how an injunction and threat of an injunction can both further and hinder the patent system's goals. On the one hand, injunctions incentivize innovation, deter infringement and encourage licensing. On the other hand, they can raise the cost and uncertainty of innovation through hold-up. For that reason, the FTC recommends that courts incorporate concerns about hold-up into the *eBay* analysis.

Moreover, an appreciation of the consumer harm from hold-up should extend to a court's design of a remedy following denial of an injunction. The FTC recommends that those remedies be based on the market value of the patented technology compared to alternatives, assuming the patent is valid and infringed. In addition, the FTC recommends that the ITC consider mechanisms that lessen the risk that an ITC exclusion order could generate hold-up, including revisiting the scope of the domestic industry requirement and incorporating competition and innovation concerns into the public interest considerations when granting an exclusion order.

APPENDIX A
STATISTICS DESCRIBING PATENT DAMAGE AWARDS

Several authors have reported statistics describing damages awards by district courts. PricewaterhouseCoopers prepares studies of damage awards annually, the most recent of which covers awards between 1995 and 2009. In a 2007 study, Professors Lemley and Shapiro collected data on reasonable royalty rates from reported cases decided between 1982 to 2005.[1] Professor Janicke and the University of Houston Law Center's Institute for Intellectual Property and Information Law provide a web-based service, Patstats (www.patstats.org), which has collected and reported jury-awarded damages in patent cases since 2005 (and other data since 2000). Some of the results from these research projects are summarized in this appendix.

I. PricewaterhouseCoopers Study

In its 2010 Patent Litigation Study, PricewaterhouseCoopers collected 1,587 district court opinions issued since 1995.[2] These decisions included final decisions both at summary judgment and after trial on the merits.[3] The authors collected these decisions from opinions available in two Westlaw databases and corresponding PACER records.[4] PricewaterhouseCoopers calculates annual median damage awards for cases reported between 1995 and 2009 (expressed in 2009 dollars). (See Chart 1.) The annual median awards range from $2.4 million to $10.5 million, with an overall median award of $5.2 million during this period.[5] PricewaterhouseCoopers also provides statistics on win rates, types of award (e.g., reasonable royalty damages), types of plaintiff (e.g., NPE), and types of factfinder (judge or jury).

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[1]Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 1991, 2029-35 (2007).

[2]PricewaterhouseCoopers, 2010 Patent Litigation Study, The Continued Evolution of Patent Damages Law: Patent Litigation Trends and the Impact of Recent Court Decisions on Damages, at 26 (Sept. 2010), *available at* http://www.pwc.com/us/en/forensic-services/publications/2010-patent-litigation-study.jhtml.

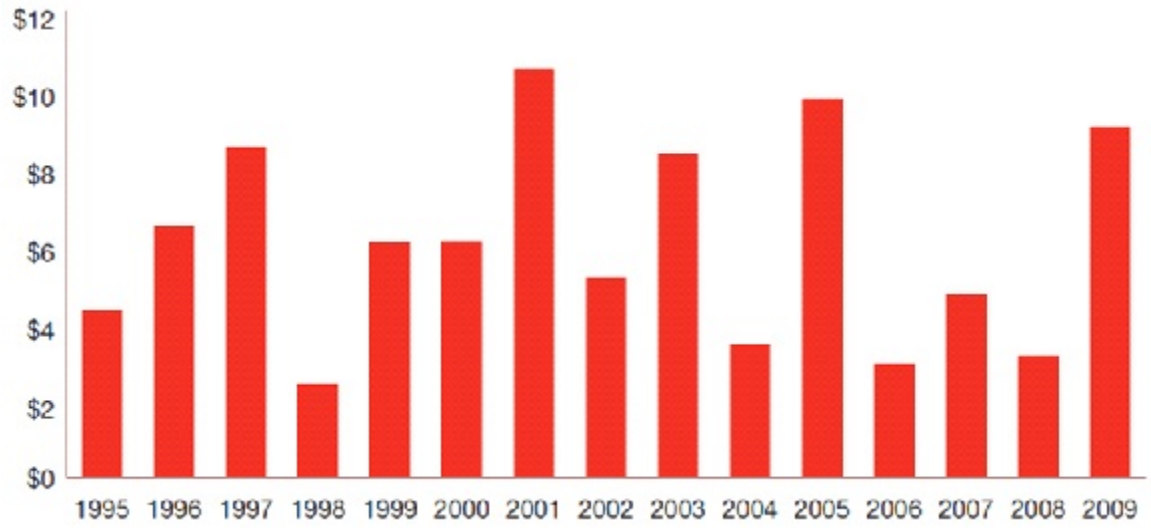
[3]*Id.*

[4]*Id.*

[5]*Id.* at 7.

Chart 1[6]

Patent holder median damages awarded (in millions): 1995-2009



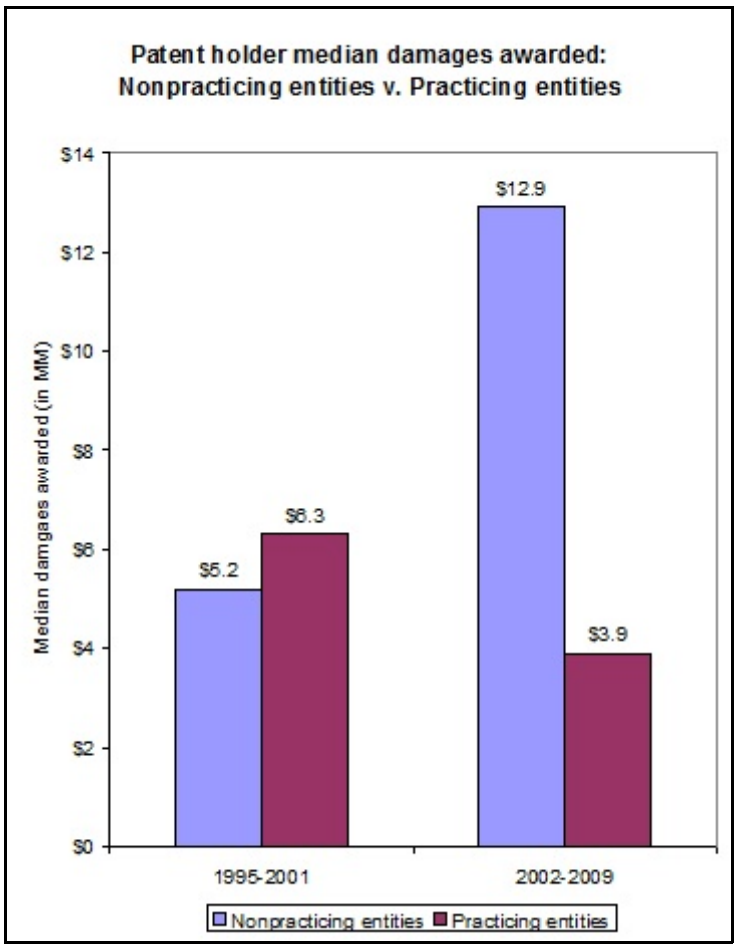
One striking trend reported in the PricewaterhouseCoopers study is the disparity that has arisen between damage awards for non-practicing entities versus practicing entities in recent years. During the 2001-2009 period, the median award to non-practicing entities was $12.9 million, while the median award to practicing entities was $3.9 million.[7] In contrast, during the period 1995-2001, the median damage award for practicing entities exceeded that for non-practicing entities ($6.3 million versus $5.2 million).[8] (See Chart 2.)

[6] *Id.* Chart 2a. Reproduced with permission from the authors.

[7] *Id.*

[8] *Id.*

Chart 2[9]



The PricewaterhouseCoopers study also identifies a shift toward jury trials versus bench trials, with the former accounting for only 14 percent of cases during the 1980s but just over 50 percent since 2000.[10] The authors suggest several factors that may contribute to this trend. They find that patentees have a higher success rate and receive on average higher damage awards in jury trials as compared to bench trials, creating a perception that juries provide more favorable results for patentees.[11] Additionally, the study reports an increase in litigation by non-practicing entities, who are more likely than practicing plaintiffs to seek a jury trial.[12]

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[9] *Id*. Chart 2b. Reproduced with permission from the authors.

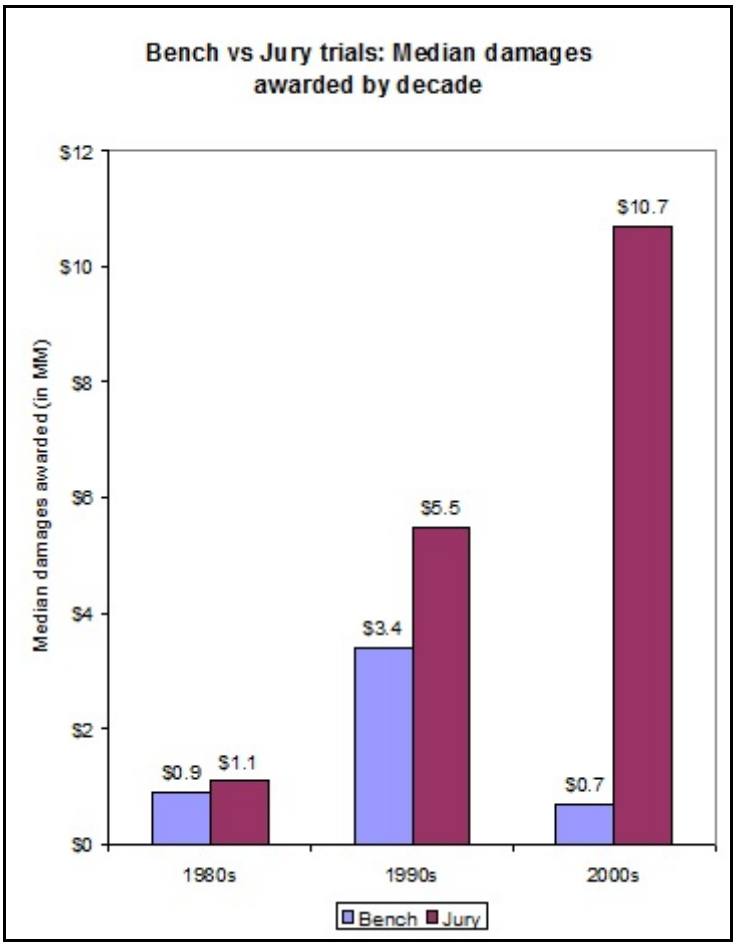
[10] *Id*. at 9 & Chart 3a.

[11] *Id*. at 10.

[12] *Id*.

The PricewaterhouseCoopers study further finds that jury awards substanitially exceed awards by judges, as the following two charts reflect.[13] The first reveals that median damage awards by juries have steadily increased over time and damages awards by judges in bench trials have decreased significantly since 2000, leading to an increasing disparity between them.[14] (See Chart 3.) The second indicates that NPE plaintiffs have obtained substantially higher awards from juries (but not from judges) than have other types of plaintiffs.[15] (See Chart 4.)

Chart 3[16]



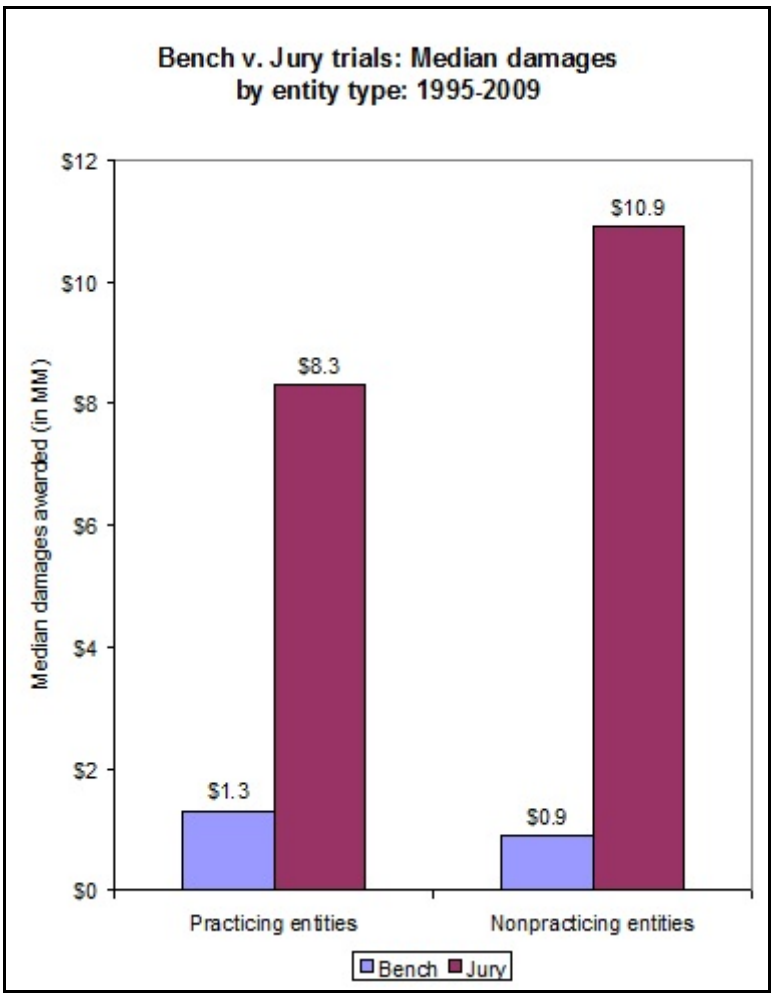
[13] *Id*. at 11.

[14] *Id*.

[15] *Id*.

[16] *Id*. Chart 3e. Reproduced with permission from the authors.

Chart 4[17]



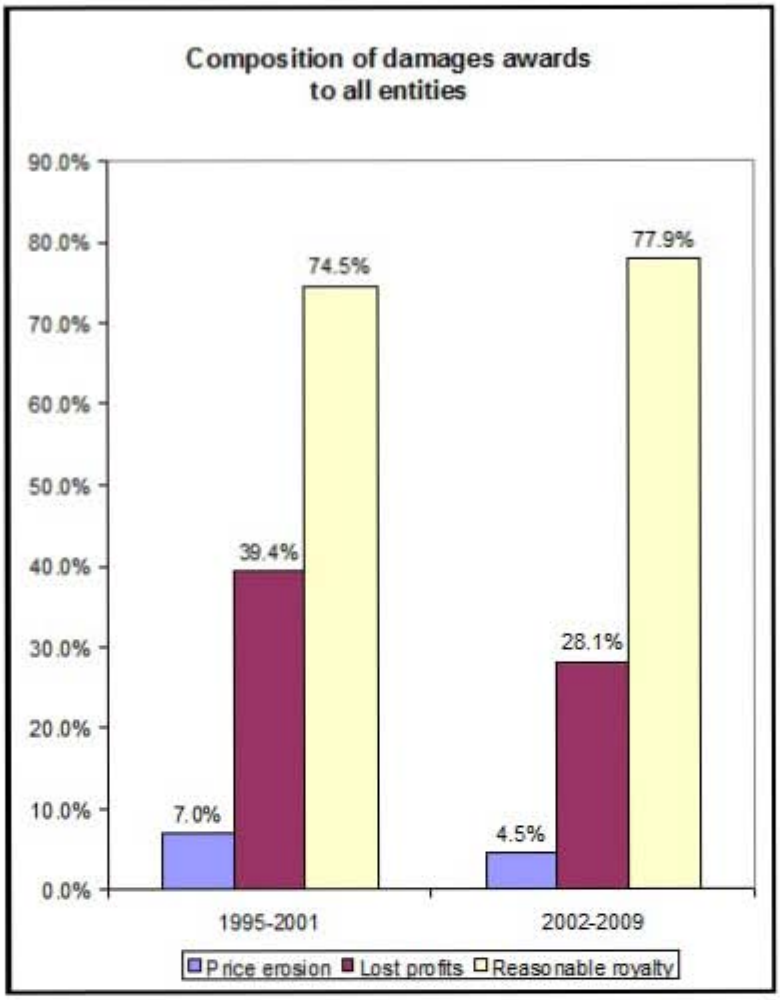
The authors of the PricewaterhouseCooper's study also conclude that reasonable royalty damages continue to be "the most frequent basis of damages awards,"[18] reporting the composition of damages awards for 1995-2001 and 2002-2009. (See Chart 5.) They observe that the expanded importance of reasonable royalties relative to lost profits is in part attributable to the increase in actions by non-practicing entities, which generally cannot recover lost profits.[19]

[17] *Id*. Chart 3f. Reproduced with permission from the authors.

[18] *Id*. at 12.

[19] *Id*. at 13.

Chart 5[20]



[20] *Id*. at 12 Chart 4. Reproduced with permission from the authors.

II. Lemley and Shapiro Study

Professors Lemley and Shapiro conducted an empirical study of the royalty rates adopted in reasonable royalty damage determinations by surveying reported cases from 1982 to 2005.[21] They found only 47 written opinions containing sufficient information for them to identify a royalty rate, and point out that judicial damages awards may be overrepresented in the sample relative to jury damages awards.[22] Lemley and Shapiro calculate a mean royalty rate for all sampled awards of 13.1% of the price of the infringing product.[23] In contrast, they state that "very few patent licenses negotiated without litigation (or even in settlement of it) result in royalty rates anywhere near that high."[24] Lemley and Shapiro report a mean royalty rate of about 10.0% for claims of infringement of component inventions and a mean rate of 14.7% for claims involving claims of infringement of integrated-product inventions.[25] The authors observe that these royalty figures exceed the economy-wide average profit margin over the sample period.[26]

III. Data Available on PatStats.org

The University of Houston Law Center's Institute for Intellectual Property and Information Law ("IPLI") has collected data on patent decisions since 2000, and made the data available on its web site Patstats.[27] Since 2005, the Institute has identified jury damage awards in those cases in a spreadsheet available for download from the website.[28] These data are limited to the actual amount the jury awarded in its verdict, and do not include interest or fees and are not

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[21]Lemley & Shapiro, *supra* note 1, at 2029-35.

[22]*Id*. at 2031. The authors focused on royalty awards disclosed in written judicial opinions – they did not include settlements, awards that they could not clearly identify as reasonable royalty awards, and excluded "pure" jury verdicts. This resulted in a bias toward court opinions; jury awards represented only eight of the opinions in their sample. *Id.* at 2030-31.

[23]*Id*. at 2030-32.

[24]*Id*. at 2032-33. Moreover, since the sample is biased toward court awards, which are generally much lower than jury awards, this estimate may be low.

[25]*Id*. at 2034.

[26]*Id*. at 2035.

[27]These data are available on the www.patstats.org website.

[28]Patstats.org, U.S. Patent Litigation Statistics, http://www.patstats.org/Patstats3.html. The excel spreadsheet is available by clicking on the Jury Patent Damages Verdicts link at http://www.patstats.org/Patstats2.html.

adjusted for decisions on post trial motions, appeals or settlements.[29] The Patstats website listed 166 jury awards between January 1, 2005 and January 11, 2010, with a median award of $6.5 million.[30] A list of the 166 awards is available on the FTC web site.[31]

[29]A paper based on this data identified those cases in which either a district court or an appellate court modified the jury verdict for cases decided between 2005 and 2007. *See* Innovation Alliance, *Moving Beyond the Rhetoric: Jury Damage Verdicts in Patent Infringement Cases 2005-2007* (2008), *available at* http://www.innovationalliance.net/files/JURY%20DAMAGE%20VERDICTS%20IN%20PATENT%20INFRINGEMENT%20CASES%5B1%5D.pdf.

[30]Patstats.org, U.S. Patent Litigation Statistics, http://www.patstats.org/Patstats3.html.

[31]*See* Paul Janicke, *Patent Damages, Patent Verdicts from 1-1-05 to 1-6-09*, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 11, 2009), *available at* http://ftc.gov/bc/workshops/ipmarketplace/feb11/docs/janicke-medianverdits.pdf. (Reproduced with permission from Professor Janicke.)

APPENDIX B
OVERVIEW OF POST-*eBAY* PERMANENT INJUNCTION CASE LAW

I. The *eBay* Case

Not long after its creation, the Federal Circuit recognized that the Patent Act "empowers district courts to grant injunctions in accordance with the principles of equity" and that "the district court's grant or denial of an injunction is within its discretion depending on the facts of each case."[1] In 1989, however, the Federal Circuit established a "general rule" in favor of granting injunctions based on a presumption of irreparable harm:

> Infringement having been established, it is contrary to the laws of property, of which the patent law partakes, to deny the patentee's right to exclude others from use of his property. The right to exclude recognized in a patent is but the essence of the concept of property. It is the general rule that an injunction will issue when infringement has been adjudged, absent a sound reason for denying it. . . . In matters involving patent rights, irreparable harm has been presumed when a clear showing has been made of patent validity and infringement.[2]

Overcoming this general rule required a significant showing of public harm in order to outweigh the irreparable harm presumed to be caused by infringement.[3] The Supreme Court's *eBay* decision corrected that analysis, however.

In the original action, MercExchange sued eBay and Half.com for infringing two patents relating to on-line sales.[4] The jury returned a verdict of willful infringement and awarded damages of $35 million. The district court denied the patentee's motion for a permanent injunction even though it recognized that injunctive relief was "considered the norm."[5] In reaching that decision, the court pointed to evidence that the patentee, a licensing company, did

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[1]Windsurfing Int'l, Inc. v. AMF, Inc., 782 F.2d 995, 1002 (Fed. Cir. 1986) (*citing* Roche Products, Inc. v. Bolar Pharmaceutical Co., 733 F.2d 858, 865-66, (Fed. Cir. 1984)).

[2]Richardson v. Suzuki Motor Corp., 868 F.2d 1226, 1246-47 (Fed. Cir. 1989) (citations omitted).

[3]Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1547 (Fed. Cir. 1995) (en banc) ("Accordingly, courts have in rare instances exercised their discretion to deny injunctive relief in order to protect the public interest.").

[4]MercExchange, LLC v. eBay, Inc., 275 F. Supp. 2d 695 (E.D. Va. 2003) ("eBay I"), *aff'd in part, rev'd in part*, 401 F.3d 1323 (Fed. Cir. 2005), *vacated and remanded*, 547 U.S. 388 (2006).

[5]*Id*. at 711.

not practice its inventions, had licensed its patents in the past, and had made statements to the media that it was willing to license eBay. The court also explained that the "public does not benefit from a patentee who obtains a patent yet declines to allow the public to benefit from the inventions contained therein."[6]

On appeal, the Federal Circuit reversed the denial of permanent injunction on the grounds that the district court had not provided a persuasive showing that the case is "sufficiently exceptional."[7] The court reiterated the general rule that a permanent injunction will issue unless a "patentee's failure to practice the patented invention frustrates an important public need for the invention such as the need to use an invention to protect public health."[8] It rejected the district court's concern that MercExchange did not practice the patents: "Injunctions are not reserved for patentees that intend to practice their patent, as opposed to those who choose to license. The statutory right to exclude is equally available to both groups, and the right to an adequate remedy to enforce that right should be equally available to both as well."[9] Finally, the appellate court stated, "[i]f the injunction gives the patentee additional leverage in licensing, that is the natural consequence of the right to exclude and not an inappropriate reward to a party that does not intend to compete in the marketplace. . . ."[10]

In 2006, a unanimous Supreme Court rejected both the Federal Circuit's general rule supporting the grant of an injunction and the district court's "expansive principles" suggesting that a patentee who did not practice its invention and was willing to license could not obtain an injunction.[11] Instead, relying on the express language of the Patent Act, which provides that district courts "may" issue injunctions "in accordance with the principles of equity," the Court looked to "traditional equitable principles." The Court listed four equitable factors that a patentee, no different from any other plaintiff, must satisfy to obtain an injunction:

> 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

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[6] *Id* at 714.

[7] MercExchange, LLC v. eBay, Inc., 401 F.3d. 1323, 1338 (Fed. Cir. 2005) ("eBay II"), *vacated and remanded*, 547 U.S. 388 (2006).

[8] *Id*. at 1338 (citations omitted).

[9] *Id*. at 1339.

[10] *Id*.

[11] *eBay*, 547 U.S. at 393.

> defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.[12]

Chief Justice Roberts' concurring opinion, joined by Justices Scalia and Ginsburg, cautioned that a major departure from the long tradition of equity practice should not be lightly implied. Courts have granted injunctive relief in the vast majority of patent cases, they explained, due to the difficulty of protecting a patentee's right to exclude others from using the invention through monetary damages.[13]

Justice Kennedy's concurring opinion, joined by Justices Stevens, Souter and Breyer, however, did suggest situations in which district courts may find injunctive relief inappropriate. Citing the FTC's 2003 IP Report,[14] Justice Kennedy noted the development of a business model in which non-practicing entities obtain patents primarily to garner license fees, not to practice the inventions. "For these firms, an 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."[15] In addition, Justice Kennedy suggested that situations in which the patented invention is "but a small component of the product the companies seek to produce" may also be inappropriate for injunctive relief because "the threat of an injunction is employed simply for undue leverage in negotiations."[16] On remand, the district court again declined the patentee's request for an injunction.[17]

II. Statistics on Post-*eBay* Cases

After enumerating the four equitable factors in the *eBay* decision, the opinion of the full Court gave little guidance on their application. That, and the divergent emphasis of the two concurring opinions, created significant uncertainty concerning the circumstances under which courts would deny permanent injunctions in patent cases immediately following issuance of the

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[12] *Id*. at 391.

[13] *Id*. at 395 (Roberts, C. J., concurring) (explaining that the "long tradition of equity practice is not surprising, given the difficulty in protecting a right to *exclude* through monetary remedies that allow an infringer to *use* an invention against the patentee's wishes - a difficulty that often implicates the first two factors of the traditional four factor test.").

[14] FEDERAL TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 3, at 38-39 (Oct. 2003) ("2003 FTC IP Report"), *available at* http://ftc.gov/os/2003/10/innovationrpt.pdf.

[15] *eBay*, 547 U.S. at 396 (Kennedy, J. concurring).

[16] *Id*.

[17] MercExchange, LLC v. eBay, Inc., 500 F. Supp. 2d 556 (E.D. Va. 2007).

eBay decision in May 2006. Since that time, the district courts have decided numerous requests for permanent injunction and the Federal Circuit also has addressed the four factors several times in permanent injunction cases. Some trends have begun to emerge from this body of case law.

In the first year following the May 2006 decision, one article reported that district courts had granted permanent injunctions in 20 of 26 cases, or approximately 77% of the time.[18] The article identified lack of competition between the patent holder and infringer as a significant indicator that a court would likely deny a motion for a permanent injunction in the remaining 23% of cases.[19] A more recent survey of post-eBay cases examined 67 cases published in Lexis or available from Lexis' Courtlink function as of May 1, 2009.[20] The authors found that district courts had awarded permanent injunctions in 48 (or approximately 72%) of the cases.[21]

An article examining 27 cases decided in the year following *eBay* found that in the four cases involving non-practicing patentees, courts awarded no injunctions.[22] This result led many to worry that patentees that did not practice their inventions would no longer be able to obtain permanents injunctions. Although non-practicing patentees have been less likely than practicing patentees to receive injunctions, the concern that injunctions are categorically unavailable is unwarranted. A longer term review of the post-*eBay* case law reveals that as of March 1, 2010, courts had heard thirteen requests for permanent injunctions where the opinion suggests that the patent owner is one of several types of non-practicing entities, including a university, research institute and independent inventor. Of those thirteen cases, district courts granted an injunction seven times.[23]

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[18]Robert A. Cote, *The State of Injunctions in a Post*-eBay *World*, Loyola IP Focus Series - Los Angeles, CA, at 4 (June 15, 2007), *available at* http://www.lls.edu/ip/past-events/documents/Cote-Revised2.pdf.

[19]*Id*. at 7-8.

[20]Ernest Grumbles III et al., *The Three Year Anniversary of* eBay v. MercExchange*: A Statistical Analysis of Permanent Injunctions*, IP TODAY (Nov. 2009).

[21]*Id*.

[22]Eric Keller, *Time Varying Compulsory License: Facilitating License Negotiation for Efficient Post-Verdict Patent Infringement,* 16 TEX. INTELL. PROP. L.J. 427, 434 (Spring 2008).

[23]Broadcom Corp. v. Qualcomm, Inc., 543 F.3d 683 (Fed. Cir. 2008) (district court's injunction grant affirmed.); i4i Ltd. Partnership v. Microsoft Corp., 670 F. Supp. 2d 568 (E.D. Tex. 2009), *aff'd*, 598 F.3d 831 (Fed. Cir. 2010) (affirming the grant of an injunction while modifying its effective date), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010) (No. 10-29); Creative Internet Advertising Corp. v. Yahoo! Inc., No. 6:07cv354, 2009 WL 4730622 (E.D. Tex. Dec. 9, 2009) (injunction denied); Kowalski v. Mommy Gina Tuna Resources, Nos. 05-00679, 05-00787, 06-00182, 2009 WL 856006 (D. Haw. March 30, 2009) (injunction granted), *clarified by*, 2009 WL 1360695 (D. Haw. May 7, 2009); Joyal Products, Inc. v. Johnson Electric North America, Inc., No. 04-5172, 2009 WL 512156 (D. N.J. Feb. 27, 2009) (injunction granted), *aff'd per curiam*, 335 Fed. Appx. 48 (Fed. Cir. 2009); Hynix Semiconductor,

To gain a better understanding of how different fact patterns influence district courts' decisions to grant or deny an injunction following the Supreme Court's 2006 decision in *eBay v. MercExchange*,[24] panelist Steve Malin conducted a survey of post-eBay cases decided through December 31, 2008. He presented the results at the FTC hearing on the Evolving IP Marketplace on February 12, 2009.[25]

To generate the results presented at the FTC hearing, Mr. Mallin updated a survey he had originally produced for a subcommittee of the American Intellectual Property Law Association (AIPLA).[26] The survey presented at the FTC hearing included 49 cases decided between May 15, 2006 and December 31, 2008. The sample did not include all post-*eBay* permanent injunction cases decided during the time frame, however. If an opinion did not offer sufficient information to determine the factors the courts used in deciding whether to grant an injunction, or if an opinion focused on technical procedural issues, it was removed from the sample.[27]

The survey result statistics were generated by evaluating whether courts used any of 28 pre-identified factors in determining whether to grant a permanent injunction (see the blank survey sheet below). At least two attorneys reviewed each opinion and determined whether it discussed any of these factors. The statistics measure the courts' assessment of the factors, and

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Inc. v. Rambus Inc., 609 F. Supp. 2d 951 (N.D. Cal. 2009) (injunction denied); Telcordia Tech., Inc. v. Cisco Systems, Inc., 592 F. Supp. 2d 727, (D. Del. 2009) (injunction denied), *aff'd in part and vacated in part*, 612 F.3d 1365 (Fed. Cir. 2010); Voda v. Cordis Corp., No. CIV-03-1512, 2006 WL 2570614 (W.D. Okla. Sept. 5, 2006), *aff'd*, 536 F.3d 1311 (Fed. Cir. 2008) (injunction denied); Emory Univ. v. Nova Biogenics, Inc., No. 1:06-CV-0141, 2008 WL 2945476 (N.D. Ga. July 25, 2008) (injunction granted); Commonwealth Scientific and Indus. Research Org. v. Buffalo Tech., Inc. ("CSIRO"), 492 F. Supp. 2d 600, 601 (E.D. Tex. 2007) (injunction granted); Johns Hopkins Univ. v. Datascope Corp., 513 F. Supp. 2d 578 (D. Md. 2007) (injunction granted), *rev'd on other grounds and remanded*, 543 F.3d 1342 (Fed. Cir. 2008); z4 Technologies, Inc. v. Microsoft Corp., 434 F. Supp. 2d 437, (E.D. Tex. 2006) (injunction denied); Paice, LLC v. Toyota Motor Corp., No. 2:04-CV-211, 2006 WL 2385139 (E.D. Tex. Aug. 16, 2006) (injunction denied), *aff'd in part, vacated in part and remanded*, 504 F.3d 1293 (Fed. Cir. 2007), *on remand*, 2009 U.S. Dist. Lexis 32723 (E.D. Tex. April 17, 2009). *See* Sections III.A.2 and III.A.3 for discussion of cases.

[24]547 U.S. 388 (2006).

[25]Steve Malin & Ari Rafilson, *Empirical Analysis of Permanent Injunctions Following* eBay, presented at FTC Hearing: The Evolving IP Marketplace (Feb. 12, 2009), *available at* http://www.ftc.gov/bc/workshops/ipmarketplace/feb11/docs/smalin.pdf.

[26]Malin et al., Injunctive Relief After *eBay v. MercExchange*, *available at* http://www.foley.com/files/tbl_s31Publications/FileUpload137/4541/InjunctiveReliefAftereBay.pdf.

[27]Malin at 9-10 (2/12/09).

thus the opinion must have discussed the factor to receive a yes or a no check mark.[28] If the reviewing attorneys disagreed, they conferred and reached an agreement on the how the court had reached its injunction decision.

The factors fell into three subcategories: (1) those related to the patentee's business; (2) those related to the defendant's business; and (3) those that related to the public interest. These categories were also designed to track the four factors. Those concepts that relate to the patentee's business also track the factors courts have used to evaluate the irreparable harm and inadequate damages prong of the *eBay* test and track plaintiff's arguments.[29] The concepts that relate to the defendant's business track factors that courts have used to evaluate the balance of the hardship prong.[30] The concepts that related to the public interest should track considerations of the effect of an injunction on third parties and the public in general. Results are reported in the table below and in Chapter 8 of this report. A blank survey checklist identifying all of the factors used by the attorneys reviewing the cases is included at the end of this appendix.

[28]If the court did not discuss the factor, the reviewing attorney would have check N/A. Attorneys did not rely on information known to them outside of the opinion. For instance, one of the factors measured by the survey was whether the patentee practiced the patent. If a case involved a consumer good that an attorney knew the patentee produced, but the court did not indicate that the patentee practiced the patent, that survey sheet for the case would not state that whether the patentee practiced the patent but have the N/A box checked for that factor.

[29]Malin at 7-8 (2/12/09).

[30]*Id*. at 7-8.

Potentially Relevant Fact Pattern	Number of Cases (of 49) that Cited the Fact	Grant Rate when YES	Grant Rate when NO
Patentee Facts			
Practicing Patentee	43	83%	43%
Patentee and Defendant Compete	42	87%	25%
Lost Sales to Defendant	36	88%	25%
Harm to Patentee's Reputation	24	95%	0%
Patentee Licensed Others	21	63%	80%
Defendant Facts			
Willfulness	25	75%	40%
Impact on Defendant's Business	24	79%	70%
Harm to Defendant's Customers	19	50%	100%
Minor Impact of Defendant's Sales	17	80%	100%
Voluntary Offer to Avoid Future Infringement	15	80%	40%
Compliance with the Injunction is Easy	13	92%	0%
Public Interest			
Health Concern	15	50%	91%

III. Analysis of the Four Factors in Post-*eBay* Decisions

As more court decisions address the availability of injunctions post-*eBay*, several themes and approaches for analyzing the four equitable factors have appeared. In many cases, courts have focused the bulk of their discussions on the irreparable harm and inadequate damages factors. In these cases, the analysis of the balance of hardships emphasized the irreparable harm to the patentee. In many of these instances, courts declined to consider harm to the defendant, relying on Federal Circuit precedent that a defendant who builds a business around an infringing product cannot be heard to complain.[31] Where courts have considered harm to the infringer, they often look to the size of the infringing company, whether the injunction will affect a large portion of its total sales, or whether the injunction will have other devastating effects. In evaluating the public interest prong, courts will recite the public's interest in a patent system that furthers innovation.[32] In cases where courts have engaged in additional analysis of the public interest, they mainly have focused on traditional health and safety concerns. However, a few courts have considered the effects on third party customers.

A. Irreparable Harm/Inadequate Money Damages

The first two of the four equitable factors recited in *eBay*, irreparable harm to the patentee caused by infringement and the inadequacy of money damages to remedy that harm, are closely linked and courts sometimes analyze them together. They reason that "irreparable harm" is that which "cannot be adequately atoned for in money."[33] One scholar also considers the irreparable injury factor equivalent to the no adequate legal remedy factor.[34] The inquiry has often focused

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[31] *Windsurfing*, 782 F.2d at 1003 ("One who elects to build a business on a product found to infringe cannot be heard to complain if an injunction against continuing infringement destroys the business so elected.").

[32] Telequip Corp. v. The Change Exchange, No. 5:01-CV-1748, 2006 WL 2385425, at *2 (N.D.N.Y. Aug. 15, 2006) (holding that absent available injunctions, the right to exclude would have only a fraction of the value it was intended and would not be an incentive for scientific research); Zen Design Group, Ltd. v. Clint, No. 08-cv-14309, 2009 WL 4050247 (E.D. Mich. Nov. 23, 2009) (holding that without a permanent injunction a patent's actual value would be reduced to a fraction of its intended value).

[33] Wald v. Mudhopper Oilfield Services, Inc. No. CIV-04-1693, 2006 WL 2128851 (W.D. Okla. July 27, 2006) (stating that irreparable harm often occurs when an injury cannot be adequately atoned for in money); *Paice*, 2006 WL 2385139, at *5 ("Irreparable harm lies only where injury cannot be undone by monetary damages."); Sprigman at 28 (2/12/09) (stating that inadequacy of money damages is the mirror image of the irreparable harm factor and courts have treated them as one inquiry).

[34] DOUGLAS LAYCOCK, THE DEATH OF THE IRREPARABLE INJURY RULE, 8-9 (1991). Professor Laycock argues that the "irreparable injury rule has two formulations." One is"[e]quity will act only to prevent irreparable injury" and the other is "equity will act if there is no adequate legal remedy." According to Professor Laycock, "[t]he two formulations are equivalent; what makes an injury irreparable is that no

on whether the parties competed and the harm that the patentee would suffer as a result of that competition, although courts have also found irreparable harm absent such competition. A lesser but still significant area of inquiry has been the relationship of the patented invention to the infringing product, and whether the invention was a small component that did not drive sales of the product.

1. Cases in Which the Patentee and Defendant Competed

Many district courts have placed the burden of proving irreparable harm on the patentee.[35] When patentees and infringers compete in a goods market, district courts have typically granted permanent injunctions.[36] However, some courts have declined to find this factor sufficiently satisfied to warrant an injunction based solely on general assertions of competition.[37] They require clear evidence such as lost market share, lost customers and price erosion.[38] The loss of

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other remedy can repair it." He adds, "I believe that no significant distinction can be drawn between irreparable injury and adequate remedy formulations" and he uses the two interchangeably throughout his book.

[35]*See, e.g.*, *z4*, 434 F. Supp. 2d at 440 (E.D. Tex. 2006) (holding that eBay eliminated irreparable harm presumption in permanent injunction context). In a non-precedential preliminary injunction case, the Federal Circuit also stated that *eBay* removed the presumption of irreparable harm and "[t]he burden is now on the patentee to demonstrate that its potential losses cannot be compensated by monetary damages." Automated Merchandising Sys. v. Crane Co., Nos. 2009-1158, 2009-1164, 2009 WL 4878643, at *3 (Fed. Cir. Dec. 16, 2009). *But see Broadcom*, 543 F.3d at 702 ("[i]t remains an open question whether there remains a rebuttable presumption of irreparable harm following *eBay*." (citations omitted)).

[36]Sprigman at 35 (2/12/09); Malin at 12-13 (2/12/09); Bernard H. Chao, *After* eBay Inc. v. MercExchange*: The Changing Landscape for Patent Remedies*, 9 MINN. J.L. SCI. & TECH. 543, 549 (2008).

[37]*See, e.g.*, Praxair Inc. v. ATMI, Inc., 479 F. Supp. 2d 440, 444 (D. Del. 2007) (denying injunction because patentee put forth general arguments about lost market share, profits, and goodwill, but did not identify specific losses or offer supporting data); IMX, Inc. v. Lendingtree, LLC, 469 F. Supp. 2d 203, 225 (D. Del. 2007) (denying injunction because plaintiff did not proffer evidence such as market or financial data to support otherwise sweeping statements); Advanced Cardiovascular Sys., Inc. v. Medtronic Vascular, Inc., 579 F. Supp. 2d 554, 560-61 (D. Del. 2008) (finding no irreparable harm despite competition between parties because patentee failed to identify any specific lost customers).

[38]*See, e.g.*, Verizon Services Corp. v. Vonage Holdings Corp., 503 F.3d 1295 (Fed. Cir. 2007) (finding that lost customers and price erosion provide evidence of irreparable harm); Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc., No. 04-1371, 2008 WL 5210843 (D. Del. Dec. 12, 2008) (lost market share, harm to plaintiff's reputation and goodwill); Sensormatic Electronics Corp. v. Tag Co. U.S., 632 F. Supp. 2d 1147 (S.D. Fla. 2008) (future loss of market share and price erosion), *aff'd in part*, 367 Fed. Appx. 143 (Fed. Cir. 2010) (non-precedential opinion); Becton Dickinson & Co. v. Tyco Healthcare Group, LP, No. 02-1694, 2008 WL 4745882 (D. Del. Oct. 29, 2008) (lost market share and customers);

"sticky" customers has been one way to establish irreparable harm. In finding irreparable harm based on Echostar's infringement of TiVo's digital video recorder (DVR) technology patents, the court emphasized that competition in the nascent DVR market would cause TiVo to lose "sticky customers," those who are loyal or "locked-in" due to a hardware purchase, at a critical time.[39] In *Transamerica*, the court also found irreparable harm based on the loss of "sticky customers" who purchased long-term infringing retirement annuities.[40]

A few courts have recognized that a determination of whether the infringement caused the patentee to lose customers will depend, in part, on the definition of the market in which the patentee and infringer compete. In the *Martek* case, for example, the court relied upon a narrow market definition to determine that the infringer was the patentee's sole competitor, and therefore necessarily targeted the patentee's customers, causing irreparable harm through lost market share.[41] A broader market definition that included alternatives to the patented invention might have supported a conclusion that the infringer's customers would have chosen a non-infringing product and so the infringement did not cause the patentee's lost market share.[42] For instance, when finding no irreparable harm in *Advanced Cardiovascular Systems*, the court pointed to market data establishing the presence of non-infringing competitors. The court also noted the patentee's admission that it had recaptured almost all market share lost due to infringement.[43]

Brooktrout, Inc. v. Eicon Networks Corp., No. 2:03-CV-59, 2007 WL 1730112 (E.D. Tex. June 14, 2007) (lost market share); MPT, Inc. v. Marathon Labels, Inc., 505 F. Supp. 2d 401 (N.D. Ohio 2007) (lost market share and customer goodwill), *aff'd in part, rev'd in part*, 258 Fed. Appx. 318 (Fed. Cir. 2007); Transocean Offshore Deepwater Drilling, Inc. v. GlobalSanteFe Corp., No. H-03-2910, 2006 WL 3813778 (S.D. Tex. Dec. 27, 2006) (citing evidence from the trial record that the parties had customers in common and the defendant used its infringing products to win bids from the patent holder).

[39]TiVo v. Echostar Commc'ns Corp., 446 F. Supp. 2d 664, 667 (E.D. Tex. 2006), *aff'd in part, rev'd in part*, 516 F.3d 1290 (Fed. Cir. 2008).

[40]Transamerica Life Insurance Co. v. Lincoln Nat'l Life Ins. Co., 625 F. Supp. 2d 702 (N.D. Iowa 2009), *rev'd on other grounds sub nom.*, Lincoln Nat. Life Ins. Co. v. Transamerica Life Ins. Co., 609 F.3d 1364 (Fed. Cir. 2010).

[41]Martek Biosciences Corp. v. Nutrinova Inc., 520 F. Supp. 2d 537 (D. Del. 2007) (defining the market as vegetarian DHA for adult foods and beverages), *aff'd in part and rev'd in part*, 579 F.3d 1363 (Fed. Cir. 2009); *see also* Arlington Indus., Inc. v. Bridgeport Fittings, Inc., No. 3:01-CV-0485, 2010 WL 817519, at *3-4 (M.D. Pa. March 9, 2010) (the district court defined the market as the narrow subset of electrical conduit fittings, essentially defined by the patents at issue).

[42]Chapter 7, Section III.

[43]*Advanced Cardiovascular Systems*, 579 F. Supp. 2d at 560-61 (D. Del. 2008). The court also noted the patentee's willingness to license other competitors in finding that money damages were adequate compensation.

One case has recognized that the relevant market may extend beyond products that incorporate the patented technology. The Federal Circuit affirmed the grant of a permanent injunction after Qualcomm was found to infringe two Broadcom patents related to CDMA cell phone technology.[44] Qualcomm argued that Broadcom, which makes only WCDMA chips not using the patented technology, suffered no irreparable harm because it did not compete with Qualcomm's infringing CDMA chips. But the district court rejected this argument on the basis that the two firms competed for "design wins for the development and production of cell phones" rather than for "each consumer sale."[45]

In identifying irreparable harm caused by competition between a patentee and infringer, courts have also looked beyond lost customers and price erosion to the more qualitative concern of damage to a patentee's reputation.[46] As one court explained, competition from an infringing product can damage the patentee's good will or brand name recognition. Because that damage is "impossible" to quantify, it cannot be adequately compensated by money damages, and so supports the grant of an injunction.[47] Similarly, in a case involving a product for treating oil wells, the court cited harm to the patentee's reputation as an innovator and its ability to maintain its product as the "industry standard," in addition to lost market share, to support its finding of irreparable harm.[48] Another district court cited evidence that the defendant's infringement not only harmed a medical device manufacturer plaintiff's market share and profits, but also interfered with the patentee's ability to form relationships with surgeons, and as a result damaged its reputation and ability to innovate.[49]

2. Cases In Which Courts Granted Injunctions to Patentees that Did Not Practice the Patent

Although courts typically find irreparable harm when a patentee and infringer compete in a goods market, the converse – that they find a lack of irreparable harm absent competition- should not be assumed. Courts have found irreparable harm that could not be adequately

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[44] *Broadcom*, 543 F.3d at 683.

[45] *Id*. at 702.

[46] *See, e.g., Emory*, 2008 WL 2945476, at *4.

[47] *z4*, 513 F. Supp. 2d at 442; Callaway Golf Co. v. Acushet Co., 585 F. Supp. 2d 600, 621 (D. Del. 2008) (holding that reputational harm supported injunction even though the patentee no longer marketed patented golf balls), *aff'd in part, vacated in part*, 576 F.3d 1331 (Fed. Cir. 2009); *see also* Sprigman at 41-42 (2/12/09).

[48] *Wald*, 2006 WL 2128851, at *5.

[49] Smith & Nephew, Inc. v. Synthes, 466 F. Supp. 2d 978, 983 (W.D. Tenn. 2006).

compensated by money damages where the patentee did not practice the patent.[50] Their reasoning varies, depending on the nature of the patentee. In two cases involving non-practicing patentees, the court relied only on harm to the patentee's right to exclude and the economic value of a patent as supporting an injunction.[51] Other cases rely on additional evidence, however.

In two cases in which the patentees were universities, their exclusive licensees marketed products in competition with the infringing products. In both cases, the university and its licensee joined suit and the court granted an injunction.[52] In *Johns Hopkins*, the court determined that the exclusive licensee and the defendant were the only two competitors in the market and any sales by the defendant would result in lost sales to the licensee.[53] Additionally, the court noted harm to the plaintiffs' reputations and injury to the patentee's right to exclude.[54] In *Emory,* the court found irreparable harm based on harm to the university's reputation. The court explained, "when an infringing company is not actively selling the offending product, the harm to a patent-holder may seem esoteric. But the negative effects of the Plaintiffs' potential loss in goodwill, market share, and prestige are real, and would be difficult to quantify solely through monetary damages."[55]

District courts have also granted injunctions to organizations that often seek to license their patents non-exclusively. The Commonwealth Scientific and Industrial Research Organisation ("CSIRO"), a scientific research organization established by the Australian government, conducts scientific research in many technological areas and licenses its patented technology. The court found that infringement of CSIRO's patent on a wireless local area network had caused irreparable harm by depriving CSIRO of licensing revenues that would have

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[50]*See supra* note 23.

[51]In *Joyal,* the district court granted an injunction to a patent holder that had ceased manufacturing operations and no longer practiced its patents based on argument that continuing infringement would devalue the patent and undermine the patentee's ability to sell it at a desirable price. *Joyal*, 2009 WL 512156, at *11; *See also Kowalski*, 2009 WL 856006, at *1 (injunction granted to independent inventor based on right to exclude).

[52]*Emory*, 2008 WL 2945476; *Johns Hopkins*, 513 F. Supp. 2d at 578. *But see Voda*, 2006 WL 2570614, in which the court rejected the licensor patentee's argument that it could demonstrate irreparable harm to itself based on harm to its exclusive licensee. The exclusive licensee was not joined in the suit, and it appears that the patentee did not provide evidence of how harm to the licensee would directly harm it.

[53]*Johns Hopkins*, 513 F. Supp. 2d at 586 ("In fact, it is the only competition and thus, its sale reduces the Plaintiffs' market share.").

[54]*Id*. ("As the principal value of a patent is its statutory right to exclude, the nature of the patent grant weighs against holding that monetary damages will always suffice to make the patentee whole." (citations omitted)).

[55]*Emory*, 2008 WL 2945476, at *5.

funded additional projects and diverting funds from its research function to patent litigation.[56] The court also noted harm to CSIRO's reputation as a research institution and its ability to recruit top scientists.[57]

In *Broadcom v. Qualcomm*, the district court and Federal Circuit recognized that a patentee may not practice its asserted patents, yet still compete with an infringer and suffer irreparable harm stemming from that competition. Broadcom held patents covering aspects of Qualcomm's CDMA cell phone technology, but it did not practice that technology in its WCDMA chips. The court found that the infringement might harm Broadcom's ability to compete with CDMA chips in a market for "design wins." The court explained the irreparable harm caused by the infringement: "In this kind of a market, the exclusion has a competitive effect on a firm even if it does not have an immediately available product."[58]

In one case, the Federal Circuit and district court have based a finding of irreparable harm in part on the past harm infringement imposed on the patentee. In *i4i*,[59] the Federal Circuit stated that it was proper for the district court to consider "strong circumstantial evidence that Microsoft's infringement rendered i4i's product obsolete. . .causing i4i to. . .change its business strategy to survive."[60] The court cited past infringement as causing 80% loss of market share, loss of revenue, and harm to brand name recognition and customer goodwill.[61]

3. Cases In Which Courts Denied Injunctions to Patentees that Did Not Practice the Patent

District courts have denied injunctions to patent holders who did not practice the patented invention in six identified cases.[62] None of these decisions depend categorically on the fact that the patentee did not manufacture a product to support denial of the injunction. In two cases,

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[56]*CSIRO*, 492 F. Supp. 2d at 603-08. The district court in *Hynix v. Rambus* criticized this rationale, explaining that the court's examination of irreparable harm was inappropriately retrospective and did not examine the harm that *CSIRO* would prospectively incur upon denial of an injunction. The *Hynix* court also criticized the *CSIRO* court's reliance on harm caused by infringers other than the defendant. *Hynix*, 609 F. Supp. 2d at 983. Interestingly, the *CSIRO* court also failed to discuss the import of *CSIRO*'s earlier RAND commitment to a standard setting organization.

[57]*CSIRO*, 492 F. Supp. 2d at 604.

[58]*Broadcom*, 543 F.3d at 702 (Fed. Cir. 2008).

[59]*i4i*, 598 F.3d at 831.

[60]*Id*. at 862.

[61]*Id*.

[62]*See supra* n.23.

Voda[63] and *Telcordia*[64], the patentee provided very little evidence that might have sufficed to carry its burden of proving irreparable harm. In *z4*[65] and *Paice*[66], the court considered a wide range of facts in finding no irreparable harm. The *Hynix*[67] case is the first to emphasize that equitable injunctions are forward, not backward looking, although the recent Federal Circuit decision in *i4i*[68] focuses attention on permitting an analysis of past harm to evaluate the injunction decision.

In *Telcordia v. Cisco Systems,* the district court rejected licensing company Telcordia's argument that it would suffer irreparable harm absent an injunction because "its lifeblood was its ability to enforce its patents and continue to generate innovative solutions. . . ."[69] The court found this argument lacking primarily because it consisted of merely attorney argument, with no supporting evidence of harm, such as lost sales, licensing or R&D opportunities. Telcordia was able to obtain licenses from other companies, suggesting that its licensing program was not harmed.[70] In *Voda*, the Federal Circuit affirmed the denial of an injunction when the district court rejected the licensor patentee's argument that it could demonstrate irreparable harm to itself based on harm to its exclusive licensee.[71] The exclusive licensee was not joined in the suit, and it appears that the patentee did not provide evidence of how harm to the licensee would directly harm it.[72] The Federal Circuit also rejected Voda's argument that in denying the injunction, the district court was adopting a categorical rule that denied injunctions to non-practicing patentees,

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[63] *Voda*, 2006 WL 2570614, at *5.

[64] *Telcordia*, 592 F. Supp. 2d at 747, *aff'd in part, vacated in part*, 612 F.3d 1365 (Fed. Cir. 2010).

[65] *z4*, 434 F. Supp. 2d at 437.

[66] *Paice*, 2006 WL 2385139, *aff'd in part, vacated in part, and remanded,* 504 F.3d 1293 (Fed. Cir. 2007).

[67] *Hynix*, 609 F. Supp. 2d at 951.

[68] *i4i*, 598 F.3d at 861-62.

[69] *Telcordia*, 592 F. Supp. 2d at 747, *aff'd in part, vacated in part*, 612 F.3d 1365 (Fed. Cir. 2010).

[70] *Id*. at 747-48.

[71] *Voda*, 536 F.3d at 1329.

[72] *Id*. Similarly, in a case involving practicing patent holders, the district court denied the injunction because there was no nexus between the harm and party. In this case, the only party the court determined had standing in an infringement case failed to proffer evidence of direct harm to itself and instead relied on harm to a co-plaintiff. Medtronic Sofamor Danek USA, Inc. v. Globus Medical, Inc., 637 F. Supp. 2d 290 (E.D. Pa. 2009), *aff'd*, No. 2009-1525, 2011 WL 229563 (Fed. Cir. Jan. 26, 2011).

stating that non-practicing patent holders may be able to obtain injunctions provided they can prove irreparable injury to themselves and satisfy the four factor test.[73]

In *z4 v. Microsoft*, one of the first cases following the Supreme Court's *eBay* decision, a district court denied patent licensing company, z4, an injunction after a jury found that Microsoft's Windows XP and Office products willfully infringed z4's patent on product activation software.[74] The court rejected z4's argument that its licensing program would be irreparably harmed by ongoing infringement for several reasons. Because Microsoft did not offer product activation software separate from its own products, customers would not be dissuaded from licensing z4 technology by Microsoft's infringement. z4 would suffer no lost market share or name recognition. The court also relied on the fact that the infringing feature was a small component of Microsoft's products and that the component did not relate to their core functionality.[75] Finally, the court determined that Microsoft's plans to phase out this software would make the damages from any future infringement easy to calculate.[76]

Similarly in *Paice v. Toyota,* the district court considered many facts in finding a lack of irreparable harm and denying the request for an injunction by a patent licensing company. Toyota was found to infringe Paice's patent on drive train technology for hybrid electric vehicles. In evaluating irreparable harm, the court noted "that because Plaintiff does not compete for market share with the accused vehicles, concerns regarding loss of brand name recognition are market share. . .are not implicated."[77] The court found that Paice's problems licensing its technology were due to its business practices, not Toyota's infringement. It also relied on the fact that the patented invention was a small component of the accused device.[78]

In *Hynix v. Rambus*, the district court found that the patentee Rambus, a semiconductor design firm that licenses its technology, did not prove irreparable harm and entitlement to an injunction. The court's analysis recognized that the purpose of equitable injunctions is to relieve future harm and not to punish past conduct.[79] For that reason, the court considered only the harm

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[73] *Voda*, 536 F.3d at 1329.

[74] *z4*, 513 F. Supp. 2d at 439-42.

[75] *Id*. at 441 (discussing Justice Kennedy's concurrence in *eBay* to support conclusion that monetary damages would be sufficient to compensate *z4* for any future infringement).

[76] *Id*. at 442.

[77] Paice, 2006 WL 2385139, at *5.

[78] *Id*. at *4-5.

[79] *Hynix*, 609 F. Supp. 2d at 968-69. *See also* Nichia Corp. v. Seoul Semiconductor, Ltd., No. 06-0162, 2008 WL 346416, at *1 (N.D. Cal. Feb. 7, 2008) (holding that the purpose of an injunction is to prevent

that the patentee would suffer in the future due to on-going infringement, and not the harm that it suffered in the past. An injunction, by its nature, could not compensate the patentee for past infringement harm, the court explained. Ultimately, the court found that since the patents in suit would expire in a year, and Rambus was willing to license, any harm to the patentee from denial of the injunction would be slight.[80] This contrasts with the Federal Circuit's statement that, even though injunctions are tools for correcting future harm, it is proper for the district court to consider past harm in determining whether to grant an injunction.[81]

B. Balance of the Hardships Between the Parties

eBay's third equitable factor requires patentees to show that "considering the balance of hardships between the plaintiff and defendant, [an injunction] is warranted."[82] The irreparable harm analysis, to the extent it considers harm to the patentee from on-going infringement, will define the hardship faced by the patentee. Some courts have also identified trespass of the patentee's "right to exclude" as a hardship to be considered.[83]

The third factor also requires courts to consider the hardship an injunction would impose on the infringer. When courts have granted an injunction, some commentators have noted that most of the analysis occurs during the irreparable harm factor.[84] Courts frequently dismiss the infringer's complaints of hardship by explaining that "[o]ne who elects to build a business on a product found to infringe cannot be heard to complain if an injunction against continuing infringement destroys the business."[85] In other cases, courts have more carefully considered the

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future harm).

[80] *Hynix*, 609 F. Supp. 2d at 983-85. The court also denied the injunction because in weighing the hardships on the parties, it found that an injunction would "decimate" the infringer's business. *Id*. at 985.

[81] *i4i*, 598 F.3d at 861-62. ("Although injunctions are tools for prospective relief designed to alleviate future harm, by its terms the first *eBay* factor looks, in part, at what has already occurred.").

[82] *eBay*, 547 U.S. at 391.

[83] *See e.g.*, *Brooktrout*, 2007 WL 1730112, at *2 (holding that absent an injunction, Brooktrout would lose goodwill, potential revenue, and the right to exclude); Visto Corp. v. Seven Networks, Inc., No. 2:03-CV-333, 2006 WL 3741891, at * 4 (E.D. Tex. Dec. 19, 2006) (holding that if no permanent injunction were entered, Visto would lose goodwill, potential revenue, and the right to exclude); 3M Innovative Properties Co. v. Avery Dennison Corp., No. 01-1781, 2006 WL 2735499, at *2 (D. Minn. Sept. 25, 2006) (finding that patentee had been barred from exercising its right to exclude).

[84] Malin at 98-99 (2/12/09); Badenoch at 111-12 (2/12/09).

[85] *3M Innovative Properties*, 2006 WL 2735499, at *2 (*citing Windsurfing*, 782 F.2d at 1003); *see also Johns Hopkins*, 513 F. Supp. 2d at 586 (holding that hardship for loss of sales and for ceasing operations not sufficient because they were direct consequences of the illegal patent infringement), *rev'd and*

effect of an injunction on the infringer, but found insufficient hardship to tip the balance towards denying the injunction.[86] Several reasons have been given, including: the defendant's size, especially compared to the patentee;[87] the defendant's minimal investment developing the infringing product;[88] and the percentage of the defendant's business comprised of infringing products.[89]

The cases in which courts have found that the balance of hardships tipped toward the infringer and supported denial of an injunction are typically those in which the patentee failed to prove irreparable harm and the consequences of an injunction for the infringer would have been severe. In the *z4* case, for instance, the court concluded that "turning off" activation software in Microsoft products would flood the market with pirated software and lead to incalculable losses for the defendant.[90] In *Paice*, the court concluded that enjoining defendant Toyota's car sales would not only affect the defendant, but also its dealers and suppliers.[91] The *Hynix* court worried that prohibiting use of patented technology that had been incorporated into an industry standard would "decimate" the infringer's business in a situation where Rambus had not disclosed its patent rights during the standard setting process.[92]

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remanded, 543 F.3d 1342 (Fed. Cir. 2008); *Smith & Nephew*, 466 F. Supp. 2d at 984-85 ("Although Synthes' effort, time, and expense in redesigning [the infringing product] might be significant, that is the consequence of patent infringement.").

[86]*Callaway Golf*, 585 F. Supp. 2d at 622; *TiVo*, 446 F. Supp. 2d at 670; Power-One, Inc. v. Artesyn Technologies, Inc., No. 2:05-CV-463, 2008 WL 1746636 (E.D. Tex. April 11, 2008), *aff'd*, 599 F.3d 1343 (Fed. Cir. 2010); Martek Biosciences Corp. v. Nutrinova Inc., 520 F. Supp. 2d 537, 559 (D. Del. 2007), *aff'd in part, rev'd in part*, 579 F.3d 1363 (Fed. Cir. 2009); *MPT*, 505 F. Supp. 2d at 420; 800 Adept, Inc. v. Murex Securities, Ltd., 505 F. Supp. 2d 1327 (M.D. Fla. 2007), *aff'd in part, vacated in part, and rev'd in part*, 539 F.3d 1354 (Fed. Cir. 2008), *rehearing and rehearing en banc denied*, (2008).

[87]*Callaway Golf*, 585 F. Supp. 2d at 622 (finding that defendant made several non-infringing products and was owned by a multi-billion dollar conglomerate); *TiVo*, 446 F. Supp. 2d at 670 (finding that patentee was a new and small company).

[88]*Power-One*, 2008 WL 1746636, at *1 n.1 (finding that infringer spent only $20,000 developing infringing product compared to patentee's $20 million).

[89]*Martek*, 520 F. Supp. 2d at 559 (finding that infringing product represented only a small percentage of infringer's total business); *MPT*, 505 F. Supp. 2d at 420 (finding that only 10-15% of the defendants sales were for the infringing product); *800 Adept*, 505 F. Supp. 2d at 1338 (finding that provision of infringing services was a small part of infringer's business, but the primary activity of patentee).

[90]*z4*, 513 F. Supp. 2d at 443.

[91]However, the Federal Circuit has held that the effect on third parties is irrelevant under the third prong of the injunction test. Acumed, LLC v. Stryker Corp., 551 F.3d 1323, 1330 (Fed. Cir. 2008).

[92]*Hynix*, 609 F. Supp. 2d at 984-85.

In some cases, courts have found that the hardship to the infringer can be ameliorated by delaying the start of the injunction in order to give the infringer time to design around the patent. For instance in *Broadcom*, the district court permitted a twenty month delay to the start of the injunction to reduce the effects of the injunction on infringer Qualcomm.[93] Similarly, the district court in *i4i* permitted a sixty day delay to abrogate the difficulties Microsoft would face in redesigning its software to comply with the injunction.[94] However, in *TiVo*, the court declined to delay the start of an injunction, stating that the harm to the defendant's business was insufficient to warrant the delay and would further harm TiVo.[95] Other courts have suggested that narrowly tailoring the injunction will mitigate harm to the defendant.[96]

C. Public Interest Prong

The fourth factor of the equitable injunction analysis examines whether the public interest would be disserved by a permanent injunction. Only a small number of post-*eBay* cases have provided an extended discussion of this factor in deciding whether to grant an injunction. In the majority of cases, courts simply recognize that the "public has an interest in maintaining a strong patent system. This interest is served by enforcing an adequate remedy for patent infringement."[97] Presumably, this common statement refers to the patent system's role in

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[93] *Broadcom*, 543 F.3d at 704 (holding that a sunset provision would ameliorate the negative effects from an injunction).

[94] *i4i*, 670 F. Supp. 2d at 603. On appeal, the Federal Circuit increased the sunset provision to five months, finding the district court erred in not citing evidence to support its 60 day sunset provision when Microsoft witnesses had declared the redesign would take at least five months. *i4i*, 598 F.3d at 861 (Fed. Cir. 2010), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010) (No. 10-290).

[95] *TiVo*, 446 F. Supp. 2d at 671 (finding that an injunction would have a severe financial impact on defendant's core business).

[96] *Power-One*, 2008 WL 1746636, at *1 n.1 (*citing Brooktrout*, 2007 WL 1730112, at *2).

[97] *TiVo*, 446 F. Supp. 2d at 670. *See also* Funai Electronics Co., Ltd. v. Daewoo Elec. Corp., 593 F. Supp. 2d 1088, 1111 (N.D. Cal. 2009); *Kowalski*, 2009 WL 856006, at *2; Mass Engineered Design, Inc. v. Ergotron, Inc., 633 F. Supp. 2d 361, 394 (E.D. Tex 2009); *Becton Dickinson*, 2008 WL 4745882, at *4 (noting that plaintiff offered no evidence of harm to public health or safety from the injunction); *Emory*, 2008 WL 2945476, at *5 (noting the public would not lose a major supplier of antimicrobial products); *Power Integrations*, 2008 WL 5210843, at *1; *Power-One*, 2008 WL 1746636, at *1 n.1; *Sensormatic*, 632 F. Supp. 2d at 1182; TruePosition, Inc. v. Andrew Corp., 568 F. Supp. 2d 500, 533 (D. Del. 2008), *amended in part,* 2009 WL 192470 (D. Del. Jan. 27, 2009), *aff'd*, 389 Fed. Appx. 1000 (Fed. Cir. 2010); Trading Technologies Int'l, Inc. v. eSpeed, Inc., No. 04-C-5312, 2008 WL 4531371, at *5 (N.D. Ill. May 22, 2008), *aff'd*, 595 F.3d 1340 (Fed. Cir. 2010); Atlanta Attachment Co. v. Leggett & Platt, Inc., No. 1:05-CV-1071, 2007 WL 5011980, at *8 (N.D. Ga. Feb. 23, 2007); Baden Sports, Inc. v. Kabushiki Kaisha Molten, No. C06-210, 2007 WL 2790777, at *3 (W.D. Wash. Sept. 25, 2007); *Brooktrout*, 2007 WL 1730112, at *2; *Martek*, 520 F. Supp. 2d at 558; *MPT*, 505 F. Supp. 2d at 420; O2 Micro Int'l, Ltd.

promoting innovation for public benefit, and the manner in which exclusive rights protected by injunctions support that role.

Several cases providing more extensive discussions of the public interest factor involve health care products. In a case finding that a generic drug infringed a patent held by a branded drug manufacturer, the court recognized a public interest in access to lower-priced generic drugs. However the court weighed that interest against the public's competing interest in "encouraging the massive investment in research and development that is required before a new drug can be developed and brought to market" and granted the injunction.[98] In *Amgen v. Hoffman-La Roche*, a matter involving a biologic drug, the district court collected extensive evidence related to the public interest prong and then granted the injunction. The court found that it was unclear whether the patented drug offered significant clinical advantages over non-infringing treatments, and whether market entry of an infringing product would lower Medicare costs. The court also determined that sale of an infringing drug would undermine incentives for innovation that the patent system is designed to protect.[99] The public interest in maintaining access to the infringing drug-eluting stent supported denial of an injunction in *Advanced Cardiovascular Systems*. Cardiologists had filed affidavits stating they preferred the infringing stents and expressed concern for the success of their surgeries if they were not available. The court also acknowledged the public's interest in competition in the stent market in this situation where the patentee had failed to establish irreparable harm.[100]

A few cases have considered non-health related disruption to customers and the broader public under the public interest prong. In a case involving computer security software, the court noted that "computer security revolves around protecting highly sensitive information and. . .that a disruption in service would be an incredible disservice to the public. . . ."[101] However, it found that these arguments were insufficient to outweigh the public's interest in the enforcement of

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v. Beyond Innovation Tech. Co., Ltd., 2007 WL 869576, at * 3 (E.D. Tex. March 21, 2007), *vacated*, 521 F.3d 1351 (Fed. Cir. 2008); Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc., Nos. 04-1689, 06-757, 06-5166, 2007 WL 869545, at *1 (D.N.J. March 20, 2007), *aff'd in part*, 520 F.3d 1358 (Fed. Cir. 2008); *Visto*, 2006 WL 3741891, at *5; Black & Decker, Inc. v. Robert Bosch Tool Corp., No. 04 C 7955, 2006 WL 3446144, at *5 (N.D. Ill. Nov. 29, 2006).

[98]Sanofi-Synthelabo v. Apotex, Inc., 492 F. Supp. 2d 353, 397 (S.D.N.Y. 2007), *aff'd*, 530 F.3d 1075 (Fed. Cir. 2009).

[99]Amgen, Inc. v. F. Hoffman-La Roche, Ltd., 581 F. Supp. 2d 160, 212-26 (D. Mass. 2008), *aff'd in part, vacated in part,* 580 F.3d 1340 (Fed. Cir. 2009).

[100]*Advanced Cardiovascular Systems*, 579 F. Supp. 2d at 560-61 (D. Del. 2008).

[101]Finjan Software, Ltd. v. Secure Computing Corp., No. 06-369, 2009 WL 2524495, at *11 (D. Del. Aug. 18, 2009), *aff'd in part, rev'd in part*, 626 F.3d (Fed. Cir. 2010).

patent rights.[102] In *z4*, defendant Microsoft argued that because its Windows operating system was ubiquitous, an injunction could flood the market with pirated software that could potentially threaten computer security and could harm sectors of the public including small computer manufacturers, retailers and, consumers.[103] The court concluded that although it was impossible to determine the actual effects of the two scenarios, even minor disruptions could harm the public, thus tipping this factor in favor of denying the injunction.[104] In *Broadcom*, the court found that it could ameliorate the disruption to cell phone service by delaying the start of the injunction in order to give the infringer time to design around the patent.[105] Another court concluded that narrowly tailoring the injunction will also mitigate harm to the public.[106]

IV. List of Post-eBay Cases

This list includes opinions available on Westlaw as of March 31, 2010 . To compile this list, we searched for all cases citing eBay and limited the results to opinions discussing permanent injunctions in patent cases. We did not include preliminary injunction cases or cases involving other areas of the law such as trademark or copyright. In the period shortly after the Supreme Court issued its opinion in *eBay*, the Federal Circuit remanded cases back to the district court with instructions to perform a four factor analysis. We included the remand opinions. There are instances in which courts have made statements about the four factors in dictum when discussing other areas of patent cases such as willfulness or when discussing stays of permanent injunctions pending appeal of infringement verdicts. We did not include those cases on this list. Some cases turned on procedural or technical issues, such as standing and we did not include those cases on this list.

A. Post-*eBay* Cases in Which the Court Denied a Permanent Injunction

Advanced Cardiovascular Systems, Inc. v. Medtronic Vascular, Inc., 579 F. Supp. 2d 554 (D. Del. 2008)

Bard Peripheral Vascular, Inc. v. W.L. Gore & Associates, Inc., No. CV-03-0597, 2009 WL 920300 (D. Ariz. March 31, 2009)

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[102] *Id*.

[103] *z4*, 434 F. Supp. 2d at 444.

[104] *Id*. at 444-45.

[105] *Broadcom*, 543 F.3d at 704. ("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.").

[106] *Transocean*, 2006 WL 3813778, at *7 (holding that a narrowly tailoring injunction would mitigate harm to public).

Boston Scientific Corp. v. Johnson & Johnson, No. C 02-0790, 2008 WL 5054955 (N.D. Cal. Nov. 25, 2008*)* (Ongoing Royalty Case*)*

Creative Internet Advertising Corp. v. Yahoo!, Inc., 674 F. Supp. 2d 847 (E.D. Tex. 2009)

Emcore Corp. v. Optium Corp., No. 7-326, 2010 U.S. Dist. LEXIS 3287 (W.D. Penn. Jan. 15, 2010), *decision reached on appeal*, 2011 U.S. App. LEXIS 1826 (Fed. Cir. Jan. 26, 2011).

Finisar Corp. v. DirecTV Group, No. 1:05-CV-264, 2006 U.S. Dist LEXIS 76380 (E.D. Tex. July 7, 2006), *aff'd in part*, 523 F.3d 1323 (Fed. Cir. 2008) (Federal Circuit vacated the district court's holding of injunction, part of its analysis regarding the validity of the patent, and remanded for new trial)

Hynix Semiconductor Inc. v. Rambus Inc., 609 F. Supp. 2d 951 (N.D. Cal. 2009)

Hypoxico Inc. v. Colo. Altitude Training, 630 F. Supp. 2d 319 (S.D.N.Y. 2009)

IGT v. Bally Gaming Int'l Inc., 675 F. Supp. 2d 487 (D. Del. 2009)

IMX, Inc. v. Lendingtree, L.L.C., 469 F. Supp. 2d 203 (D. Del. 2007), *on reconsideration in part*, No. 03-1067, 2007 WL 1232184 (D. Del. April 25, 2007).

Innogenics, N.V. v. Abbott Labs., 512 F.3d 1363 (Fed. Cir. 2008) (upholding lower court's grant of injunction based on payment of a market entry fee to compensate the patentee for loss of market power in the future)

Medtronic Sofamor Danek USA Inc. v. Globus Med., 637 F. Supp. 2d 290 (E.D. Pa. 2009)

Nichia Corp. v. Seoul Semiconductor, Ltd., No. 06-0162, 2008 WL 346416 (N.D. Cal. Feb. 7, 2008)

Paice LLC v. Toyota Motor Corp., No. 2:04-CV-211, 2006 WL 2385139 (E.D. Tex. Aug. 16, 2006), *aff'd in part, rev'd in part and remanded*, 504 F.3d 1293 (Fed. Cir. 2007) (Federal Circuit upheld the denial of the injunction and grant of on-going royalties but remanded for the court to do a better job on calculating those damages), *on remand at*, 609 F. Supp. 2d 620 (E.D. Tex. 2009) (District court increased the on-going royalties from $25 per license to $98 license)

Praxair Inc. v. ATMI, Inc., 479 F. Supp. 2d 440 (D. Del. 2007). In a later opinion patents were held unenforceable for inequitable conduct. *See* 489 F. Supp. 2d 387 (2007), *aff'd in part, rev'd in part*, 543 F.3d 1306 (Fed. Cir. 2008) (upholding the inequitable conduct finding for one patent and reversing the inequitable conduct and infringement decisions for a second, also vacating the finding of invalidity for a third patent)

Respironics, Inc. v. Invacare Corp., No. 04-0336, 2008 WL 111983 (W.D. Pa. Jan. 8, 2008)

ResQNet.com, Inc. v. Lansa, Inc., 533 F. Supp. 2d 397 (S.D.N.Y. 2008), *aff'd in part, rev'd in part*, 594 F.3d 860 (Fed. Cir. 2010) (affirming patent valid and infringed; reversing and remanding damages decision; reversing imposition of Rule 11 sactions)

Sundance Inc. v. DeMonte Fabricating Ltd., No. 02-73543, 2007 WL 37742 (E.D. Mich. Jan. 4, 2007). Patent declared invalid for obviousness by 550 F.3d 1356 (Fed. Cir. 2008).

Telcordia Tech., Inc. v. Cisco Sys., Inc., 592 F. Supp. 2d 727(D. Del. 2009), *aff'd in part, vacated in part*, 612 F.3d 1365 (Fed. Cir. 2010)

Voda v. Cordis, No. CIV-03-1512, 2006 WL 2570614 (W.D. Okla. Sept. 5, 2006), *aff'd*, 536 F.3d 1311 (Fed. Cir. 2008)

z4 Technologies, Inc. v. Microsoft Corp., 434 F. Supp. 2d 437 (E.D. Tex. 2006)

B. Post-*eBay* Cases in Which the Court Granted a Permanent Injunction

3M Innovative Properties Co. v. Avery Dennison Corp., No. 01-1781, 2006 WL 2735499 (D. Minn. Sept. 25, 2006)

800 Adept, Inc. v. Murex Securities, Ltd., 505 F. Supp. 2d 1327 (M.D. Fla. 2007), *aff'd in part, vacated in part, and rev'd in part*, 539 F.3d 1354 (Fed. Cir. 2008), *rehearing and rehearing en banc denied*, (2008) (Federal Circuit held that trial court erred on claim construction on one set of claims and reversed the finding of infringement and vacated the injunction; Federal Circuit upheld jury's finding that a second set of patents were invalid except for two claims and remanded for new trial on those claims.)

Acticon Tech. v. Heisei Electronics Co., Ltd., No. 06-CV-4316, 2008 WL 356872 (S.D.N.Y. Feb. 5, 2008)

Acumed, LLC v. Stryker Corp., 483 F.3d 800 (Fed. Cir. 2007) (Federal Circuit remanded decision to district court to apply *eBay* factors); 2007 WL 4180682 (D. Ore. Nov. 20, 2007) (district court applied eBay factors and granted injunction), *aff'd*, 551 F.3d 1323 (Fed. Cir. 2008).

Allan Block Corp. v. E. Dillon & Co., 509 F. Supp. 2d 795 (D. Minn. 2007), *aff'd per curiam*, 287 Fed. Appx. 109 (Fed. Cir. 2008)

Amgen, Inc. v. F. Hoffman-La Roche Ltd., 581 F. Supp. 2d 160 (D. Mass. Oct. 2, 2008), *aff'd in part*, 581 F. Supp. 2d 160 (D. Mass. 2008) (Federal Circuit reversed some of findings of infringement and affirmed others and remanded; injunction undisturbed with instruction that district court can revisit scope on remand if appropriate.)

Arlington Industries, Inc., v. Bridgeport Fittings, Inc., No. 3:01-CV-0485, 2010 WL 817519 (M.D. Pa. March 9, 2010)

Atlanta Attachment Co. v. Leggett & Platt, Inc., No. 1:05-CV-1071, 2007 WL 5011980 (N.D. Ga. Feb. 23, 2007)

Baden Sports, Inc. v. Kabushiki Kaisha Molten, No. C06-210, 2007 WL 2790777 (W.D. Wash. Sept. 25, 2007)

Becton Dickinson & Co. v. Tyco Healthcare Group, LP, No. 02-1694, 2008 WL 4745882 (D. Del. Oct. 29, 2008)

Black & Decker Inc. v. Robert Bosch Tool Corp., No. 04 C 7955, 2006 WL 3446144 (N.D. Ill. Nov. 29, 2006), *aff'd in part, vacated in part*, 260 Fed. Appx. 284 (Fed. Cir. 2008) (The Federal Circuit overturned the district court's claim construction and remanded, rendering the initial grant of injunction moot.)

Broadcom Corp. v. Qualcomm Inc., 543 F.3d 683 (Fed. Cir. 2008)

Brooktrout, Inc. v. Eicon Networks Corp., No. 2:03-CV-59, 2007 WL 1730112 (E.D. Tex. June 14, 2007)

Callaway Golf Co. v. Acushet Co., 585 F. Supp. 2d 600 (D. Del. 2008), *aff'd in part, vacated in part*, 576 F.3d 1331 (Fed. Cir. 2009) (The Federal Circuit reversed the district court's summary judgment ruling on anticipation and vacated the district court's finding on obviousness and remanded. The Federal Circuit did not rule on the district court's injunction decision.)

Commonwealth Scientific and Industrial Research Organisation v. Buffalo Technology Inc., 492 F. Supp. 2d 600 (E.D. Tex. 2007), *aff'd in part*, 542 F.3d 1363 (Fed. Cir. 2008) (Federal Circuit overturned the decision on willfulness and remanded).

Emory University v. Nova Biogenetics, No. 1:06-CV-0141, 2008 WL 2945476 (N.D. Ga. July 25, 2008)

Extreme Networks, Inc. v. Enterasys Networks, Inc., No. 07-cv-229, 2008 WL 4756498 (W.D. Wisc. Oct. 29, 2008); motion to modify injunction denied and motion to stay injunction granted by 2009 WL 679602 (D. Wisc. March 16, 2009), *vacated and remanded*, 395 Fed. Appx. 709 (Fed. Cir. 2010)

Finjan Software, Ltd. Secure Computing Corp, No. 06-369, 2009 WL 2524495 (D. Del. Aug. 18, 2009), *aff'd in part, rev'd in part*, 626 F.3d 1197 (Fed. Cir. 2010)

Flexiteek Ams., Inc. v. PlasTEAK, Inc., No. 08-60996, 2009 WL 2957310 (S.D. Fla. Sept. 15, 2009)

Fresenius Medical Care Holdings, Inc. v. Baxter Int'l, Inc., No. C 03-1431, 2008 WL 928496 (N.D. Cal. April 4, 2008), *aff'd in part, rev'd in part*, 582 F.3d 1288 (Fed. Cir. 2009) (injunction vacated because of validity decision)

Funai Elec. Co., Ltd. v. Daewoo Elec. Corp., 593 F. Supp. 2d 1088 (N.D. Cal. 2009), *aff'd*, F.3d 1357 (Fed. Cir. 2010)

i4i Ltd. Partnership v. Microsoft Corp., 670 F. Supp. 2d 5680 (E.D. Tex. 2009), *aff'd*, 589 F.3d 1246 (Fed. Cir. 2009) (affirmed grant of permanent injunction but increased the delay period before it started from 60 days to 5 months based on testimony supporting the time necessary for Microsoft to design around.), *superseded by*, 598 F.3d 831 (Fed. Cir. 2010), *cert. granted*, 79 U.S.L.W. 3326 (U.S. Nov. 29, 2010) (No. 10-29).

I-Flow Corp. v. Apex Medical Technologies, Inc., No. 07cv1200, 2010 WL 141402 (S.D. Tex. Jan. 8, 2010)

Johns Hopkins Univ. v. Datascope Corp., 513 F. Supp. 2d 578 (D. Md. 2007), *rev'd and remanded*, 543 F.3d 1342 (Fed. Cir. 2008) (jury's finding of infringement was not supported by substantial evidence; reversed the district court's denial of JMOL and remanded for entry of judgment; injunction held moot)

Joyal Products, Inc. v. Johnson Elec. North Amer., Inc., No. 04-5172, 2009 WL 512156 (D. N.J. Feb. 27, 2009), *aff'd per curiam*, 335 Fed. Appx. 48 (Fed. Cir. 2009)

Kowalski v. Mommy Gina Tuna Resources, Nos. 05-00679, 05-00787, 06-00182, 2009 WL 856006 (D. Haw. March 30, 2009), *clarified by*, 2009 WL 1360695 (D. Haw. May 7, 2009)

Litecubes, LLC v. Northern Light Products, Inc., No. 4:04CV00485, 2006 WL 5700252 (E.D. Mo. Aug. 25, 2006), *aff'd*, 523 F.3d 1353 (Fed. Cir. 2008)

Mannatech, Inc. v. Glycoproducts Int'l, Inc., No. 3-06-CV-0471, 2008 WL 2704425 (N.D. Tex. July 9, 2008)

Martek Biosciences Corp. v. Nutrinova Inc., 520 F. Supp. 2d 537 (D. Del. 2007), *aff'd in part, rev'd in part*, 579 F.3d 1363 (Fed. Cir. 2009) (Federal Circuit affirmed the denial of JMOL for a finding of invalidity and non-infringement on some patent claims; reversed grant the JMOL finding invalidity on other patent claims; upheld the district court's claim construction).

Mass Engineered Design, Inc. v. Ergotron, Inc., 633 F. Supp. 2d 361 (E.D. Tex. 2009)

MGM Well Services Inc. v. Mega Lift Systems, LLC, 505 F. Supp. 2d 359 (S.D. Tex. 2007), *aff'd*, 264 Fed. Appx. 900 (Fed. Cir. 2008)

MPT, Inc. v. Marathon Labels, Inc., 505 F. Supp. 2d 401 (N.D. Ohio 2007), *rev'd in part*, 258 Fed. Appx. 318, (Fed. Cir. 2007) (Federal Circuit found injunction overly broad and remanded)

Muniauction, Inc. v. Thomson Corp., 502 F. Supp. 2d 477 (W.D. Pa. 2007), *rev'd in part*, 532 F.3d 1318 (Fed. Cir. 2008) (injunction vacated because Federal Circuit found some patent claims invalid for obviousness and other claims not infringed)

Novozymes A/S v. Genecor Int'l Inc., 474 F. Supp. 2d 592 (D. Del. 2007)

O2 Micro Int'l, Ltd. v. Beyond Innovation Technology Co., Ltd., No. 2-04-CV-32, 2007 WL 869576 (E.D. Tex. March 21, 2007), *rev'd*, 521 F.3d 1351 (Fed. Cir. 2008) (The Federal Circuit vacating the finding of infringement and the injunction and remanding)

Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc., Nos. 04-1689, 06-757, 06-5166, 2007 WL 869545 (D. N.J. March 20, 2007), *aff'd in part*, 520 F.3d 1358 (Fed. Cir. 2008)

Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc., No. 04-1371, 2008 WL 5210843 (D. Del. Dec. 12, 2008), *motion for temporary stay granted by*, 2008 WL 5351038 (D. Del. Dec. 22, 2008)

Power-One, Inc. v. Artesyn Technologies, Inc., No. 2:05-CV-463, 2008 WL 1746636 (E.D. Tex. April 11, 2008), *aff'd*, 599 F.3d 1343 (Fed. Cir. 2010)

Rosco, Inc. v. Mirror Lite Co., No. CV-96-5658, 2006 WL 2844400 (E.D.N.Y. Sept. 29, 2006)

Sanofi-Synthelabo v. Apotex, Inc., 492 F. Supp. 2d 353 (S.D.N.Y. June 19, 2007), *aff'd*, 550 F.3d 1075 (Fed. Cir. 2008) (infringement and validity decision upheld), *cert. denied*, 130 S. Ct. 493 (2009) Preliminary injunction opinion: 488 F. Supp. 2d 317 (S.D.N.Y 2006), *aff'd*, 470 F.3d 1368 (Fed. Cir. 2006)

Sensormatic Electronics Corp. v. Tag Co. U. S., 632 F. Supp. 2d 1147 (S.D. Fla. 2008), *aff'd*, 2010 WL 565606 (Fed. Cir. Feb. 17, 2010) (non-precedential opinion)

Smith & Nephew, Inc. v. Synthes, 466 F. Supp. 2d 978 (W.D. Tenn. 2006)

Spectrlytics, Inc. v. Cordis Corp., 650 F. Supp. 2d 900 (D. Minn. 2009)

Telequip Corp. v. The Change Exchange, No. 5:01-CV-1748, 2006 WL 2385425 (N.D.N.Y. Aug. 15, 2006)

TiVo v. Echostar Commc'ns Corp., 446 F. Supp. 2d 664 (E.D. Tex. 2006), *aff'd in part*, *rev'd in part*, 516 F.3d 1290 (Fed. Cir. 2008) (Federal Circuit overturned the infringement decision with respect to hardware claims and upheld the infringement decision with respect to software claims.)

Trading Technologies Int'l, Inc. v. eSpeed, Inc., No. 04 C 5312, 2008 WL 4531371 (N.D. Ill. March 22, 2008), *aff'd*, 595 F.3d 1340 (Fed. Cir. 2010)

Transamerica Life Ins. Co. v. Lincoln National Life Ins. Co., 625 F. Supp. 2d 702 (N.D. Iowa 2009)

Transocean Offshore Deepwater Drilling, Inc. v. GlobalSanteFe, No. H-03-2910, 2006 WL 3813778 (S.D. Tex. Dec. 27, 2006)

TruePosition, Inc. v. Andrew Corp., 568 F. Supp. 2d 500 (D. Del. 2008) (post-judgment interest order amended by 2009 WL 192470 (D. Del. Jan. 27, 2009).

U.S. Philips Corp. v. KXD Technology, Inc., No. CV 05-8953, 2007 WL 4984150 (C.D. Cal. Sept. 7, 2007)

U.S. Philips Corp. v. Iwasaki Electric Co., Ltd., 607 F. Supp. 2d 470 (S.D.N.Y. 2009)

Verizon Servs. Corp. v. Vonage Holdings Corp., 503 F.3d 1295 (Fed. Cir. 2007)

Visto Corp. v. Seven Networks, Inc., No. 2:03-CV-333, 2006 WL 3741891 (E.D. Tex. Dec. 19, 2006)

Wald v. Mudhopper Oilfield Servs., No. CIV-04-1693, 2006 WL 2128851 (W.D. Okla. July 27, 2006)

Zen Design Group, Ltd. v. Clint, No. 08-cv-14309, 2009 WL 4050247 (E.D. Mich. Nov. 23, 2009)

V. Questionnaire Used in Malin Study

SURVEY OF *EBAY* INJUNCTION FACTORS

CASE NAME: _____

CITATION: _____ DECISION DATE: _____

COURT: _____ JUDGE: _____

REVIEWER: _____ FIRM NAME: _____

INJUNCTION REQUESTED: ☐ PERMANENT ☐ PRELIMINARY

DISPOSITION: ☐ GRANTED ☐ DENIED

PATENTEE	Yes	No	N/A	Weight*	*Ebay* Factor**
Delay in Bringing Suit	☐	☐	☐	0 1 2 3	1 2 3 4
Practicing Patentee	☐	☐	☐	0 1 2 3	1 2 3 4
Direct Competitor to Defendant	☐	☐	☐	0 1 2 3	1 2 3 4
Patentee's Only/Primary Product	☐	☐	☐	0 1 2 3	1 2 3 4
Lost Mkt. Share/Sales Linked to Infringement	☐	☐	☐	0 1 2 3	1 2 3 4
Limited/Small Customer Base	☐	☐	☐	0 1 2 3	1 2 3 4
Likely Price Erosion	☐	☐	☐	0 1 2 3	1 2 3 4
Nascent/Developing Market	☐	☐	☐	0 1 2 3	1 2 3 4
Critical/Developing Time for Patentee	☐	☐	☐	0 1 2 3	1 2 3 4
"Sticky"/Loyal Customers	☐	☐	☐	0 1 2 3	1 2 3 4
Licensing Others	☐	☐	☐	0 1 2 3	1 2 3 4
Offered License to Defendant	☐	☐	☐	0 1 2 3	1 2 3 4
Refused License to Defendant	☐	☐	☐	0 1 2 3	1 2 3 4
Only Asserting Harm On Behalf of Licensees	☐	☐	☐	0 1 2 3	1 2 3 4
Patentee's Reputation Harmed	☐	☐	☐	0 1 2 3	1 2 3 4

ALLEGED INFRINGER	Yes	No	N/A	Weight*	*Ebay* Factor**
Willful Infringement	☐	☐	☐	0 1 2 3	1 2 3 4
Voluntarily Offer to Avoid Future Infringement	☐	☐	☐	0 1 2 3	1 2 3 4
Impact on Defendant's Business/Product Line	☐	☐	☐	0 1 2 3	1 2 3 4
Inexpensive Noninfringing Alternatives Available	☐	☐	☐	0 1 2 3	1 2 3 4
Invention a Trivial Component	☐	☐	☐	0 1 2 3	1 2 3 4
Product at Core of Defendant's Business	☐	☐	☐	0 1 2 3	1 2 3 4
Minor Impact on Infringer's Sales	☐	☐	☐	0 1 2 3	1 2 3 4
Compliance w/ Injunction Easy	☐	☐	☐	0 1 2 3	1 2 3 4

EFFECT ON THIRD PARTIES	Yes	No	N/A	Weight*	*Ebay* Factor**
Harm to Defendant's Employees	☐	☐	☐	0 1 2 3	1 2 3 4
Harm to Defendant's Customers	☐	☐	☐	0 1 2 3	1 2 3 4
Product Ubiquitous/Relied on by Public	☐	☐	☐	0 1 2 3	1 2 3 4
Health Concern Implicated	☐	☐	☐	0 1 2 3	1 2 3 4
Product for Entertainment Only	☐	☐	☐	0 1 2 3	1 2 3 4

* **0**=Treated as Irrelevant; **1**=Mentioned But Not Very Significant; **2**=Average; **3**=Material to Holding

** **1**=Irreparable Harm; **2**=Adequacy of Damages; **3**=Balance of Hardships; **4**=Public Interest

APPENDIX C
HEARING PARTICIPANTS

Participants in the FTC Hearings on the Evolving Intellectual Property Marketplace[1]

Participant	Hearing Date
Keith Agisim Associate General Counsel for Global Intellectual Property, Bank of America	February 11, 2009
John A. Amster Co-CEO, RPX Corp.	May 4, 2009
Robert A. Armitage Senior Vice President and General Counsel, Eli Lilly & Co.	February 12, 2009 March 19, 2009
Ashish Arora Professor of Strategy, Fuqua School of Business, Duke University (visiting) H. John Heinz, III Professor of Economics, Innovation and Economic Development, Carnegie Mellon University (on leave)	March 19, 2009
George E. Badenoch Partner, Kenyon & Kenyon, LLP	February 12, 2009
Christine P. Bellon Vice President of Intellectual Property & Legal Affairs, Hydra Biosciences	March 18, 2009
Keith Bergelt Chief Executive Officer, Open Invention Network	April 17, 2009
James E. Bessen Lecturer in Law, Boston University School of Law; Director, Research on Innovation	March 19, 2009

[1]Full transcripts of all the hearing testimony, agendas describing these hearings, biographies of the panelists and speakers, and related materials are available at http://www.ftc.gov/bc/workshops/ipmarketplace.

Participant	Hearing Date
Earl (Eb) Bright General Counsel and Vice President, Intellectual Property, Exploramed	May 4, 2009
Bruce W. Burton Senior Managing Director, FTI Consulting, Inc.	February 11, 2009
Dan L. Burk Chancellor's Professor of Law, University of California Irvine School of Law	May 5, 2009
Bernard J. Cassidy General Counsel and Senior Vice President, Tessera Technologies, Inc.	February 12, 2009
Yar R. Chaikovsky Partner, Sonnenschein Nath & Rosenthal, LLP	May 5, 2009
Henry Chesbrough Adjunct Professor, Haas School of Business, U.C. Berkeley; Executive Director, Center for Open Innovation	May 4, 2009
Robert A. Clarke Director, Office of Patent Legal Administration, Patent & Trademark Office	March 19, 2009
Iain Cockburn Professor of Finance and Economics and Everett W. Lord Distinguished Faculty Scholar, Boston University School of Management	April 17, 2009
Thomas F. Cotter Briggs and Morgan Professor of Law, University of Minnesota Law School	December 5, 2008 February 11, 2009
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Marcus Delgado Chief IP Counsel, Cox Communications, Inc.	April 17, 2009

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Dianna L. DeVore Partner, Virtual Law Partners LLP	May 4, 2009
Q. Todd Dickinson Executive Director, American Intellectual Property Law Association	December 5, 2008
Mary E. Doyle Senior Vice President and General Counsel, Palm, Inc.	May 5, 2009
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Daralyn J. Durie Partner, Durie Tangri Page Lemley Roberts & Kent LLP	May 5, 2009
Rebecca S. Eisenberg Robert and Barbara Luciano Professor of Law, University of Michigan Law School	May 4, 2009
Ron Epstein CEO, IPotential, LLC	May 4, 2009
Richard J. Gilbert Professor of Economics and Professor of the Graduate School (Emeritus), University of California, Berkeley	May 5, 2009
John M. Golden Assistant Professor, University of Texas School of Law	February 12, 2009
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Steven J. Hoffman CEO, ThinkFire	April 17, 2009
Carl B. Horton Chief Intellectual Property Counsel, General Electric Co.	March 18, 2009
Robert Hunt, Ph.D. Assistant Vice President, Federal Reserve Bank of Philadelphia	March 19, 2009
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Philip S. Johnson Chief Intellectual Property Counsel, Johnson & Johnson	February 11, 2009
Brian Kahin Senior Fellow, Computer & Communications Industry Association	December 5, 2008
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Ron D. Katznelson, Ph.D. President, Bi-Level Technologies	March 18, 2009

Participant	Hearing Date
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F. Scott Kieff Professor, Washington University School of Law; Senior Fellow, Hoover Institution	March 19, 2009
William E. Kovacic Chairman, Federal Trade Commission	December 5, 2008
Noreen Krall Vice President and Chief IP Counsel, Intellectual Property Law, Sun Microsystems, Inc.	March 18, 2009
Stephen G. Kunin Partner, Oblon, Spivak, McClelland, Maier & Neustadt, P.C.	March 19, 2009
Jeffrey P. Kushan Partner, Sidley and Austin LLP	December 5, 2008
Jack Lasersohn Partner, The Vertical Group; Member, Board of Directors, National Venture Capital Association	February 11, 2009
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Michelle K. Lee Associate General Counsel and Head of Patents and Patent Strategy, Google Inc.	May 5, 2009
Mark A. Lemley William H. Neukom Professor of Law, Stanford Law School; Director, Stanford Program in Law, Science and Technology	April 17, 2009 May 5, 2009
Dr. Gregory K. Leonard Senior Vice President, NERA Economic Consulting	February 11, 2009

Participant	Hearing Date
Aron Levko Principal, PricewaterhouseCoopers	February 11, 2009
Gail Levine Assistant General Counsel, Verizon Communications Inc.	February 11, 2009
Gary H. Loeb Vice President, Intellectual Property, Genentech	February 11, 2009 February 12, 2009
Bryan Lord Vice President, Finance and Licensing and General Counsel, Amberwave Systems Corp.	February 11, 2009
Douglas B. Luftman Associate General Counsel of Intellectual Property, Palm, Inc.	February 12, 2009
Richard J. ("Chip") Lutton Jr. Chief Patent Counsel, Apple Computer, Inc.	May 4, 2009
Taraneh Maghamé Vice President, Patent Policy & Government Relations Counsel, Tessera Technologies, Inc.	February 11, 2009
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James E. Malackowski President & Chief Executive Officer, Ocean Tomo, LLC	April 17, 2009
Kenneth M. Massaroni Senior Vice President and General Counsel, Seagate Technology	February 12, 2009
Daniel P. McCurdy Chief Executive Officer, Allied Security Trust; Chairman, PatentFreedom, LLC	December 5, 2008
The Honorable Roderick R. McKelvie Partner, Covington & Burling; formerly Judge, United States District Court for the District of Delaware	December 5, 2008

Participant	Hearing Date
John T. McNelis Partner and Chair of the Patent Group, Fenwick and West	May 5, 2009
Peter S. Menell Professor of Law, U.C. Berkeley Boalt Hall School of Law; Director, Berkeley Center for Law and Technology	May 5, 2009
Robert P. Merges Wilson Sonsini Goodrich & Rosati Professor of Law and Technology, U.C. Berkeley Boalt Hall School of Law; Director, Berkeley Center for Law & Technology	May 4, 2009
Michael V. Messinger Director, Sterne, Kessler, Goldstein & Fox	March 19, 2009
Michael Meurer Michaels Faculty Research Scholar and Professor of Law, Boston University School of Law	December 5, 2008
Christine Meyer Vice President, NERA Economic Consulting	February 12, 2009
The Honorable Paul R. Michel Chief Judge, Court of Appeals for the Federal Circuit (retired)	December 5, 2008
Raymond Millien founder, PCT Companies and CEO, PCT Capital, LLC	December 5, 2008
Joseph S. Miller Associate Professor, Lewis & Clark Law School; Visiting Associate Professor, University of Georgia Law School	December 5, 2008
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Jeffrey Myers Vice President and Assistant General Counsel, Intellectual Property Enforcement, Pfizer, Inc.	March 18, 2009
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Lee Petherbridge Associate Professor of Law, Loyola Law School, Los Angeles	May 5, 2009
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Teresa Stanek Rea Partner, Crowell & Moring, LLP	March 19, 2009
Edward R. Reines Partner, Weil, Gotshal & Manges, LLP	February 11, 2009
Kevin H. Rhodes President and Chief Intellectual Property Counsel, 3M Innovative Properties Co.	February 11, 2009 February 12, 2009
Kevin G. Rivette Chair, PTO Patent Public Advisory Committee	May 5, 2009

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The Honorable Sue L. Robinson Judge, United States District Court for the District of Delaware	February 11, 2009
Alexander H. Rogers Senior Vice President and Legal Counsel, Qualcomm Inc.	March 18, 2009
William C. Rooklidge Partner, Howrey, LLP	May 5, 2009
Paul Ryan Chairman & CEO, Acacia Research	April 17, 2009
Matthew M. Sarboraria Senior Patent Counsel, Oracle Corporation	March 18, 2009
Jason Schultz Acting Director, Samuelson Law, Technology & Public Policy Clinic, U.C. Berkeley Boalt Hall School of Law	May 5, 2009
John W. Schlicher Attorney, Lafayette, California	May 5, 2009
Herbert F. Schwartz Adjunct Professor of Law, University of Pennsylvania Law School and New York University Law School; Partner, Ropes & Gray, LLP (retired)	March 19, 2009
Maggie Shafmaster Senior Vice President & Chief Patent Counsel, Genzyme Corp.	March 18, 2009
Suzanne M. Shema Senior Vice President, General Counsel and Corporate Compliance Officer, ZymoGenetics, Inc.	May 4, 2009
David Simon Chief Patent Counsel, Intel Corporation	February 11, 2009
P. Martin Simpson, Jr. Managing Counsel - Business and Land Use, Office of General Counsel, University of California	May 5, 2009

Participant	Hearing Date
Steven D. Singer Partner, WilmerHale Chair, Technology Transactions and Licensing Practice Group and Co-Chair, Life Sciences Group	March 18, 2009
John M. Skenyon Principal, Fish & Richardson P.C.	February 11, 2009
Russ Slifer Chief Patent Counsel, Micron Technology, Inc.	March 18, 2009
Henry E. Smith Professor, Harvard Law School	February 12, 2009
Jon Soderstrom, Ph.D. Managing Director, Office of Cooperative Research, Yale University	March 18, 2009
Alex Sousa Counsel, Innovalight, Inc.	May 4, 2009
Christopher J. Sprigman Associate Professor, University of Virginia School of Law	February 12, 2009
John A. Squires Chief Intellectual Property Counsel, Goldman Sachs & Co.	December 5, 2008
Jennifer M. Stec Intellectual Property Counsel, Ford Global Technologies	March 18, 2009
Scott Stern Associate Professor of Management and Strategy, Kellogg School of Management, Northwestern University	March 19, 2009
Henry Su Partner, Howrey, LLP	February 12, 2009
John R. Thomas Professor of Law, Georgetown University Law Center	December 5, 2008

Participant	Hearing Date
Tracey R. Thomas Chief IP Strategist and License Negotiator, American Express Co.	April 17, 2009
E. Earle Thompson Vice President and Chief Intellectual Property Counsel, SanDisk Corp.	May 4, 2009
John Thorne Senior Vice President and Deputy General Counsel, Verizon Communications Inc.	March 18, 2009
Marian Underweiser Intellectual Property Law Counsel, IBM	February 11, 2009
Duane R. Valz VP & Associate General Counsel, Global Patents, Yahoo!	December 5, 2008
Lee VanPelt VanPelt, Yi & James, LLP	May 4, 2009
Samson Vermont Assistant Professor of Law, George Mason University School of Law	April 17, 2009
Polk Wagner Professor of Law, University of Pennsylvania School of Law	April 17, 2009
Donald R. Ware Partner, Foley Hoag, LLP	February 12, 2009
Stuart L. Watt Vice President, Law & Intellectual Property Officer, Amgen, Inc.	May 4, 2009
Thomas G. Woolston Chief Executive Officer, MercExchange, LLC	March 18, 2009
Mallun Yen Vice President, Worldwide Intellectual Property, Cisco Systems, Inc.	December 5, 2008

Participant	Hearing Date
Rosemarie Ziedonis Assistant Professor of Strategy, Stephen M. Ross School of Business, University of Michigan and Co-Director, Program in Law, Economics, and Technology, Michigan Law	May 4, 2009

Participants on Selected Panels from the May 26, 2010 FTC/DOJ/PTO Workshop on the Intersection of Competition Policy and Patent Policy: Implications for Promoting Innovation[2]

William Barr
former General Counsel, Verizon Communications, Inc.

Bernard J. Cassidy
Executive Vice President and General Counsel, Tessera Technologies, Inc.

Mark Chandler
Senior Vice President & General Counsel, Cisco Systems

Colleen Chien
Assistant Professor of Law, Santa Clara Law

Joseph Farrell
Director, Bureau of Economics, Federal Trade Commission

Patrick Gallagher
Director, National Institute of Standards & Technology, U.S. Department of Commerce

Stuart Graham
Chief Economist, U.S. Patent and Trademark Office

Brian Kahin
Senior Fellow, Computer & Communications Industry Association

[2]The listed participants took part in the three panels held of the workshop that explored issues discussed in this report: Panel 2 – Permanent Injunctions in the District Courts and ITC; Panel 3 – Standard Setting, Patent Rights, and Competition Policy; and the Wrap-Up Discussion panel. A full transcript from the workshop, an agenda, and biographies of the panelists are available at http://www.ftc.gov/bc/workshops/ipmarketplace.

Alice A. Kipel
Partner, Steptoe & Johnson, LLP

Anne Layne-Farrar
Director, LECG

Amy A. Marasco
General Manager, Standards Strategy, Microsoft Corp.

Stanford McCoy
Assistant U.S. Trade Representative for Intellectual Property and Innovation,
Office of the U.S. Trade Representative, Executive Office of the President

Christine McDaniel
Economic Adviser to Chairman Shara L. Aranoff,
U.S. International Trade Commission

Douglas A. Melamed
Senior Vice President & General Counsel, Intel Corp.

Carl Shapiro
Deputy Assistant Attorney General for Economic Analysis, Antitrust Division,
U.S. Department of Justice

Emily Ward
Vice President and Deputy General Counsel, eBay, Inc.

APPENDIX D
PUBLIC COMMENTS AND PRESENTATIONS AT HEARINGS

Public Comments[3]

Name	Comment Date
Acacia Research Corporation (Ryan, Paul)	May 14, 2009
American Intellectual Property Law Association (Crowne, Jim)	May 18, 2009
Biotechnology Industry Organization (DiLenge, Tom)	May 15, 2009
Choate, Pat	February 3, 2009
Coalition for Patent Fairness (Pincus, Andrew)	February 5, 2009
Cochran, William	February 5, 2009
Computer & Communications Industry Association (Schruers, Matthew)	February 5, 2009
Craig, Barbara	November 10, 2008
Dolak, Lisa	February 3, 2009
Durdik, Paul	February 4, 2009
Furstenwerth, Greg	December 2, 2008
IBM Corporation (Mortinger, Alison)	February 12, 2009
Innovation Alliance (Thomas, Eric)	February 6, 2009

[3] All public comments submitted to the FTC during the course of this project are available at http://www.ftc.gov/bc/workshops/ipmarketplace.

Name	Comment Date
Jones, Nathan	November 17, 2009
Kidder, Douglas	May 15, 2009
Lass, Stanley	February 4, 2009
Licensing Executives Society USA and Canada (Painchaud, Francois)	May 14, 2009
Licensing Executives Society USA and Canada (Painchaud, Francois)	May 15, 2009
Martin, Michael	May 15, 2009
Masse, Benjamin	February 5, 2009
Morgan, Paul	December 11, 2008
Morgan, Paul F.	January 12, 2009
Morgan, Paul F.	February 24, 2009
NanoBusiness Alliance (Murdock, Sean)	February 5, 2009
Nordin, Miles	March 29, 2009
NERA Economic Consulting (Leonard, Gregory)	March 9, 2009
Pharmaceutical Research and Manufacturers of America (Tauzin, Billy)	February 10, 2009
Prakash-Canjels, Gauri	April 16, 2009
Quillen, Cecil (Four comments submitted)	February 5, 2009
Rearden LLC (Perlman, Steve)	February 5, 2009

Name	Comment Date
Schlicher, John	May 15, 2009
Shane, Scott	February 5, 2009
Software & Information Industry Association (Kupferschmid, Keith)	February 5, 2009
Strategic Advisory Group (Mattathil, George)	November 12, 2008
Sun Microsystems, Inc. (Anastasio, Michael)	February 5, 2009
Trainor, Nuala	May 15, 2009
Verizon Communications Inc. (Levine, Gail)	March 20, 2009
Verizon Communications Inc. (Levine, Gail)	May 15, 2009
Vertical Group on behalf of **the National Venture Capital Association** (Lasersohn, Jack)	March 6, 2009
Wi-Lan Inc.	February 5, 2009
Wisconsin Alumni Research Foundation (Gulbrandsen, Carl)	May 15, 2009
Wren, Stephen	February 4, 2009
Wren, Stephen	February 5, 2009

Panelist Presentations at the Hearings[4]

Keith Agism, *Study of the Evolving IP Marketplace*, (June 9, 2009)

Ashish Arora, *Markets for Technology and the Division of Innovative Labor: A View from the Ivory Tower* (March 19, 2009)

James Bessen, *Patent Notice and Markets for Technology* (March 19, 2009)

Henry Chesbrough, *Specialisation and Markets for IP* (May 4, 2009)

Iain M. Cockburn, *Licensing: A View from the Trenches (Selected findings from the LES Foundation Surveys)* (April 2009)

Thomas Cotter, *Remedies for Patent Infringement: Theory and Practice* (December 5, 2008)

Peter Detkin, *To Promote the Progress...of Useful Arts: Investing in Invention* (December 5, 2008)

Q. Todd Dickinson, *Federal Trade Commission Workshop: Recent and Proposed Changes in Remedies Law* (December 5, 2008)

Stuart Graham, *Patents and Technology Markets: How is the Market Operating, and Can it be Improved?* (April 17, 2009**)**

Bronwyn Hall, *FTC Panel on Markets for IP and Technology* (May 4, 2009)

Robert Hunt, *The Federal Trade Commission's Hearing on "The Evolving IP Marketplace"* (March 19, 2009)

Paul Janicke, *Patent Damages* (February 2009)

Brian Kahin, *The Patent Ecosystem in IT: Business Practice and Arbitrage* (December 5, 2008)

Ron D. Katznelson, *"The Evolving IP Marketplace" Hearings on the Operation of IP Markets* (March 18, 2009)

F. Scott Kieff, *The Importance of Marinating on Patents* (March 19, 2009)

Mark A. Lemley, *Ignoring Patents; How to Make a Patent Market* (April 17, 2009)

Aron Levko, *2009 Patent Damages Study- Preliminary Results* (February 11, 2009)

Bryan P. Lord, *Hearing on Patent Damages* (February 11, 2009)

James E. Malackowski, *FTC Hearings on Developing Business Models and a National IP Economic Infrastructure* (April 17, 2009)

[4]All written presentations and materials provided by the panelists at the hearings are available at http://www.ftc.gov/bc/workshops/ipmarketplace.

Steve Malin, *Empirical Analysis of Permanent Injunction Decisions Following eBay* (February 12, 2009)

Daniel P. McCurdy, *Unique Operating Companies Involved in Patent Litigation with NPEs; Patent Litigation Involving NPEs and Operating Companies* (December 5, 2008)

Hon. Roderick R. McKelvie, *Seagate Plus One: How the District Courts are Implementing Seagate; Seagate Plus One (Article)* (December 5, 2009)

Robert Merges, *The Evolving IP Marketplace* (May 4, 2009)

Joseph Scott Miller, *Testimony of Professor Joseph Scott Miller, Lewis & Clark Law School-Legal Doctrines That Affect the Value and Licensing of Patents (Panel 3)* (December 5, 2008)

Raymond Millien, *The IP Marketplace Players,* (December 5, 2008)

John W. Schlicher, *Comments on Patent Damages, Injunctions, Recent Supreme Court Patent Decisions, and Other Issues Identified in the Notice of Hearings on the Intellectual Property Marketplace* (May 16, 2009)

Suzanne M. Shema, *The Need for Distinct Claims* (May 4, 2009)

John A. Squires, *Patent Remedies: Can Quanta Finish What eBay Started?* (December 5, 2008)

Scott Stern, *The Impact of the Patent System on the Market for Technology* (March 19, 2009)

Jay Thomas, *Patent Damages: Principles and Current Problems* (December 5, 2008)

Marian Underweiser, *Towards an Efficient Market for Innovation* (February 11, 2009)

Duane R. Valz, *Yahoo! Inc. - FTC Hearing on The Evolving IP Marketplace* (December 5, 2008)

R. Polk Wagner, *Patent Portfolios [Written]; Understanding Patent Quality Mechanisms* (January 6, 2009)

Donald R. Ware, *Introductory Remarks and Presentation* (February 12, 2009)

Mallun Yen, *Cisco Systems, Inc. FTC Hearing on the Evolving IP Marketplace* (December 5, 2008)

Rosemarie Ziedonis, *Startups as Sources of New Technologies...and Patents* (May 4, 2009)

APPENDIX E
ANNOUNCED AGENDA TOPICS FOR THE FTC HEARINGS ON THE EVOLVING IP MARKETPLACE[5]

KICKOFF HEARING
(December 5, 2008)

Opening Remarks: William Kovacic, Chairman, Federal Trade Commission

Panel 1: Developing Business Models

Some of the most significant recent changes in markets for intellectual property have occurred through the emergence of new business models involving the buying, selling and licensing of patents. The first panel will discuss the operation of emerging business models, aspects of the patent system that support those models, and industry responses. The panel will also explore the implications these developing business models have for patent valuation and licensing.

Keynote Address: The Honorable Paul R. Michel, Chief Justice, Court of Appeals for the Federal Circuit

Panel 2: Recent and Proposed Changes in Remedies Law

This panel will explore recent and proposed changes in remedies law, their impact on innovation and consumers, and the use of economic analysis in determining remedies. Among other topics, the panel will consider: what economic evidence is relevant when analyzing whether to grant a permanent injunction; whether the legal rules governing patent damages result in awards that appropriately compensate patentees; and whether changes in willfulness doctrine have altered the behavior of patentees and potential infringers.

Panel 3: Legal Doctrines That Affect the Value and Licensing of Patents

In the third panel, participants will examine changes in legal doctrines that affect the value and licensing of patents brought about by recent Supreme Court cases on obviousness, declaratory judgment and exhaustion. The panel will also discuss the role of unpredictability and notice in the IP marketplace.

[5]Agendas describing the topics covered at the hearings and other materials related to the hearings (including full transcripts of testimony, lists of witnesses, etc.) are available at http://www.ftc.gov/bc/workshops/ipmarketplace.

DAMAGES
(February 11, 2009)

Panel 1: Standards for Assessing Patent Damages and Their Implementation by Courts

This panel will discuss trends in damage awards, the current standards governing patent damages, and their impact on patent value and innovation. It will examine various approaches to damages calculation and the evidence used in assessing damages, particularly in the context of reasonable royalty determinations. Policy concerns relating to the calculation of reasonable royalties and potential reforms will also be addressed.

Keynote Address: The Honorable Sue L. Robinson, United State District Court for the District of Delaware

Panel 2: Industry Roundtable Discussion

This panel, structured as an industry roundtable, will explore how patent damages affect licensing, business strategies, and innovation in various sectors of the economy. In particular, it will consider whether damage awards in patent cases result in awards that promote innovation. Panelists will examine various proposals to revise the standards for damage determinations and discuss how such changes would impact their industries.

PERMANENT INJUNCTIONS & WILLFULNESS
(February 12, 2009)

Panel 1: Changes in Injunction Law

This panel will explore permanent injunctions in patent cases in the wake of the Supreme Court's *eBay* decision. It will examine the ways the courts have analyzed whether to grant or deny injunctions, including the role of economic evidence in that analysis, and any trends that have developed. Panelists will consider the implications of these developments for innovation, competition, and consumer welfare.

Panel 2: Industry Roundtable Discussion

This panel will explore recent changes in injunction law and willfulness standards, and their impact on innovation, licensing and business strategies. Among other topics, the panel will consider the impact of the *eBay* decision on patent valuation and licensing; whether the changes in the willfulness doctrine have altered the behavior of patentees and potential infringers; how these court decisions have changed investment in R&D; and how changes in remedies law have implicated incentives to bring, defend or settle patent suits.

INDUSTRY ROUNDTABLES
(March 18, 2009)

Four panels featuring representatives from universities and entrepreneurs, the IT and electronics industries, manufacturing and diversified companies, and the life sciences will examine the operation of IP and technology markets and the impact of patent policies on those markets. Panelists will discuss the factors they consider in determining how to use patents in the IP marketplace, for instance, whether to enforce exclusivity or enter licensing agreements. The panels will consider whether these markets operate efficiently and transparently, and what could be done to improve their operation. The effect of recent Supreme Court decisions and uncertainty in the patent system will be discussed, as will experience with the patent system's notice function.

THE OPERATION OF IP MARKETS AND THE NOTICE FUNCTION OF PATENTS
(March 19, 2009)

Keynote Address: **Herbert F. Schwartz, Former Partner, Ropes & Gray and Adjunct Professor, University of Pennsylvania and New York University Law Schools**

Panel 1: **Economic Perspectives on IP and Technology Markets**

Panelists will examine how patents facilitate technology transfer, whether markets for technology and IP operate efficiently and transparently, and what could be done to improve their operation. The effect of recent Supreme Court decisions on licensing decisions will be discussed.

Panel 2: **Fulfilling the Patent System's Public Notice Function**

Experts from academia and the bar will address the extent to which the patent system adequately fulfills its notice function – for example, ensuring that the firms seeking to develop and introduce innovative technologies can obtain clear and reliable information regarding the existence and scope of patent rights that could cover those technologies. Specifically, panelists will consider how various patent law doctrines or procedural aspects of the system affect notice, including (1) legal standards such as rules of claim construction and standards governing indefiniteness, written description, and enablement, and (2) examination practice and procedures, including notice available from the information that applicants are required to supply during the examination process, the information provided by examiners in allowing claims, the use of continuing applications, and the publication of applications and evolving claims.

MARKETS FOR INTELLECTUAL PROPERTY
(April 17, 2009)

Keynote Address: James E. Malackowski, President & CEO, Ocean Tomo

Panel 1: Roundtable Discussion

Some of the most significant recent changes in markets for intellectual property have occurred through the emergence of new business models involving the buying, selling and licensing of patents. This panel will discuss valuing and monetizing patents, strategies for buying and selling patents, and the role of secondary markets for intellectual property.

Panel 2: Recent Scholarship in Patent Markets

As markets for intellectual property have developed and evolved, so has the scholarship analyzing them. This panel will showcase some of the recent academic thinking about the development and functioning of markets for intellectual property and the policy implications surrounding them.

THE IP MARKETPLACES IN THE LIFE SCIENCES AND IT INDUSTRIES
(May 4, 2009 Berkeley, CA)

Panels 1 & 2: Industry Roundtable Discussions

Panels 1 and 2 will examine the operation of IP and technology markets in the life sciences and IT industries, respectively: how and why companies buy, sell and license patents; how patents support innovation and technology transfer; what aspects of the patent system create difficulties when seeking freedom to operate; and how the potential of patent litigation affects the operation of IP markets.

Panel 3: Markets for IP and Technology: Academic Perspectives

Panelists will examine how patents facilitate technology transfer, whether markets for technology and IP operate efficiently and transparently, and what could be done to improve their operation.

THE NOTICE FUNCTION OF PATENTS AND PATENT REMEDIES
(May 5, 2009 Berkeley, CA)

Panel 1: The Notice Function of Patents

Experts from academia and the bar will address the extent to which the patent system adequately fulfills its notice function, for example, ensuring that firms seeking to develop or license innovative technologies can obtain clear and timely information regarding the existence and scope of relevant patents and patent applications. Specifically, panelists will consider how various patent law doctrines and patent examination procedures affect notice, including (1) legal standards such as rules of claim construction and standards governing indefiniteness, written description, and enablement, and (2) examination practices and procedures, including notice available from information supplied by applicants and examiners, the use of continuing applications, and the publication of applications. Panelists will also discuss the extent to which the sheer number of potentially relevant patents and patent applications hinders effective notice and will consider whether any adjustments to the patent system are warranted.

Panel 2: Patent Remedies

This panel will discuss trends in damage awards, the current standards governing patent damages, and their impact on patent value and innovation. It will examine various approaches to damages calculation and the evidence used in assessing damages, particularly in the context of reasonable royalty determinations. This panel will also explore permanent injunctions in patent cases in the wake of the Supreme Court's *eBay* decision and the impact of recent changes to the doctrine of willful infringement.

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