INVENTIONS, INDUSTRY STANDARDS, AND INTELLECTUAL PROPERTY

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ABSTRACT

When an industry standard incorporates a patented invention, the demand for products that comply with the standard has two components. Some of the demand may be for the inherent technical advantages of the invention; the patentee is generally entitled to revenues attributable to this demand. But some of the demand is for the benefits of standardization, such as interoperability, and the patentee is not entitled to revenues attributable to this demand. From this point, the article draws two conclusions. First, the amounts to which a patentee is entitled, either in litigation or in licensing negotiations, should be calculated by determining the portion of demand that is attributable to its invention. In some cases, there will be evidence from which one can make this determination directly; in others, there may be no such direct evidence, but it may still be possible to draw inferences regarding the contributions of the patentee. Second, because the contributions of the standard itself, like interoperability, are economically distinct, the "owner" of a standard—typically a standard-setting organization—should be allowed to negotiate license fees with the patentee of an invention incorporated in the standard.

I. INTRODUCTION

When an industry standard incorporates a patented invention, the legal challenge is to distinguish several market effects. Some of the demand for products that comply with the standard may be for the inherent technical advantages of the invention. A patentee is generally entitled to revenues

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attributable to this demand.[1] But some of the demand may also be created by the adoption of the standard.[2] The patentee is not entitled to revenues attributable to this demand. Although it may be difficult to distinguish demand for the invention and demand for the standard, it is that distinction—rather than, say, a focus on "inequity" or some other concept—that best fosters the incentive-creating goals of patent law while minimizing negative effects on competition.[3]

The distinction can be illustrated by a specific example. Rambus, Inc. recently alleged infringement of its patents,[4] which it says are required to comply with standards for memory technology developed by JEDEC, an industry standard-setting organization.[5] The claims of the Rambus patents are directed at "inventions designed to increase the operating speed of memory in computers."[6] The JEDEC standards, however, are intended to provide compatibility or interoperability among the products of different manufacturers.[7] Although some of the demand for the Rambus inventions

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1. *See* Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1569 (Fed. Cir. 1995) (Nies, J., dissenting in part) (describing the Federal Circuit's view that award of lost profits is dependent on the consumer demand for patentee's invention).

2. *See infra* Part I.A.

3. That is not to say that inequitable conduct on the part of a patentee is irrelevant. Such conduct might also justify placing limits on the patentee's entitlement to returns from its invention. Indeed, most of the commentary on the issue of patents and standard-setting addresses the issue in that context. *See* Janice M. Mueller, *Patenting Industry Standards*, 34 J. MARSHALL L. REV. 897 (2001); Daniel I. Prywes, *Patent Ambushes and Licensing in Computer Standard-Setting Groups*, ANTITRUST REP. 17 (March 2001). This essay argues that even when the patentee has engaged in no bad conduct, it should be limited to returns that are attributable to its invention.

4. *See* Rambus, Inc. v. Infineon Techs. AG, 155 F. Supp. 2d 668, 671 (E.D. Va. 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.).

5. *See* JEDEC, *at* www.jedec.org (last visited July 28, 2002). JEDEC is an acronym for Joint Electron Device Engineering Council.

6. Memorandum Opinion, Rambus, Inc. v. Infineon Techs. AG, No. 3:00cv524, 2001 U.S. Dist. LEXIS 10990, at *4 (E.D. Va. Mar. 15, 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.). One of those claims is presented in the text accompanying note 99 *infra*.

7. In the specification of one standard at issue in *Rambus*, JEDEC describes that its goals include "eliminating misunderstandings between manufacturers and purchasers" and "facilitating interchangeability and improvement of products." JEDEC Solid State Technology Association, JEDEC Standard JESD79, Double Data Rate (DDR) SDRAM Specification, "NOTICE" page (June 2000), *at* http://www.jedec.org/download/search/JESD79R1.pdf. To that end, the standard defines the memory's "features, functionality, AC and DC parametrics, packages and pin assignments." *Id.* at i.

See also Daniel I. Prywes, Amicus Curiae Brief of JEDEC Solid State Technology Association in Support of Appellees 4, Rambus Inc. v. Infineon Techs. AG, (Feb. 8,

may be due to the increased speed benefits that they provide, much of the demand is no doubt due to the benefits of interoperability, which are made possible by standardization, not by the invention. Therefore, although Rambus is entitled to returns from its technical contribution, it is not entitled to returns from the interoperability provided by the JEDEC standards.[8] This is so even if Rambus did not mislead JEDEC regarding the existence of its patents, although deception or other inequitable conduct might be an independent reason to deny a patentee the right to enforce its invention.[9]

This distinction between a standard's technical contributions, which may be attributable to a patented invention, and its other contributions, such as interoperability, has two important implications. The first implication is that the patented invention should be treated as only one contributor to the economic value of the standard. The second implication is that the other contributions of a standard—like interoperability—should be given independent legal significance. Even if the creation of interoperability is not patentable,[10] it creates product demand independent of those aspects of

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2002) (not filed with Federal Circuit, on file with the *Berkeley Technology Law Journal*) (stating that "JEDEC develops technical standards that will permit DRAM products made by different manufacturers to be interchangeable with each other, and to be inter-operable on a standardized basis with other computer-system components") [hereinafter Amicus Curiae Brief].

8. This oversimplifies somewhat. In a case where an invention contributes directly to the purpose of a standard, the invention may be entitled to returns from the standardization. *See infra* Part II.C.

9. *See supra* note 3. The Federal Trade Commission recently filed suit against Rambus, alleging that its conduct in the course of JEDEC's standard-setting process was anticompetitive. *See In re* Rambus, Inc., No. 9302 (F.T.C. June 18, 2002), *available at* http://www.ftc.gov/os/2002/06/rambuscmp.htm. In its enforcement efforts in this area, the Commission has distinguished the contributions of the invention from the standard, and it has also relied on whether the patentee disclosed the patent's existence:

> If a company misrepresents its patent rights to a standard-setting-organization, thereby leading the organization to adopt a particular standard that may infringe on the company's patent rights, the company's later efforts to take advantage of market power resulting from the standard, rather than from some inherent value of the patent, constitutes a violation of [FTC Act § 5].

In re Dell Computer Corp. 60 Fed. Reg. 57,870 (F.T.C. Nov. 22, 1995) (consent agreement with analysis to aid public comment), 1995 WL 688383. *See also* Ted Bridis, *FTC to Probe Sun, Rambus On Disclosure*, WALL ST. J., Sept. 11, 2001, at A16.

10. Although standards possess the two main economic characteristics of intellectual property, in that they are expensive to create but easy to copy, interoperability standards are not likely to meet the legal requirements for patentability, because they will not often be nonobvious. In addition, standards possess other characteristics that may make it undesirable to give them all the legal protections of intellectual property (particularly the

the products that comply with the standard. Consequently, this essay argues that the "owner" of a standard—typically a standard-setting organization—should be allowed to negotiate license fees with the patentee of an invention incorporated in the standard. That is, the organization should be permitted to negotiate on behalf of its members' collective interests, just as a patentee can negotiate on behalf of its licensees' collective interests.[11]

The essay first contends that standards, like inventions, provide independent contributions to the demand for the products that conform to them. Part I supports this argument using the doctrinal framework of patent law, and Part II illustrates how to measure the standard's contribution to demand. Part III then presents the argument for allowing the "owner" of a standard, which is typically a standard-setting organization, to negotiate with patentees on behalf of the standard. Part IV summarizes the implications of these proposals.

II. THE CURRENT LEGAL FRAMEWORK

Three bodies of rules currently govern the relationship between patented inventions and industry standards. First, patent law establishes the rules that determine damages in the case of infringement. The rules not only govern in the infringement context, but also influence the incentives of patentees and potential licensees in the standard-setting process. Second, the rules of standard-setting bodies can affect, through contract or fraud-based theories,[12] the licensing fees that their members may charge.[13]

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right to exclude, which raises anticompetitive concerns). *See, e.g.*, Allied Tube & Conduit Corp. v. Indian Head, Inc., 486 U.S. 492, 500-01 (1988); Am. Soc'y of Mech. Eng'rs, Inc. v. Hydrolevel Corp., 456 U.S. 556, 571 (1982). Nevertheless, a recognition that standards share much of the distinctive characteristics of intellectual property can help clarify the issues at stake.

11. *See infra* Part III.

12. One contract-based approach is that participation in the standard-setting process resulted in a contract between the patentee and the standard-setting organization, and that those who use the standard are third-party beneficiaries of that contract. Alternatively, the patentee could be viewed as having engaged in a fraud on the standard-setting organization. *See* Rambus, Inc. v. Infineon Techs. AG, 155 F. Supp. 2d 668 (E.D. Va. 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.) (presenting both theories).

13. For example, in a recent infringement case the defendant argued that to the extent that the patents at issue were adopted as industry standards, the patentee "had an obligation to license its standards patents on reasonable, nondiscriminatory terms." Lucent Techs., Inc. v. Newbridge Networks Corp., 168 F. Supp. 2d 181, 264 (D. Del. 2001).

The federal government also requires that when federal agencies use private standards, the standard-setting process should comply with certain procedures, including a requirement that licenses be made royalty-free or at a "reasonable" royalty. Federal Participation in the Development and Use of Voluntary Consensus Standards and in Con-

Third, antitrust law places restrictions on collective actions that control whether standard-setting organizations, on behalf of their members, can negotiate with patentees.

A. Patent Law

Patent law has not addressed the precise problem posed by the incorporation of inventions in standards. This problem can be characterized as the difficulty of allocating entitlements to the benefits of an invention, when some of those benefits stem not from the contribution of the inventor but from the actions of others. That is, even when infringement is clear, it may not be accurate to characterize all the patentee's lost profits as due to the infringement, or to use the demand for the invention as a determinant of the patentee's entitlement to a royalty. Patent law has, however, addressed similar problems in the rules for calculating infringement damages and in the rules governing patent misuse.

1. Infringement Damages

The law applicable in calculating damages for infringement requires consideration of the source of the demand for the patentee's product. In the Federal Circuit, "lost profit awards have been dependent, *inter alia*, on proof that consumer demand for the patentee's goods is created by the advantages of the patented invention."[14] This rule is usually applied where the allegedly infringing product includes not only the invention but also some other desirable feature.[15]

The standard-setting context is different, and more difficult. If the invention is incorporated in the standard, the two are not distinct, as an invention and some other feature of a product can be. Indeed, in some instances the invention and the standard are identical.[16] Hence, in the stan-

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formity Assessment Activities, 63 Fed. Reg. 8546, 8554 (Feb. 19, 1998). The federal policy requires that the agencies "must use voluntary consensus standards in lieu of government-unique standards . . . except where inconsistent with law or otherwise impractical." *Id.* "Voluntary consensus standards" are defined by several characteristics, among which the most relevant here is that they include "provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a nondiscriminatory, royalty-free or reasonable royalty basis to all interested parties." *Id.*

14. Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1569 (Fed. Cir. 1995) (Nies, J., dissenting in part).

15. *See* Georgia-Pac. Corp. v. United States Plywood Corp., 318 F. Supp. 1116 (S.D.N.Y. 1970) (distinguishing between advantages of underlying patent and those of infringer's additions when calculating damages award).

16. *See In re* Dell Computer Corp., 121 F.T.C. 616, 617 (1996) (noting that Dell's patent covers a mechanical slot (for computer buses) which had been adopted as a standard).

dard-setting context, there is in fact demand *for* the invention, even if the demand does not exist *because of* the invention.

Nevertheless, the same principle is applicable in both contexts: damages should derive from the technical advance made by the invention, as reflected in the patent claims. This seems the fairest reading of the Federal Circuit's statement quoted above, since "the advantages of the patented invention" are presumably those that are inherent in the invention, not those associated with its incorporation in an industry standard.[17] The rules applicable in calculating a reasonable royalty (as distinguished from lost profits) also reflect this interpretation, where among the factors to be considered are the invention's "usefulness and commercial value as shown by its advantages over other things."[18] Although the "advantages" of an invention could include not just its inherent technical advantages but also its advantages in appropriating value from the efforts of others,[19] that interpretation would be inconsistent with other inquiries in patent law.[20]

Most basically, "[t]o recover lost profits damages for patent infringement, the patent owner must show that it would have received the additional profits 'but for' the infringement."[21] An example illustrates this principle. Take a case involving sales by a number of infringing sellers of products that comply with an industry standard and incorporate the pat-

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17. That is so unless the invention contributes to the purpose of the standard. *See infra* Part II.C.

18. Panduit Corp. v. Stahlin Bros. Fibre Works, Inc., 575 F.2d 1152, 1159 (6th Cir. 1978) (quoting United States Frumentum Co. v. Lauhoff, 216 F. 610, 617 (6th Cir. 1914)).

19. *See Georgia-Pac. Corp.*, 318 F. Supp. at 1120 (listing among the factors to be used in calculating a reasonable royalty "[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 improvements added by the infringer").

20. For example, in determining patentability, one of the factors that can be considered in the obviousness inquiry is the commercial success of the invention. The rationale for the use of the commercial success test is that an invention that meets with such success was presumably nonobvious, else the commercial need would previously have been met. The law recognizes, though, that this test is effective only if the commercial success of the product is due to the invention embodied therein and not to some other factor. Thus, the Federal Circuit has said that commercial success "must be shown to have in some way been due to the nature of the claimed invention, as opposed to other economic and commercial factors unrelated to the technical quality of the patented subject matter." Cable Elec. Prods., Inc. v. Genmark, Inc., 770 F.2d 1015, 1027 (Fed. Cir. 1985), *overruled on other grounds by* Midwest Indus., Inc. v. Karavan Trailers, Inc., 175 F.3d 1356 (Fed. Cir. 1999) (en banc).

21. King Instruments Corp. v. Perego, 65 F.3d 941, 952 (Fed. Cir. 1995).

entee's invention. Suppose also that some portion of the demand for the infringers' products is created by the interoperability made possible by the products' compliance with the standard, and that compliance with the standard requires the sellers to incorporate the invention. In this case, for the patentee to show that it would have made the sales but for the infringement, it would have to show that *all* the infringing sellers would have sold the same products even if they were paying licensing fees, instead of turning to a noninfringing alternative. If some of the sellers declined to license the invention, and thus declined to comply with the standard, the advantages of interoperability would be lessened, and sales might decrease even for those sellers that were willing to license.[22]

Other Federal Circuit statements, though not always very clear, also support a focus on the technical aspects of the invention. For example, in *Slimfold Manufacturing Co. v. Kinkead Industries, Inc.*,[23] the Federal Circuit affirmed the district court's conclusion that there were acceptable noninfringing alternatives[24] because the patentee "failed to show that buyers of bi-fold metal doors specifically want a door having the advantages of the Ford patent"[25] The reference to the "patent," rather than the invention, suggests that the relevant advantages are those made possible by the claims of the patent, not extrinsic factors such as the invention's incorporation in a standard.

The district courts have also made statements that appear to distinguish the patentee's contribution from other factors. For example, in *Polaroid Corp. v. Eastman Kodak Co.*,[26] the court addressed the proof required of the plaintiff:

> The patent holder must show that it had the marketing capability to make the sales. Typically this requires proof of factors such as an adequate distribution system and sales personnel. This factual inquiry is consistent with the role of marketing in markets where demand is relatively inelastic or dependent on variables *outside*

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22. In theory, if the patentee had licensed some sellers, it might be able to recover damages for lost profits based on the sales of others, because the limited licensing might be sufficient to create the additional interoperability-based demand.

23. 932 F.2d 1453 (Fed. Cir. 1991).

24. The existence of noninfringing alternatives is part of the damages inquiry because the absence of such alternatives "tends to prove that the patentee would not have lost the sales to a noninfringing third party rather than to the infringer." Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1548 (Fed. Cir. 1995) (en banc).

25. *Slimfold*, 932 F.2d at 1458.

26. No. 76-1634-MA, 1990 WL 324105 (D. Mass. Oct. 12, 1990).

> *the seller's control*, such as a rate of new construction or population growth.[27]

The reference to factors "outside the seller's control" suggests that the patentee is not entitled to returns from such factors, including industry standardization efforts.

One might argue that even if some of the demand for the patented invention derives from its standardization, rather than its technical merits, the functional relationship between the two entitles the patentee returns from both. After all, the Federal Circuit has stated that the "entire market rule" is appropriate when "the patented and unpatented components together are 'analogous to components of a single assembly,' 'parts of a complete machine,' or 'constitute a functional unit,' but not where the unpatented components 'have essentially no functional relationship to the patented invention and . . . may have been sold with an infringing device only as a matter of convenience or business advantage.'"[28] This principle should only apply, though, when the demand for the product derives from the larger "functional relationship." In the standardization context, even where there is a functional relationship between the invention and the standard, the demand for the standard may not relate to the functional factors at all, but derives from the basic fact of standardization.[29]

2. Patent Misuse

Another way to approach this issue is to consider it as analogous to the leveraging problem, as reflected in tying law and in the law of patent misuse. In a typical patent-leveraging context, the problem is distinguishing a patentee's legitimate return on its invention in a leveraging market from illegitimate efforts to extend its power to a related, leveraged market.[30] The Federal Circuit has stated that the patentee's power is limited by the scope of its patent claims, and that the misuse inquiry turns on whether the

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27. *Id.* at *15 (emphasis added) (citations omitted).

28. Tec Air, Inc. v. Denso Mfg. Mich., Inc., 192 F.3d 1353, 1362 (Fed. Cir. 1999) (quoting *Rite-Hite*, 56 F.3d at 1550).

29. Part II.C *infra* discusses those cases in which standardization is made possible by the technical advances of the invention.

30. As the Supreme Court said, it "has held many times that power gained through some natural and legal advantage such as a patent, copyright, or business acumen can give rise to liability if 'a seller exploits his dominant position in one market to expand his empire into the next.'" Eastman Kodak Co. v. Image Technical Servs., Inc., 504 U.S. 451, 479 n.29 (1992) (citations omitted).

patentee seeks to extend its power further.[31] The issue can be clarified by recognizing that the invention itself is generally distinct from the products sold in both the leveraging and the leveraged markets, and that the legitimacy of the patentee's leveraging depends whether the invention is of value in only one of those markets, or in both.[32]

In the standard-setting context, the market relationships are analogous. Again, there are three economically distinguishable "products": the invention (and the patentees' right to exclude others from it); the invention's technical benefits; and the interoperability benefits of the standard.[33] Just as a patentee in the leveraging context may seek to use its power over an invention with value only in the leveraging market to reap profits in the leveraged market, a patentee in the standards context may seek to use its power over an invention that provides only particular technical benefits to reap profits from interoperability. But the market effects are more difficult to distinguish, for two reasons. First, whereas in the leveraging context two of the products—the leveraging and leveraged products—are typically sold in active markets, in the standard-setting context the standardized product—incorporating both the invention's technical benefits and the standard's interoperability benefits—may be the only product actually sold. Second, whereas in the leveraging context the invention may not be used in the leveraged product market, in the standard-setting context the invention may be identical to the standard, though the demand for the benefits provided by the two are distinct. Although these differences may make the analysis more difficult, it still may be possible to determine whether a patentee is extending power beyond the scope of its patent claims.[34]

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31. B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1426-27 (Fed. Cir. 1997); Mallinckrodt, Inc. v. Medipart, Inc., 976 F.2d 700, 708 (Fed. Cir. 1992).

32. In a common example, a patentee claims that its patented invention entitles it to supracompetitive profits not only in a market for parts that incorporates its invention, but also in a market for service, which is not dependent on the invention. *See* Mark R. Patterson, *When Is Property Intellectual? The Leveraging Problem*, 73 S. CAL. L. REV. 1133, 1141-42 (2000); *see also* Julie E. Cohen & Mark Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 25-26 (2001) (relying on same distinction).

33. For a recent discussion distinguishing these three in the context of expert testimony regarding infringement, see *Lucent Technologies., Inc. v. Newbridge Networks Corp.*, 168 F. Supp. 2d 181, 223-25 (D. Del. 2001).

34. *See infra* Part II.

Even if a standard were viewed as formally within the scope of a patent incorporated in it, the patentee's power should be limited.[35] For example, one might consider whether the reverse doctrine of equivalents should bar extension of a patent covering a technical innovation to the use of that innovation in an industry standard. As Merges and Nelson have argued, the reverse doctrine of equivalents can be viewed as a means of avoiding holdups that could deter innovation.[36] The application of the reverse doctrine of equivalents in this context would not be a traditional one, in that it would not eliminate infringement liability entirely, but would only limit that liability to the returns on the patent's technical contribution.

The result, as Merges and Nelson also suggest, would resemble a compulsory licensing scheme.[37] Although U.S. patent law does not explicitly provide for compulsory licensing, a similar outcome would be achieved by limiting damages and using the reverse doctrine of equivalents to eliminate injunctive relief. Such a result does not seem unfair since in most of the cases in which patentees have sought to enforce patents that have been incorporated in standards, the patentees have been members of the standard-setting organizations. As a result, they would in most cases have agreed to license on reasonable and nondiscriminatory terms,[38] and a refusal to license would not be at issue.

B. Standard-Setting Organizations' Rules

Some standard-setting bodies are moving away from policies requiring their members to agree to royalty-free licensing and are instead adopting policies requiring "reasonable and nondiscriminatory" ("RAND") licensing.[39] Although the "nondiscriminatory" element of these policies is straightforward, since it requires that patentees license to all on the same terms, the definition of "reasonable" is not so clear. Moreover, the stan-

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35. *See generally* Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990).

36. *Id.* at 865-67. Merges and Nelson argue that reverse doctrine of equivalents can be used to free a subservient patent holder from being blocked by the original patentee.

37. *Id.* at 866 n.118.

38. *See infra* Part I.B.

39. This shift is not universal, however. The World Wide Web consortium recently abandoned a proposal for a RAND policy, in favor of a royalty-free one. *See* Margaret Kane, *W3C retreats from royalty policy*, NEWS.COM (Feb. 26, 2002), *at* http://news.com.com/2100-1023-845023.html; W3C, Patent Policy Working Group, *Royalty-Free Patent Policy* (Feb. 26, 2002), *at* http://www.w3.org/TR/2002/WD-patent-policy-20020226/.

dard-setting bodies themselves make little effort to define the term.[40] Indeed, the American National Standards Institute ("ANSI") says that determination of reasonableness is not a proper subject for the standard-setting process.[41] As a result, it is unclear whether the standard-setting

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40. *See, e.g.*, INTERNET ENGINEERING TASK FORCE, REQUEST FOR COMMENTS (RFC) 2026 (INTERNET STANDARDS PROCESS) § 10.3.3, *at* http://www.ietf.org/IESG/Section10.txt ("The IESG will not make any explicit determination that the assurance of reasonable and nondiscriminatory terms for the use of a technology has been fulfilled in practice. It will instead use the normal requirements for the advancement of Internet Standards to verify that the terms for use are reasonable.") (last visited July 28, 2002); INTERNATIONAL TELECOMMUNICATION UNION, TELECOMMUNICATION STANDARDIZATION BUREAU, STATEMENT ON TSB PATENT POLICY, PATENT DECLARATION FORMS AND GUIDELINES FOR THE IMPLEMENTATION OF THE TSB PATENT POLICY Annex 1 § 2.2 (Feb. 2, 2000) (Statement on TSB Patent Policy), *at* http://www.itu.int/itudoc/itu-t/circ/circ5/245_ww9.doc ("The patent holder is not prepared to waive his rights but would be willing to negotiate licenses with other parties on a nondiscriminatory basis on reasonable terms and conditions. Such negotiations are left to the parties concerned and are performed outside the ITU-T.") [hereinafter ITU TSB PATENT POLICY]; AMERICAN NATIONAL STANDARDS INSTITUTE, PROCEDURES FOR THE DEVELOPMENT AND COORDINATION OF AMERICAN NATIONAL STANDARDS § 1.2.11.1 (Jan. 2002), *at* http://www.ansi.org/public/library/std_proc/anspro/due_proc1.html (last modified Mar. 2002). The same is true of some commentary on this issue. *See* Mueller, *supra* note 3, at 933-34 (stating that "some competent authority must set a licensing fee structure that will determine the patentee's remuneration," but not proposing any criteria for that determination other than recommending that industry experts instead of the government should create the licensing fee schedules).

41. ANSI apparently believes that reasonableness is a subject only for the parties to a license:

> It should be reiterated, however, that the determination of specific license terms and conditions, and the evaluation of whether such license terms and conditions are reasonable and demonstrably free of unfair discrimination, are not matters that are properly the subject of discussion or debate at a [standards] development meeting. Such matters should be determined only by the prospective parties to each license or, if necessary, by an appeal challenging whether compliance with the Patent Policy has been achieved.

American National Standards Institute, Guidelines for Implementation of the ANSI Patent Policy: An Aid to More Efficient and Effective Standards Development In Fields That May Involve Patented Technology § III.B, *at* http://www.ansi.org/public/library/guides/ppguide.html [hereinafter ANSI Guidelines].

Although the ANSI GUIDELINES do not provide further rationale for this approach, the organization may be concerned about antitrust issues. *Cf. infra* Part I.C; Sony Elecs., Inc. v. Soundview Techs., Inc., 157 F. Supp. 2d 190, 193 (D. Conn. 2001) (noting patentee's allegations that a standards organization and its members conspired "to 'avoid unreasonable royalty demands'" on the members). On the other hand, ANSI will apparently consider the reasonableness of terms and conditions outside the initial standard-

bodies would approve (or mandate) an approach like that described in the previous section.

Where an attempt is made to define "reasonable," however, the focus is on factors that contribute to the patentee's technical contribution, not to those related to standardization.[42] For example, the International Telecommunication Union, which has a RAND policy, states that "in order to define what is fair and 'reasonable' in a given case, one needs to know development and manufacturing costs, profits, etc."[43] The "development and manufacturing costs" of an invention would presumably be unrelated to its incorporation in an industry standard. Furthermore, although the "profits" from an invention could be greater if the patentee were viewed as entitled to returns from standardization, the mention of profits in the context of costs suggests that it refers to pre-standardization profits, which would reduce the post-standardization royalty required to provide the patentee with a reasonable rate of return.

Thus, both patent law and the policies of standard-setting organizations can be seen as limiting patentees' entitlements to their specific technical contributions to products that incorporate their inventions. Neither set of principles supports allowing patentees to reap profits from the contributions of others to the standard and to the distinct benefits, such as interoperability, that standardization provides. But neither the law nor the organizational policies speaks clearly on this issue, so it is not surprising that licensing negotiations are fraught with uncertainty.

C. Blocking Patents and Antitrust Law

The combination of a patented invention and a standard incorporating the invention resembles two "blocking" patents.[44] The typical blocking situation arises when a new patent offers a narrow improvement on an ex-

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setting process, stating that a decision on reasonableness "is the exclusive province of the Board of Standards Review (or, on appeal, the ANSI Appeals Board)." ANSI GUIDELINES § II.

42. A recent article made a somewhat similar point. *See* Prywes, *supra* note 3, at 26 ("The determination of a reasonable royalty must take into account the benefits of standardization to the patent-holder at the time a standard is being developed.") The focus of Prywes, however, is on supply, rather than demand. "A patent-holder . . . usually stands to benefit from the adoption of its design as an industry standard, because that status will promote greater production and, in turn, lower costs for items needed for the patent-holder's own products." *Id.* A footnote that Prywes adds to this statement refers to network effects, which are a demand-side phenomenon, but Prywes discusses only costs. *Id.* at 28 n.31.

43. ITU TSB PATENT POLICY, *supra* note 40, at app. 1, § 2.3.

44. *See* Merges & Nelson, *supra* note 36, at 860.

isting, broader patent.[45] In that situation, licenses under both patents are needed to produce the improved product.[46] Thus, the owner of either patent can block the production of the product. However, the patentees will often negotiate a cross-licensing or pooling agreement, since it is in both their interests to profit from their innovative contributions.[47]

The patent-standard combination is similar. To produce a product that embodies both a patented invention and standardization, a seller must both obtain a license under the patent and comply with an agreed-upon standard. Just as with the blocking patents, two independent factors contribute to the value of the ultimate product.[48] The patentee, of course, provides the innovative contribution for the invention, and the standard-setting organization and its members invest considerable effort in creating the standard. (Usually, the standard itself is not patented,[49] but if it were, cross-licensing could be used in these circumstances as well.)

As a result, the negotiation process between the patentee and the standard setting organization can be difficult. On one side is the patentee, and on the other are the sellers who seek to offer products that comply with the standard. One way to solve the problem would be to allow the standard-setting organization to negotiate a licensing arrangement with the patent holder, just as the holder of one blocking patent generally negotiates with the other. There are antitrust risks to that approach, though, because the standard-setting organization could be seen as a vehicle for price-fixing collusion by its members, as at least one case has suggested.[50] Antitrust liability for such negotiations would be unfortunate, because those negotiations could provide all of the pro-competitive benefits cited by the antitrust agencies in their *Antitrust Guidelines for the Licensing of Intellectual Property*, "by integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation."[51]

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45. *See* U.S. DEPARTMENT OF JUSTICE AND FEDERAL TRADE COMMISSION, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 2.3 (1995), *available at* http://www.usdoj.gov/atr/public/guidelines/ipguide.htm [hereinafter DOJ-FTC IP GUIDELINES].

46. *Id.*

47. *See generally id.* § 5.5.

48. That is, they potentially do so, if there are independent benefits from the invention and the standard.

49. *See supra* note 10 and accompanying text (on standard that is not patentable).

50. *See* Sony Elecs., Inc. v. Soundview Techs., Inc., 157 F. Supp. 2d 180, 181 (D. Conn. 2001).

51. DOJ-FTC IP GUIDELINES, *supra* note 46, § 5.5.

Antitrust law can and should distinguish, however, between collective action that facilitates negotiation in the patent-standard context and anti-competitive collusion among potential licensees. As the *Guidelines* make clear, it is important to distinguish the market for technology (the standard) from the market for goods (the products that comply with the standard).[52] The *Guidelines* state that "[t]he Agencies will not require the owner of intellectual property to create competition in its own technology,"[53] and the same rule should apply to standards, even if the standards themselves are not patented, as discussed below.

Ultimately, then, the relevant background rules support treating inventions and standards separately for the purposes both of calculating infringement damages and of negotiating between patentees and standard-setters. This basic principle does not, however, establish how one should determine specific entitlements in particular instances. The following section addresses that question.

III. DETERMINING LICENSE FEES FOR PATENTED INVENTIONS IN STANDARDS

The analysis presented in this section provides an approach to determine license fees. That approach considers whether demand is due to the technical advance of the patentee's invention or is instead the product of the adoption of a standard that happens to incorporate the invention.[54] This section first considers this issue from a general perspective and then considers three special cases: inventions that contribute directly to the goal of the standard that incorporates them; *de facto* standards; and "standards" created by "lock-in" (*i.e.*, the existence of investments that would make it costly to switch to an alternative).

As an aid in illustrating the first part of the analysis, consider the following table, the cells of which represent products that might be sold. Each product may incorporate a patented invention, comply with a standard, or neither, or both.

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52. *Id.* § 3.2.

53. *Id.* § 3.1.

54. In the ongoing Rambus litigation, the standard-setting organization, JEDEC, said in an *amicus* brief that a previous court had stated that "JEDEC's adoption of an item as an industry standard can vastly increase demand for that item, in some cases into a 'multi-billion dollar market.'" Amicus Curiae Brief , *supra* note 7, at 11 (quoting Wang Labs., Inc. v. Mitsubishi Elecs. Am., Inc., 103 F.3d 1571, 1579) (Fed. Cir. 1997)). In fact, *Wang* did not say that the size of the market in that case was a result of the adoption of a standard, but the basic point is no doubt a valid one.

	Does not incorporate a patented invention	Incorporates patented invention P	Incorporates alternative patented invention P_a
Does not comply with standard	A: demand: \$6 cost: \$5	B: demand: \$7 cost: \$5	C: demand: \$9 cost: \$6
Complies with chosen standard S	D: demand: \$9 cost: \$8	E: demand: \$10 cost: \$6	F: demand: \$9 cost: \$6
Complies with alternative, unchosen standard S_a	G: demand: \$8 cost: \$7		

For each cell's hypothetical product, the table provides a hypothetical cost of manufacture and a hypothetical value for buyer demand (or willingness to pay).[55] Although the numbers chosen are hypothetical, the relationships among them are intended to be plausible.

One who knew all of this information could draw conclusions about the value of patented invention P. For example, the manufacturing cost advantage provided by invention P in complying with the standard (*i.e.*, E's cost, without license, of \$6, as compared to D's cost of \$8) shows that the invention provides value in itself. The greater demand for a standardized product that incorporates invention P, as distinguished from a product that does not incorporate any invention or incorporates alternative invention P_a (E's demand of \$10, as compared to D's and F's demands of \$9), also shows that invention P has independent value.

Unfortunately, this information is rarely available. For example, when the invention and the standard are coextensive, the possibility of complying with the standard without incorporating the invention does not exist.[56] Nevertheless, these hypothetical products must be considered to distinguish desirable licensing of technical advances from opportunistic exploitation of standardization. In many instances, one can infer approximations

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55. In a real market, of course, one could rarely characterize demand as a single value, because demand often differs for different consumers. This approach is a helpful simplification, though, and it may even be plausible for some markets. If, for example, the product at issue is incorporated as part of a larger product, and if it is a small part of that larger product, the value of the incorporated product may be consistent across buyers. This might be the case, for example, of a product like the VL Bus, which was at issue in the *Dell* case, in that the bus was a small part of a larger computer product. *In re* Dell Computer Corp., 121 F.T.C. 616, 617 (1996).

56. Even in some such cases, though, a variation on this analysis can be helpful, as discussed later in this section.

of the values in the table, as is discussed below. Even more importantly, the principles of the analysis provide an appropriate background for licensing negotiations, even where the data for precise application of the principles are unavailable.[57]

A few more points should be made before moving to the analysis. As the discussion above indicates, an invention can provide value to a standard that incorporates it either by reducing the cost of compliance with the standard or by increasing the attractiveness of the standardized product. Either possibility causes sellers of the standardized product to demand the invention. In the former case, though, the standardized product is assumed to be equally desirable to an end consumer whether or not it incorporates the invention, so there is no independent demand for the invention by downstream buyers of the standardized product. Only when the invention has independent technical value will there be additional buyers who provide a demand for the invention above and beyond the demand for the standard.

These two possibilities present different problems when inferring the importance of the invention. When the demand for the invention is due purely to cost savings in complying with the standard, the invention and the standard may be coextensive. In that case, the benefit of the invention is inseparable from the benefit of the standard, and one can only measure it by considering alternative standards. Where the invention provides technical benefits beyond those provided by the standard, on the other hand, one can measure its benefits by considering alternative means of complying with the standard.

A. License Fees Attributable to Cost Savings

In principle, an invention may reduce the cost of complying with a standard by a measurable amount. One could measure this reduction in cost to determine the value of the patentee's contribution and thus the license fees to which it is entitled. One might question whether measuring the demand for an invention, as courts do when calculating patent damages,[58] overlooks the benefit of this cost reduction. But an invention's capacity for reducing costs for product manufacturers will in fact create demand for the invention. The demand is defined, though, by the cost reduction that the invention makes possible. This possibility was acknowledged by the Federal Circuit in *Slimfold*, where it said that "the advantage of the

57. *See infra* Part III.
58. *See supra* Part I.A.1.

Ford invention was primarily a manufacturing advantage . . . and did not greatly increase the value of the entire door."[59]

	Does not incorporate a patented invention	Incorporates patented invention P
Complies with chosen standard S	D: demand: $9 cost: $8	E: demand: $10 cost: $6

The most straightforward circumstances in which cost savings can be measured are those in which there are alternative means of attaining compliance. For example, in the table above, where it is possible to comply with the standard without using any patented invention, at a manufacturing cost of $8 (cell D), but use of invention P allows compliance at a cost of $6 (cell E), the invention provides a cost savings of $2. The patentee is certainly entitled to a license fee of $2 for the use of its invention in these circumstances, at least if the standard-setter knew of the patent when it adopted the standard, or did not know of the invention at all (in which case it would not have relied on the existence of the invention in selecting the standard).

If the standard-setting organization did not know of the patent, and the organization relied on the ability to comply with the standard by using the invention, the situation is more complicated.[60] In this case, the problem is that the invention is unexpectedly expensive,[61] and therefore compliance with the standard may also be unexpectedly expensive. In some cases, this will occur because the cost difference between compliance with the invention and by alternative means is great; in others—perhaps the majority—it

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59. Slimfold Mfg. Co. v. Kinkead Indus., Inc., 932 F.2d 1453, 1459 (Fed. Cir. 1991).

60. This has been the circumstance in most of the litigated cases. *See* Rambus, Inc. v. Infineon Techs. AG, 155 F. Supp. 2d 668, 672 (E.D. Va. 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.) (describing Rambus's failure to disclose existence of pending patent to JEDEC); *see also Dell*, 121 F.T.C. at 617 (noting that Dell never disclosed existence of its patent to a standard-setting organization).

61. The ongoing Rambus litigation apparently presents an example of this situation. *See* Tony Smith, *Rambus's 'Very High' DDR Royalty Revealed*, THE REGISTER (Mar. 5, 2001), *at* http://www.theregister.co.uk/content/3/18706.html (reporting that Rambus was charging a royalty of 3.5% of sales for rights to patents that had been incorporated in a standard, as compared with a 0.75% rate for some of its other patents).

will occur because the invention *is* the standard.[62] In either case, the problem is evaluating the possibility of alternative standards.[63]

	Does not incorporate a patented invention	Incorporates patented invention P
Complies with chosen standard S	D: demand: $9 cost: $8	E: demand: $10 cost: $6
Complies with alternative, unchosen standard Sa	G: demand: $8 cost: $7	

For example, suppose that the standard-setting organization relied on the ability to comply with standard S at a cost of $6 in selecting that standard (cell E in the table). That is, suppose that the organization knew of and could have selected an alternative standard S_a that cost $7 (in cell G).[64] So long as compliance with S at a cost of $6 is possible, there may be no reason to consider S_a, but knowledge that compliance with S would cost $8 (cell D, or cell E with the $2 license that the patentee would likely charge) could provide such a reason. If the $1 cost difference seems insufficient, one can imagine a much higher difference. When S is coextensive with P, and the patentee refuses to license, the cost is infinite. If the organization considered an alternative standard, and rejected it only on the basis of cost, limiting the patentee to a license fee of only $1 (the cost difference between E, with the chosen standard, and G, the alternative) seems straightforward.

The circumstances are more difficult when the organization did not consider any such alternative standards. The question then is one of *hypothetical* noninfringing alternatives: if there had been disclosure of the patent, and therefore disclosure of the higher-than-expected cost, would the standard-setting organization have chosen a different standard that would have served as a noninfringing alternative? Assuming that the patentee was not part of the standard-setting organization, the purpose of asking

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62. *See infra* note 104.

63. That is so, at least, if any alternative means of compliance with the standard has an unacceptably high cost.

64. At least in some cases evidence of such noninfringing alternatives may be available. *See* Dell Computer Corp. Consent Agreement Statement, Federal Trade Commission, (June 17, 1996) *at* http://www.ftc.gov/opa/1996/9606/dell2.htm (describing the *Dell* case as one in which "there is evidence that the association would have implemented a different non-proprietary design had it been informed of the patent conflict during the certification process").

this question is not to determine whether the patentee behaved unethically—it had no obligation to disclose—but to determine just how much its invention contributed to the demand for the standard. If, with knowledge of the patent, the standard-setting organization would have found a noninfringing standard at the same cost, it is fair to infer that the demand for the standard is not due to the incorporation in it of the patentee's invention.

The patentee should be free to contest such an inference, though. For example, the patentee might argue that the circumstances are as shown in the table above. As shown there, the selection of S_a would have provided a noninfringing alternative with $1 of the $2 cost savings provided by invention P in standard S; if so, the patentee of P is entitled only to the additional $1 in cost savings that its invention provides. But the demand for the standard S_a in cell G is less than the demand for the standard S (incorporating invention P) in cell E. If the greater demand for standard S is due to the technical contribution of invention P, the patentee is entitled to the revenue from that greater demand; this issue is taken up in more detail in the next section.

Although the principles described above apply regardless of whether the patentee is a member of the standard-setting organization, organization membership is not irrelevant. The arguments above depend on the existence of an alternative standard S_a. Those arguments will always be somewhat difficult for the parties to make, given their hypothetical nature, so allocating the burden of proof will be important. If the patentee is not part of the standard-setting organization, it seems appropriate to allocate the initial burden of showing that an alternative standard could have been chosen to the defendant infringer (or to the standard-setting organization itself). But if the patentee is a member of the standard-setting organization, it is reasonable to charge it with acting so as to facilitate the organization's process.[65] Consequently, if by its nondisclosure it fails to do that, it is reasonable to require, if it later brings an infringement suit, that it bear the burden of showing that no alternative standard would have been chosen had it disclosed its patent.[66]

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65. *See* Rambus, Inc. v. Infineon Techs. AG, 164 F. Supp. 2d 743, 751 (E.D. Va. 2001) (discussing JEDEC committee chairman's testimony that committee's successful operation depended on disclosure requirement).

66. These allocations of the burden of proof are generally consistent, or at least not inconsistent, with current law. As the Federal Circuit has said, the patentee generally has the burden of showing that the four *Panduit* factors (one of which is the absence of a noninfringing alternative) are met. Rite-Hite Corp. v. Kelley Co., Inc., 56 F.3d 1538, 1545

This burden is nevertheless less severe than some would impose. For example, JEDEC, the relevant standard-setting organization in the *Rambus* litigation, suggests in its *amicus* brief[67] that nondisclosure should make a patent unenforceable.[68] JEDEC argues, as suggested above, that with knowledge of the existence of patent protection for technology it is considering, a standard-setting organization might "seek to use alternative technology that is not saddled with actual or potential patent rights."[69]

	Does not incorporate a patented invention	Incorporates patented invention P
Does not comply with standard	A: demand: $6 cost: $5	B: demand: $7 cost: $5
Complies with chosen standard S	D: demand: $9 cost: $8	E: demand: $10 cost: $6

JEDEC says that it will use patented technology, but only if the patentee agrees to a royalty-free or reasonable-and-nondiscriminatory licensing policy.[70] Given the vague meaning of "reasonable," as noted earlier, it is difficult to assess JEDEC's policy. But to the extent that the require-

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(Fed. Cir. 1995) (en banc). "The burden then shifts to the infringer to show that the inference is unreasonable for some or all of the lost sales." *Id.* (citation omitted).

Here, where the noninfringing alternative is a hypothetical one, the patentee would generally meet its burden by showing the absence of any *actual* noninfringing alternative. Therefore, the burden would be on the infringer to show that the inference of damages was an unreasonable one, as by showing that the standard-setting organization would have chosen a noninfringing alternative if it had had information about the patent. But if the patentee was a member of the organization, the approach proposed here would provide for a re-shifting of the burden to the patentee. One could view this approach as conforming to the *Rite-Hite* analysis simply by treating a showing of the patentee-member's nondisclosure as a showing that the inference of damages was unreasonable. The patentee could then show once again that the inference was reasonable by showing that no noninfringing alternative would have been chosen.

67. Amicus Curiae Brief, *supra* note 7, at 11-13.

68. The brief says only that a court should impose "suitable remedies," *id.* at 14, but it cites with approval a number of cases in which courts have not enforced patents in such circumstances, *id.* at 11-13.

69. *Id.* at 6. The brief also acknowledges, though, that "[i]n some cases . . . the technology that is the subject of a patent or patent application may be technically superior to alternatives." *Id.* This presents the standard-setting organization's dilemma: the organization would prefer to avoid patented inventions, but to do so might result in a standard with significantly less technical merit.

70. *Id.*

ment contemplates any meaningful content for the term "reasonable,"[71] it seems an undesirably strict policy. Even if the patentee demands licensing revenues that are greater than those to which its contributions in cost reductions (and technical advantages, as discussed in the next section) entitle it, the adoption of the standard may be beneficial. That is, referring to the table, cell E is an improvement over cell A or B, even if the patentee demands a licensing fee greater than the $2 to which it is entitled based on the manufacturing cost savings that its invention provides. This is so even if the invention provides no independent value, so that the demand values in cells A and B and those in cells D and E are the same, when the benefit of standardization outweighs the cost of the license. If so, an organization that refused to use the invention would be shooting itself in the foot if there were no acceptable alternative standard S_a. The approach proposed here—to require the patentee to prove that in fact there was no alternative standard—avoids that danger, while still ensuring that the standard-setting organization does not unnecessarily suffer from exploitation by patentees.

Moreover, this analysis justifies the policy of those standard-setting organizations that require members to disclose any inventions that may affect particular standard-setting activities, even if the patentee is not itself a part of those particular activities.[72] One might argue that if a member did not participate in a particular standard-setting effort, it could not deceptively promote standards that would incorporate its patents. But the approach described above places the burden on the patentee not as a penalty for any particular act of deception, but in order to facilitate the standard-

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71. If the policy merely requires that the patentee will license its patent on some terms, rather than refuse to license it entirely, the term "reasonable" should be said to have no meaning. But the policy might in fact not contemplate any such meaning, if its focus is on ensuring that patentees act nondiscriminatorily.

72. For example, the W3C Patent Policy Framework requires disclosure from all W3C members:

> W3C Members agree to use good faith efforts to disclose all patents known to them which may contain Essential Claims. Disclosure obligations stated here cover:
>
> 1. W3C Members: whether or not they are part of a given Working Group
>
> 2. Working Group participants: individuals, whether or not they are in good standing, who have joined a Working Group, and their alternates
>
> 3. Working Group contributors: Working Group members who make formal contributions to a Working Group W3C Patent Policy Framework § 7 (Aug. 16, 2001 working draft), *at* http://www.w3.org/TR/2001/WD-patent-policy-20010816.

setting process. By joining a standard-setting organization, an organization member presumptively commits itself to the goals of the organization, and likely benefits in its industry relations from that commitment.[73] It therefore should not be permitted to disavow its commitment later, when it sees an opportunity for profit. The adoption by standard-setting organizations of general—*i.e.*, nonstandard-specific—disclosure policies is consistent with this understanding.

B. License Fees Attributable to Technical Advances

Demand for a patented invention may also arise not from any cost savings that it provides, but from its contribution to the desirability of the standardized product. Generally speaking, it is more difficult to derive objective measures of the demand for an invention than it is to derive measures of the cost savings it provides.[74] Nevertheless, one can sometimes distinguish demand for an invention and demand for a standard, even where the invention and the standard coincide, by drawing inferences from market conditions before and after the invention is incorporated into the standard.

	Does not incorporate a patented invention	Incorporates patented invention P	Incorporates alternative patented invention P_a
Does not comply with standard	A: demand: \$6 cost: \$5	B: demand: \$7 cost: \$5	C: demand: \$9 cost: \$6
Complies with chosen standard S	D: demand: \$9 cost: \$8	E: demand: \$10 cost: \$6	F: demand: \$9 cost: \$6

Suppose, referring to the table above, that three approaches, A, C, and E, each accomplish a particular goal, and that C and E are patented, but that the patent protection for E is secret.[75] Suppose further that the industry has generally adopted either A or C, but that an industry standardization effort selects a standard based on E, perhaps to avoid giving an advan-

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73. *See* Marvin Lumber & Cedar Co. v. PPG Indus., Inc., 223 F.3d 873, 883 (8th Cir. 2000) (accepting district court's view that activity in standard-setting organization indicates possession of specialized knowledge in field).

74. *See generally* William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 Harv. L. Rev. 937 (1981) (explaining the difficulty of measuring demand).

75. The significance of this latter assumption is explained in the text following note 76 *infra*.

tage to the users of either A or C. Consumers demand the standardized product, and the industry switches to E. Under these circumstances, the fact that users had not selected E before it was chosen as a standard, but did so after it became the standard, suggests that their later choice of E was not due to its intrinsic value but to the standardization.[76] Moreover, the initial secrecy of the patent supports this conclusion, because it indicates that the industry did not avoid E merely to avoid paying licensing fees.

If E *was* widely used even before its incorporation into a standard, the situation is more complicated. One might then conclude that the standard-setting organization adopted E for its intrinsic value. But since the patent on E was secret before its incorporation into the standard, E might only have been widely used because it had no associated licensing fees. That is, one cannot conclude from users' adoption of an invention when the use of it is free that they would also be willing to pay for it. For that reason, the use of a patented invention prior to its standardization does not justify the patentee's post-standardization imposition of more onerous licensing terms.

The patentee would, however, be justified in continuing to impose whatever licensing terms it imposed before standardization.[77] That is, suppose P had been adopted by some, but not all, users before being incorporated into a standard. Suppose that after P's incorporation into a standard, other users also sought to license it. If those users had previously used some technology other than P, and in fact had declined to license P on its pre-standardization terms, they might contend that, for them, it was P's value as a standard, not as technology, that they sought. But even if they did not prefer the technology of P to other alternatives, given their relative pre-standardization prices, the pre-standardization license terms of P are still the best estimate of its value. That is particularly so in that P might have technological benefits in a standardized context that it did not have when there was no standard. This is reflected in the table in the greater

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76. The possibility that the standard might have been made possible only by the existence of E, so that E should be entitled even to the returns from standardization, is discussed below. *See infra* Part II.C.

77. IBM, for example, takes this approach, at least in some instances. Its statement regarding licensing of a patent that it believes is relevant to the standard-setting activities of the Internet Engineering Task Force states that "IBM is willing upon written request to grant a nonexclusive license under such patents on a nondiscriminatory basis and on reasonable terms and conditions, including its then-current terms and royalty rates." *See* Posting of Chuck Adams, Jr., wcadams@us.ibm.com, *at* http://www.ietf.org/ietf/IPR/IBM-SNMP (May 14, 2001).

demand for E over F or D, though the demand for B was less than that for C.

It must be clear, though, that the pre-standardization terms represent an objective estimate of value. For example, the court in *Townshend v. Rockwell International Corp.*[78] might too readily have accepted an argument along this line, where the alleged infringer argued that the patentee had sought unfair licensing terms after adoption of a standard:

> Even if the [c]ourt were to consider the unfair terms alleged by [the alleged infringer], the [c]ourt finds that these terms do not state an injury to competition. First, with respect to the proposed royalty rates, the [c]ourt notes the initial licensing proposal dated September 1997 sought a maximum $1.25 per-unit royalty for client-end products and a maximum $9.00 per-port royalty for server-end products. In September 1998, after the V.90 standard had been adopted, [the patentee] submitted a revised licensing proposal which sought a maximum $1.25 per-unit royalty for client-end products and a maximum $2.50 per-port royalty for server-end products.[79]

If the court meant to suggest here that the absence of any royalty increase after adoption of the standard was evidence of the reasonableness of the terms, that was incorrect. The initial licensing proposal was submitted to the standard-setting organization,[80] and thus was made in anticipation of standardization. For pre-standardization licensing terms to be significant, they must have been determined prior to any effect, actual or anticipated, of standardization.

That is not to say, however, that if the patentee did not seek license fees prior to standardization, it would never be justified in demanding such fees after standardization. In such circumstances, the analysis could rely on inferences from the post-standardization market, but this is only possible in certain circumstances. When saving costs is the issue, as discussed in the previous section, one can hypothesize alternative standards, because one can objectively evaluate the cost of compliance with hypothetical standards.[81] In contrast, it is more difficult to estimate the demand for hy-

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78. No. C 99-0400 SBA, 2000 U.S. Dist. LEXIS 5070 (N.D. Cal. Mar. 28, 2000).

79. *Id.* at *23-*24.

80. *Id.* at *21.

81. It is also possible to infer, with at least some confidence, whether a standard-setting organization would have adopted an alternative standard.

pothetical inventions or standards.[82] Therefore, only where the post-standardization market presents actual alternatives can one reliably estimate the relative significance of the invention and the standard.

	Does not incorporate a patented invention	Incorporates patented invention P
Complies with chosen standard S	D: demand: $9 cost: $8	E: demand: $10 cost: $6

As an example of an instance where such an alternative *is* available, suppose, referring again to the table, that it is possible to comply with the standard either by using invention P or without using any invention. Suppose also, as shown in the table, that the alternatives for compliance with the standard are D and E, that the cost of compliance with D is $8, and that the cost of compliance with E is $6. Under these circumstances, the patentee would presumably demand, and users would pay, a license fee of at least $2 for E. If the license fee paid exceeded $2, one could assume that users license P for its technical contribution, as well as (or rather than) for the cost savings that it provides. Therefore, the patentee's entitlement to the $2 from cost savings would be determined as described in the previous section, but the patentee would be entitled to any license fees beyond the fees for cost savings, which must be due to demand for the invention's technical contribution.[83]

	Incorporates patented invention P	Incorporates alternative patented invention P_a
Complies with chosen standard S	E: demand: $10 cost: $6	F: demand: $9 cost: $6

One can draw similar inferences from alternatives that appear subsequent to standardization, though the process is somewhat more complicated. For example, suppose that there is no alternative D, but that after standardization, an alternative invention P_a is created that allows compliance with the standard, with cost and demand of F in the table. Suppose

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82. *Cf.* Micro Chem., Inc. v. Lextron, Inc., 161 F. Supp. 2d 1187 (D. Colo. 2001) (illustrating difficulty of proving market demand for specific claimed features of patent).

83. That is, it might be appropriate to reduce the patentee's fee entitlement for cost savings, as described in the previous section, but its total fee for both demand and cost contributions could still be greater than $2.

that F is licensed for $2, and that E had been licensed for $3. If buyers choose F over E under these conditions, one could infer that the combination of E's cost savings and technical advantages is no more than $1 greater than the same combination for F. Therefore, one could use the relative costs of E and F to determine how much buyers would be willing to pay for E's technical advantages. For example, suppose that the cost to comply with the standard were the same for E and F (absent license fees). One could then infer that buyers value E's technical contributions at no more than $1 more than F's. More significantly, if the cost to comply with the standard were $2 less for E than for F (as if the cost in cell E of the table were $4), one could infer that E's technical contributions were valued by buyers at (no more than) $1 less than F's (in which case demand for E in the table would be $8 or less).[84]

The scenario in the preceding paragraphs somewhat resembles the GIF controversy.[85] When Unisys asserted its patent on the algorithm for generating compressed GIF files, competitors initiated an effort to develop a method of creating the files without infringing the patent.[86] Had this effort been entirely successful, one could perhaps make the calculations described above. But the alternative method that avoided the patent was not entirely successful,[87] preventing any clear comparison. Nevertheless, because the alternative method apparently worked in some applications but not in others,[88] it might have been possible to determine the relative value of the two implementations.

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84. That is, E's total contribution, relative to F, is $1, and its relative cost savings contribution is $2. Therefore, its relative technical contribution is—$1. Because F's (absolute) total contribution is $2, its technical contribution can be no more than $2, and E's therefore can be no more than $1.

85. *See* Michael C. Battilana, *The GIF Controversy: A Software Developer's Perspective*, CLOANTO, *at* http://cloanto.com/users/mcb/19950127giflzw.html (last modified Feb. 2, 2002).

86. *Id.*

87. *Id.*

88. Specifically, in applications where compression of the data was not critical, alternatives might have worked:

> Some of the most active developers decided to collaborate on the design of a patent-free evolution of GIF (and TIFF's LZW compression mode [which Unisys had patented]). A method was quickly found to create uncompressed GIF files without using LZW code, while remaining compatible with existing GIF loaders. Also, a variety of different procedures and data structures (such as Shannon-Fano and AVL trees) have been used to compress data in ways similar, if not always equivalent, to LZW. But a diversity in procedures and data structures alone

Knowing this sort of information about relative values, one could determine P's owner's total entitlement to reasonable royalties (or to damages based on reasonable royalties) based on cost savings and technical advantages. As described in the previous section, a patentee's entitlement to returns on cost savings that its invention makes possible may be limited depending on whether it disclosed the existence of its invention during the standard-setting process. However, the patentee's entitlement to returns on the independent technical contribution made by its invention is not so limited; it is therefore important to allocate the returns sought by the patentee to their correct sources.

The principles discussed above apply even in cases in which the patentee, during patent prosecution, amends its claims to conform to a standard under consideration, as has happened in some cases.[89] Because the key issue under the approach proposed here is whether the demand for the invention arises from its technical contribution or from its adoption as a standard, that the claims are identical to the standard is irrelevant. Also irrelevant is the question that some have suggested for dealing with such cases: should the standard-setting organization, rather than the patentee, be credited with "inventing" the patented invention?[90] Under the approach proposed here, the question is the more fundamental one of whether the standard-setting organization or the patentee created the demand for the invention.

C. License Fees Attributable to Direct Impact on Performance or Interoperability

The most conceptually difficult cases under the approach proposed here arise when the invention that is incorporated in the standard provides some advantages over alternative approaches in achieving the goal of the

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> apparently does not escape the patent. As one expert said, "If the output data is [compressed] GIF, the compressor infringes the Unisys patent regardless of the algorithm."

Id.

89. *See, e.g.*, Mueller, *supra* note 3**,** at 913-14 ("After the [California Air Resources Board (CARB)] issued its regulations, the refiners contended, Unocal cancelled its original patent claims and intentionally substituted amended claims to 'resemble' the CARB regulations.") (footnote omitted).

90. *See id*. This argument was made in the *Unocal* case, but did not prevail. *See* Union Oil Co. of Cal. v. Chevron U.S.A., Inc., 34 F. Supp. 2d 1222, 1224 (C.D. Cal. 1998), *aff'd sub nom* Union Oil Co. of Cal. v. Atl. Richfield Co., 208 F.3d 989 (Fed. Cir. 2000), *cert. denied*, 531 U.S. 1183 (2001) (stating that the defendants made a "'derivation' argument, the gist of which was that Unocal had copied the invention from CARB," but that "[n]o competent evidence was introduced in support of that argument and the jury did not find the patent invalid on that basis").

standard. Here the distinction between standards directed at interoperability and those directed at improved performance becomes important. Many inventions embody technical advances that are not directed specifically at interoperability.[91] For those inventions, it is not difficult, at least conceptually, to distinguish the technical benefits of the invention and the interoperability benefits of the standard. Where both the invention and the standard are directed at improved performance, that distinction is more difficult to maintain.

The *Unocal* case[92] presents an example of an invention that is arguably essential to a performance-directed standard. Unocal received a patent on gasoline formulations that produce fewer emissions than previous formulations.[93] When the California Air Resources Board ("CARB")[94] enacted a new, more demanding emissions standard,[95] Unocal notified its competitors that they would be required to license its invention.[96] In such a case, where the standard is directed at improved performance, the patentee is entitled to whatever returns it can achieve. If there is more than one way of complying with the performance standard, the patentee will face competition, which will constrain its licensing terms. Also, if the patentee's invention is the only means of complying with the standard, or if alternatives are significantly less desirable, the invention can be said to make the standard possible, and thus the patentee is entitled to the returns derived from demand for the standardized product.[97]

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91. *See supra* Introduction (*Rambus* discussion).

92. Union Oil Co. of Cal. v. Atl. Richfield Co., 208 F.3d 989 (Fed. Cir. 2000), *cert. denied*, 531 U.S. 1183 (2001).

93. *Id.* at 991.

94. Because the CARB was a state agency, *Unocal* presents some issues that are not present in cases that involve an industry standard-setting body. For example, the CARB standard was coercive in a more direct way than are "voluntary" industry standards. These differences are not important in the present context, however.

95. *See* Aguilar v. Atl. Richfield Corp., No. 7008101997, WL 824017 (Cal. Super. Ct. Oct. 17, 1997), *superceded by* Aguilar v. Atlantic Richfield Corp., 999 P.2d 666 (Cal. 2000) (describing adoption of new CARB standard).

96. Unocal Corp., Unocal Awarded Patent for Reformulated Gasolines; Plans to License Patent, (Jan. 31, 1995), *at* http://www.unocal.com/rfgpatent/rfgnr1.htm. Some of Unocal's competitors contended that it had behaved inequitably in keeping the existence of its patent application secret while CARB deliberated on its standard. Such conduct, if proven, might be an independent reason for denying a patentee license revenue, but it is not directly relevant to the approach to these issues that is proposed here.

97. This is so under the basic approach described here, which turns on determining the sources of market demand. If the patentee engaged in deception in connection with

Where a standard is directed at interoperability, rather than performance, a particular invention generally will not be necessary to make the standard possible. In most such instances, interoperability could be achieved in any of a variety of ways, just as a particular level of performance can in principle be achieved in many ways. The difference in the interoperability context is that the standard achieves its goal by specifying a particular approach, thus eliminating some alternatives that might otherwise have provided competition. As a result, even if the particular standard chosen is technically better than alternatives, and is better because it incorporates a patented invention, the patentee may also benefit from the standard-setting organization's exclusion of possible competition. It may therefore be possible to distinguish two distinct sources of demand: technical performance and interoperability. When that is the case, one can apply the principles from the previous section to determine the patentee's contribution to demand, and thus its entitlement to licensing revenue.

For example, Rambus bases its ongoing patent infringement action[98] on its claims pertaining to memory devices, as in the following example:

> 14. A synchronous semiconductor memory device having at least one memory section which includes a plurality of memory cells, the memory device comprising:
>
> > a programmable register to store a value which is representative of a number of clock cycles of an external clock to transpire before data is output onto an external bus in response to a read request; and
> >
> > a plurality of output drivers, coupled to the bus, to output data in response to the read request, wherein the output drivers output data on the bus after the number of clock cycles of the external clock transpire.[99]

The goal of this invention is to make "response time more predictable . . . , thereby allowing the system to plan for transfers and improving overall traffic flow over the bus."[100] Rambus alleges that products that comply

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the standard-setting process, it might still be appropriate to limit its returns for that reason. *But see supra* note 68.

98. Rambus, Inc. v. Infineon Techs. AG, No. 3:00cv524 (E.D. Va. filed Aug. 8, 2000).

99. U.S. Patent No. 5,953,263 col. 25, ll. 32-42 (issued Sept. 14, 1999).

100. Memorandum opinion, Rambus, Inc. v. Infineon Techs. AG, No. 3:00cv524, 2001 U.S. Dist. LEXIS 10990, at *6-*7 (E.D. Va. Mar. 15, 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.).

with a JEDEC[101] standard for dynamic random access memory devices infringe its claims. Although JEDEC's standards exist to ensure compatibility among different manufacturers' devices,[102] the Rambus invention improves memory speed[103] and does not obviously further the goal of compatibility.

There is, however, the possibility that an invention could be directed specifically to, or at least could contribute to, improvements in interoperability. For example, a form of computer bus connection that works with a wide variety of circuit board configurations might contribute significantly to interoperability. If so, its inventor could be entitled to the profits made possible by the demand created by adoption of that invention as an interoperability standard.

This might in fact have been true of the invention in the *Dell* case.[104] The patent at issue in that case, U.S. Patent No. 5,036,481, includes the following independent claim:

1. A personal computer system having an I/O channel and a memory channel, and having a dual purpose expansion slot, comprising:
   (a) a chassis;
   (b) a main logic board mounted on the chassis and incorporating the I/O channel and the memory channel;
   (c) a fixed number of expansion slots, including the dual purpose expansion slot, each occupying a fixed volume, positioned over the main logic board for providing space for selective connections of I/O devices, implemented on full length and short logic cards, to the I/O channel;
   (d) a high speed memory system mounted on the main logic board and connected to the memory channel, occupying a fixed amount of space; and
   (e) expansion high speed memory, mounted on the main logic board within the fixed amount of space, connected to the memory channel, and occupying a portion of the dual purpose expansion slot, the remaining portion being occupied

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101. *See* JEDEC, *at* www.jedec.org (last visited July 28, 2002).

102. Rambus, Inc. v. Infineon Techs. AG, 155 F. Supp. 2d 668. 672 (E.D. Va. 2001), *appeal docketed*, 2002 WL 554344 (Fed. Cir.).

103.*See supra* note 6.

104. *In re* Dell Computer Corp., File No. 931-0097, 1995 FTC LEXIS 466 (F.T.C. Oct. 20, 1996).

> by a short logic card, thereby enabling increased high speed memory capacity without eliminating I/O capability.[105]

The flexibility provided by the "dual purpose" expansion slot might well make standardization more attractive. As the patent notes, the invention "may be practiced in other personal computers with more or less memory, [and with] more or less [sic] expansion slots with different implementations of memory and connectors."[106] It is plausible that it was exactly this flexibility that made the invention a desirable standard.

Of course, other means might be used to achieve similar flexibility. Thus, the principles discussed above for analyzing whether an alternative standard might have been chosen apply in this context also, as do other principles applicable to a patentee's nondisclosure to a standard-setting organization. The FTC's enforcement proceeding against Dell was therefore appropriate, particularly under its view that if Dell's patent had been disclosed, the standard-setting organization might have adopted a nonproprietary standard.[107] Indeed, where the invention at issue contributes directly to the goal of the standard-setting organization, it seems particularly appropriate to impose on the patentee a duty to disclose.

D. License Fees for Patented Elements in De Facto Standards

Patented *de facto* standards present a special case in the broader range of patented inventions that enable standardization. A *de facto* standard is one that achieves industry acceptance without the imprimatur of any official or quasi-official standard-setting body.[108] Initially, it might seem that the incorporation of an invention in a *de facto* standard would indicate that the invention contributes to making the standard possible, in the sense discussed in the previous section. That is, it might seem that when the market chooses a standard that incorporates an invention, it will do so because the invention best serves the purposes of standardization.

105.U.S. Patent No. 5,036,481, at col. 3, ll. 41-65 (issued July 30, 1991).

106. *Id.* at col. 3, ll. 34-37.

107. *See supra* note 64.

108.*See* Mueller, supra note 3, at 905 (noting that *de facto* standards arise not from involvement of particular organizations but from market activity); *see also* Lauren Johnston Stiroh & Richard T. Rapp, *Market Power in Technology Markets*, 1999 ALI-ABA 61, 70 (Apr. 22, 1999) (predicating development of *de facto* standard on amount of technology dispersed to market).

In fact, though, the market is likely to choose a standard just as a standard-setting body does, in order to maximize the combination of inherent technical benefits and suitability to the goals of the standard (such as, for example, interoperability), and in order to minimize the costs of searching for a standard. Consequently, an invention may become part of a standard not because it makes any particular contribution to the goals of the standard, but only because it provides greater (or at least no less) technical benefit or is more widely available than alternative possibilities. Thus, a patentee is generally entitled to revenues from the adoption of its invention in a *de facto* standard under the same principles described in the preceding sections for *de jure* standards.

There is one important difference, though. Because a *de facto* standard comes into existence without a formal standard-setting process, it is more difficult to define a point at which a duty of disclosure would arise for the patentee. If no such duty exists, the burden of showing that if information about the patent had been available, an alternative standard would have been adopted will fall, as described above, on the infringer. Nevertheless, in some cases it may be reasonable to impose upon the patentee of an invention incorporated in a *de facto* standard a duty to disclose.

For example, market participants sometimes promote the adoption of their approach to a particular problem, and this promotion can contribute to the development of a *de facto* standard.[109] Where such promotion occurs, the patentee should be charged with a duty to disclose the existence of any relevant patents. The rationale would be that the patentee, by promoting its invention, is participating in the standard-setting process, even if the process is an informal one. Moreover, the disclosure required, in this context as with formal standard-setting processes, should be sufficient to put potential adopters on notice that they may be obligated to pay licensing fees. For example, Microsoft has promoted its "HailStorm" product (now called "Microsoft .NET My Services"), which it describes as "a user-centric architecture and set of XML Web services," as an industry

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109. A recent example may be Geoffrey Moore's book *Crossing the Chasm*. *See* GEOFFREY MOORE, CROSSING THE CHASM 69-86 (paperback ed. 1995). Moore formed The Chasm Group, LLC to provide advice on putting his market strategies to work, and the success of his books and speaking tours seem to indicate the possibility that promoting his approach might lead to creation of a *de facto* standard for high technology market analysis. *See generally* Chasm Group webpage, *available at* http://www.chasmgroup.com (last visited May 24, 2002).

standard.[110] In its literature promoting HailStorm, Microsoft initially mentioned the possibility that it had applicable intellectual property rights:

> Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.[111]

Although Microsoft is certainly correct that its marketing of HailStorm should not be construed as granting a license to its intellectual property, by promoting HailStorm as a standard, Microsoft should have the burden of disclosing any intellectual property that would influence adoption of HailStorm as a *de facto* standard. A general disclosure of the existence of *some* intellectual property rights, as in the passage quoted above, is not sufficient because it does not allow users to evaluate the cost of using Microsoft's product or the benefits of seeking alternatives. In the absence of more specific disclosure, describing the nature of the intellectual property and its applicability, Microsoft should be required, if it seeks returns from the adoption of its products as standards, to show that even with disclosure its products would have been chosen as standards.

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110. Microsoft's marketing literature is fairly explicit:

> HailStorm is the user-centric architecture and set of services for .NET that deliver personally relevant information through the Internet to a user, to software running on the user's behalf, or to devices working for the user. HailStorm services are accessed through SOAP (Simple Object Access Protocol) and XML (eXtensible Markup Language), which are open access technologies: they can be called from any network-connected device that supports SOAP, regardless of operating system or service provider. SOAP and XML are the open Internet standards Microsoft has helped champion throughout the first phase of the .NET rollout. HailStorm is the next logical step: Microsoft began by encouraging the general standards and introducing the first Web services tools and infrastructure. Now we're leading the way to the first set of compelling Web services.

Microsoft Corp., Building User-Centric Experiences: An Introduction to Microsoft Hailstorm 4-5 (Mar. 2001).

111. *Id.* at 13. Interestingly, the latest version of this paper, though in similar in many ways to the older one, omits this notice regarding intellectual property. *See* Microsoft Corp., Building User-Centric Experiences with .NET Services, *at* http://www.microsoft.com/myservices/services/userexperiences.asp (visited Apr. 2, 2002).

E. Lock-In and *IMS Health*

The European Commission's current action against IMS Health Inc. presents interesting variations on these issues.[112] It then, with the aid of some pharmaceutical companies,[113] developed a "brick structure" that divided Germany into small geographical areas. IMS Health provided pharmaceutical sales data to pharmaceutical companies organized according to this structure. IMS Health received a copyright in Germany for its "1860" brick structure,[114] which became the industry standard, despite competitors' efforts to introduce other structures. It refused to license the 1860 brick structure to competing data providers, and the European Commission challenged the refusal to license as an abuse of IMS Health's dominant position under Article 82 of the EC Treaty.

The pharmaceutical companies' adoption of the 1860 brick structure without the intervention of a standard-setting body appears to make it a *de facto* standard. On the other hand, because the pharmaceutical companies, through their trade group, were involved in its creation, the adoption has some *de jure* character as well. Regardless, the critical point is that users do not demand the specific geographical divisions of the 1860 brick structure, but simply the existence of *some* acceptable brick structure. Therefore, because IMS Health does not have intellectual property protection for the invention of brick structures in general, but only for its particular brick structure, it is not entitled to all the revenues from the standardiza-

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112. Initially, the Commission imposed interim measures that required IMS Health to license its "1860 brick structure," which is described in the text. NDC Health/IMS HEALTH: Interim Measures, 2002 O.J. (L 59) 18, *available at* http://europa.eu.int/comm/competition/antitrust/cases/decisions/38044/en.pdf [hereinafter Commission Decision]. Subsequently, the president of the Court of First Instance (C.F.I.) issued an *ex parte* interim order suspending the operation of the Commission's decision. Case T-184/01, IMS Health Inc. v. Commission, 2001 E.C.R. II-2349, *available at* http://curia.eu.int/en/jurisp/index.htm. That order was confirmed after submission of arguments by the parties and a hearing, Case T-184/01, IMS Health Inc. v. Commission, 2001 E.C.R. II-3193, *available at* http://curia.eu.int/en/jurisp/index.htm [hereinafter C.F.I. Decision], and a challenge to it was rejected by the president of the European Court of Justice, Case C-481/01, NDC Health Corp. v. IMS Health Inc., Apr.11, 2002, *available at* http://curia.eu.int/en/jurisp/index.htm.

113. *See* C.F.I. Decision, *supra* note 112, at ¶ 128 ("many of [IMS Health's pharmaceutical company] clients appear, as alleged in the contested decision . . . to have played a significant role . . . in the development of 1 860 brick structure").

114. The ultimate validity of the copyright is as yet undetermined. *See* C.F.I. Decision, *supra* note 112, at ¶¶ 8-17.

tion.[115] The Commission seems to have been correct, then, in imposing a licensing obligation on IMS Health,[116] despite some significant differences from the usual standards context.

First, that the intellectual property at issue is a copyright rather than a patent does not alter the issues significantly. Although copyright law, unlike patent law, does not prohibit independent creation (as distinguished from copying) of the original work, the adoption of the copyrighted work as a standard eliminates that possibility. That is, although IMS Health's competitors did not seek to copy the 1860 brick structure *per se*, they did seek to comply with the standard, which required copying the 1860 brick structure. As a result, the copyright provided a patent-like monopoly. That is likely to be the case in most standards contexts, where it is conformity, not creativity, that matters after the standard is accepted.[117]

Second, the 1860 brick structure apparently became a standard not so much because of a need for interoperability among firms using it, but as a way of preserving the value of individual firms' investments in it.[118] The various pharmaceutical companies were not exchanging their data, but had invested in adapting their operations to the 1860 brick structure. Nevertheless, the critical point continues to be that the demand for the standard

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115. One might argue that in a sense similar to that discussed above, IMS Health's creation of the 1860 brick structure enabled the creation of the industry standard, because before its creation, there was no structure available for standardization. It appears not, however, to have been the specific 1860 structure that enabled the standardization, but merely the existence of *some* acceptable brick structure. Therefore, by the same reasoning, IMS Health is not entitled to all the revenues from the standardization.

116. Commission Decision, *supra* note 112, at ¶ 185. The Commission did not rely on this rationale, however. Instead, it appears to have relied on the involvement of the pharmaceutical companies in creating the standard:

> The input which the pharmaceutical companies have made to the structure has contributed greatly to its status as a de facto industry standard and to their current dependence on this structure as a format for the receipt of regional sales data services. It is therefore the case that refusing access to this structure to competitors on the relevant market would exclude all competition from this market, and that therefore IMS' refusal to license the 1860-brick structure involves abusive conduct.

Id.

117. In that respect, copyrighted material incorporated into or adopted as a standard is functional. *Cf.* Lotus Dev. Corp. v. Borland Int'l, Inc., 49 F.3d 807 (1st Cir. 1995), *aff'd* 519 U.S. 233 (1996) (holding that functional menu trees are not copyrightable).

118.There were some interoperability issues, in that related firms used the same 1860 brick structure, but the pharmaceutical companies' primary concern seemed to be their own investments. Commission Decision, *supra* note 112, at ¶ 120.

does not arise from any inherent advantages in the intellectual property owner's product, but from the contributions of its users.

In this context, the parallel to tying law is clear.[119] IMS Health was really offering two products: the 1860 brick structure, and pharmaceutical data based on it. By denying access to the brick structure, IMS Health effectively extended its copyright to the pharmaceutical data market, which could otherwise have been competitive. Moreover, the investments of the pharmaceutical companies created switching costs of the sort that were held to contribute to market power in the U.S. Supreme Court's tying decision in *Kodak*.[120] The pharmaceutical companies might have faced information costs as well, depending on whether they should have anticipated IMS Health's hold-up possibilities before choosing to invest in the 1860 brick structure. As discussed above, though, because the law in the United States and the EC does not clearly cover those hold-up possibilities, it is difficult to charge the companies with anticipating them.

A related point concerns the risk borne by IMS Health in creating the 1860 brick structure. Commentary on the case has argued that if IMS Health is forced to license the 1860 structure, the royalty should include compensation for the risk taken by IMS Health.[121] But the involvement of the pharmaceutical companies in the development of the 1860 structure makes it unclear just how much risk IMS Health bore. This point, too, is a more general one: where an intellectual property owner develops its invention in parallel with a standard-setting effort, the risk of its efforts is considerably reduced, so that the justifications for intellectual property protections are lessened.

IV. NEGOTIATIONS BETWEEN PATENTEES AND STANDARD-SETTERS

As described above, the relationship between a standard-setting organization and the patentee of an invention incorporated in a standard is analogous to the relationship between two blocking patent holders.[122] In contrast to the situation of blocking patents, though, a standard-setting organization may risk antitrust liability by negotiating with a patent holder. Generally, it is an antitrust violation for individual competitors to combine

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119. *See supra* notes 30-38 and accompanying text.

120. *See* Eastman Kodak Co. v. Image Technical Services, Inc., 504 U.S. 451 (1992).

121. Valentine Korah, *The Interface Between Intellectual Property and Antitrust: The European Experience*, 69 ANTITRUST L.J. 801, 826 (2002).

122. *See supra* Part I.

their negotiating power. In the patent-standard context, though, the underlying rationale for that general rule is not applicable.

The members of a standard-setting organization, or at least the organization itself, should be treated as a single entity when involved in negotiations related to the standard. More specifically, when the goal of the negotiation is to procure a patent license that will enable the practice of the standard, and when the license will only be valid when it is used with the standard, the members can be thought of as negotiating for the standard itself. In such circumstances, the individual members are not pooling their market shares to gain greater power, but are using the power of the standard. In that respect, they are acting just as would the owner of an improvement patent in a situation in which its use of the patent was blocked by another patent.

As described above, the standard, though not technically an intellectual property right, functions much like one, in that it requires a considerable investment to develop and provides easily duplicable benefits to those with access to it. Although it may not meet the technical requirements of patentability,[123] it is nevertheless an additional source of market power for the sellers that produce products in compliance with it.[124] For that reason, it should be treated as a unitary interest, and members of a standard-setting organization negotiating for it should not be treated as parties to an impermissible agreement.[125] Viewed from this perspective, the members are more akin to the licensees of a patent than to competitors.

This view calls into question the allegation in *Sony Electronics, Inc. v. Soundview Technologies, Inc.*,[126] that the members of a standard-setting organization had conspired to refuse to purchase a license for a patent that was needed to comply with a standard. The challenged actions in that case were coordinated through the standard-setting organization, and they appeared to be directed solely toward enabling compliance with the standard.[127] Hence, although the court refused to dismiss the antitrust claims,

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123. Although it might be possible to patent, for example, the use of a particular technical approach to achieve interoperability, it seems likely that in most circumstances such a use would be obvious (given the availability of the technical approach itself).

124. *See supra* note 10.

125. In that respect, they could be treated as having the sort of "unity of interest" that can prevent formally separate entities from forming an illegal conspiracy for the purposes of Sherman Anti-Trust Act § 1, 15 U.S.C. § 1 (1994). *See* Copperweld Corp. v. Independence Tube Corp., 467 U.S. 752, 768 (1984).

126. 157 F. Supp. 2d 180 (D. Conn. 2001).

127. *See id.* at 181-82.

holding that the patentee had properly alleged a conspiracy to drive down license fees, the members of the organization might better be viewed as vindicating the interests of the standard itself, rather than their own interests independent of the standard.

It is true, though, that if this sort of freedom from normal antitrust standards were provided,[128] it could perhaps be used anticompetitively. For example, the members of a standard-setting organization, if unsatisfied with the terms offered by a patentee, might develop a sham standard in order to be permitted to negotiate collectively.[129] However, this possibility could be addressed by the same method used for determining whether a patent provides an independent technical contribution to a standardized product.[130] That is, if the purported standard provided no independent contribution to demand, then any benefit of adopting the standard would come from the patented invention. Thus, the standard-setting body would not merit any antitrust accommodations in the negotiating process. Although a patentee might choose to test this question through antitrust litigation, a standard-setting organization could provide itself with some security by seeking clearance of its negotiating activities from the antitrust agencies.

V. SUMMARY OF IMPLICATIONS

To summarize, this essay proposes two changes in, or clarifications of, existing law: an approach to determine licensing fees for patented inventions incorporated in standards and a recognition of the freedom of standard-setting organizations to negotiate with patentees. Both would likely reduce the licensing fees to which patentees would be entitled, either in litigation or in licensing negotiations. Although these proposals might be thought to reduce undesirably the incentives that patent law is intended to provide, they probably would not do so in fact. The inventor will still re-

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128. This assumes that a deviation from normal antitrust standards would be required. *See supra* note 125.

129. Alternatively, they might use licensing negotiations for a standard as an opportunity to exchange information for anticompetitive purposes. For example, some of the information gathered by the standard-setting organization in the *Soundview* litigation seems at least as useful for anticompetitive collusion as it would be for negotiating a license. *See Sony Elecs.*, 157 F. Supp. 2d at 193 (noting that the organization's "meeting minutes also make statements concerning the 'revenue streams' of member companies"). However, because this sort of information exchange would not necessarily harm the patentee, it might have no standing to challenge it.

130.*See supra* Part II.

ceive the return on the technical advances of her invention. Furthermore, giving the standard-setting organization the right to bargain on behalf of its members would reduce the transaction costs of the negotiation process.

A. Effects of Reduced License Fees on Incentives of Inventors

The limits on licensing fees proposed above would deny patentees some returns to which they might otherwise be entitled.[131] This could be viewed as undesirable. An inventor, when considering whether to engage in a particular research project, might include in her decision-making calculus the possibility that any invention she creates might be adopted as an industry standard, in which case she would reap returns from that adoption. Therefore, so the argument would go, to deny the inventor that return would lessen her incentive to invent. However, this should not cause concern, for a number of reasons.

First, under the approach proposed here, the inventor would not be denied returns derived from her technological contribution, even if her invention *was* incorporated in a standard. The inventor would only be denied those returns that derive from standardization, and that do not derive from her technical innovation. Consequently, to the extent that the inventor relied on the latter returns, there is no reason to think that those returns would be correlated in any way with the desired incentive for technical innovation. The law provides patent protection for inventions in the expectation that the costs imposed by the elimination of competition in the sale of those inventions are balanced by the benefits of increased innovation. This balance is struck, at least implicitly, by granting the patentee the right to exclude others from its *invention*.[132] Permitting the patentee to exclude others not just from its invention but also from others' standardization efforts disturbs this balance.[133] Over-investment, always a concern in patent law,[134] becomes a very real possibility, in that patent law would then create an incentive for inefficient rent-seeking.

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131. *See supra* Part I.

132. *See supra* note 32 and accompanying text.

133. *See* Patterson, *supra* note 32, at 1138-39.

134. *See, e.g.*, Jennifer F. Reinganum, *The Timing of Innovation: Research, Development, and Diffusion*, *in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 849, 850 (Richard Schmalensee & Robert D. Willig, eds., 1989) ("The typical outcome of these comparisons [between models that compare noncooperative investment in research and development with those with cooperative investment or surplus-maximizing results] is that aggregate expenditure on R&D is too high relative to the cooperative optimum; there are too many firms and each invests too much").

Second, those cases that provide guidance in this area suggest that it is often exactly this sort of rent-seeking that motivates patentees to seek returns from the standardization of their inventions. Inventors seeking adoption of their inventions as industry standards have distorted the standard-setting process in a variety of ways.[135] The effect of this, then, is more than a distortion of higher prices for the selected standard—the distinction contemplated by patent law—but also a distortion of the standard-setting process itself. This effect must be added to the cost side of the balance, and it strengthens the conclusion that patent protection should not be extended to the effects of standardization.

Regardless of the theoretical merits of the approach proposed here, it may appear that the proposal would be difficult to apply in practice. But this proposal's approach is not appreciably more difficult than other inquiries in patent law, such as determining the source of demand for an infringing product when deciding the damages that will be awarded. Whenever damages must be calculated in a patent case, such factors as the existence and significance of noninfringing alternatives[136] must be considered. Accounting for these factors presents difficulties that are similar both qualitatively and quantitatively to the proposal here.

Moreover, adopting this proposal might itself reduce the need for its application. Since patentees will be unable to rely on extracting licensing revenue deriving from standardization, they have less incentive to engage in the rent-seeking conduct referred to above, and they might negotiate licensing arrangements more readily. Because no clear rule currently establishes the allocation of entitlements to profits deriving from standardization, parties can take broadly different positions in negotiations. By establishing the principle that a patentee is entitled only to revenues from its

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135. As discussed in note 16 *supra*, the F.T.C. brought an enforcement action against Dell Computer Corp., alleging that Dell kept the existence of a patent secret while a standard-setting organization considered a standard based on the invention claimed in Dell's patent. Rambus, Inc., as noted earlier, and Sun Microsystems, Inc., may also have engaged in similar behavior. *See supra* note 10 and accompanying text; *see also* Bridis, *supra* note 9 (reporting that the F.T.C. has commenced an investigation into whether Rambus and Sun encouraged standard-setting organizations to adopt standards covered by their patents, which they did not disclose). Another example of questionable behavior in this context is the use of insiders at standard-setting meetings to gather information about the progress of the standard-setting process. *See* Tony Smith, *Rambus Received Leaked JEDEC SDRAM Data*, THE REGISTER (June 4, 2001), *at* http://www.theregister.co.uk/content/archive/18148.html.

136. *See, e.g.*, Polaroid Corp. v. Eastman Kodak Co., No. 76-1634-MA 1990 WL 324105 at *3 (D. Mass. Oct. 12, 1990).

technical contribution, the range of disagreement is narrowed, and a negotiated settlement made more likely.

B. Effects of Granting License-Negotiating Power to Standard-Setting Organizations

As discussed above, giving standard-setting organizations the right to negotiate on behalf of their members could improve the negotiation process. However, this approach might provide standard-setting organizations with so much power that they would negotiate patent licensing fees that were too low to provide sufficient incentive for innovation. It is theoretically possible that a standard-setting organization could force a patent licensing fee down not just to the value of the invention's technical contribution—which would be desirable[137]—but below its value. However, it is equally possible that the patentee, who is after all in a similar monopoly position, could demand fees higher than those justified by its contribution.[138] In fact, Merges and Nelson argue that a likely outcome in the similar context of original and improvement patents (analogous to a patent and a standard)[139] is that the original patentee will extract half the value of the improvement (standard).[140] Ultimately, the result is indeterminate, as would be expected with a bilateral monopoly. It is clear, though, that current rules allow patentees to threaten discriminatorily large fees from some standards users.[141] By eliminating that market failure, this proposal will likely to provide better correspondence between financial returns and innovative contributions.

VI. CONCLUSION

The approach presented in this essay provides a means of efficiently and fairly determining what licensing revenue is due a patentee when an industry standard incorporates its patent. The proposed approach puts an emphasis on distinguishing between demand for the invention and demand for the standard, and it would allocate to the patentee only those revenues derived from its own innovative contribution. In some cases there may be evidence available to determine what portion of the demand for a standardized product is due to that contribution. In other cases, there may be

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137. *See supra* Part I.A.

138. *See, e.g.*, Rambus, Inc. v. Infineon Techs. AG, 155 F. Supp. 2d 668 (E.D. Va. 2001).

139. *See supra* Part I.C.

140. *See* Merges & Nelson, *supra* note 35, at 866 n.117.

141. *See* Smith, *supra* note 135.

no such direct evidence, but it may still be possible to use indirect evidence to draw inferences regarding the contributions of the patentee. Although in some instances this analysis will be inconclusive, even in those instances it clarifies the issues to be resolved. Furthermore, by giving standard-setting organizations the power to negotiate on behalf of their members, the equilibrium in the patent system is restored.