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

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

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

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

CHAPTER 3
PATENT NOTICE: A COMPETITION PERSPECTIVE

The Nature and Sources of Notice Problems

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

**Difficulty interpreting the boundaries of issued claims.** To fulfill their notice function, patent claims must delineate the scope of patent rights with sufficient clarity that a person skilled in the relevant art can reliably determine whether planned activities would infringe. The hearings explored several interrelated sources of ambiguity or uncertainty:
• Language is inherently imprecise.
• Some art areas, such as software, lack clear nomenclature and common vocabularies for claiming.
• Claiming using functional language, which describes what the invention does rather than what it is, can produce abstract, ambiguous claims.
• Some applicants may have incentives to draft ambiguous claims that might be viewed narrowly by the PTO and then construed broadly in litigation.
• PTO examination often focuses on issues of novelty and nonobviousness and may result in deferring clarification of claim boundaries until litigation.

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

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

**Guideposts and Trade-offs**

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

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

**Improving the Ability to Understand Existing Claims: Indefiniteness**

Under Section 112, second paragraph of the Patent Act, 35 U.S.C. § 112, claims must “particularly point[] out and distinctly claim[] the subject matter which the applicant regards as
his invention.” Otherwise, the claims are invalid on grounds of “indefiniteness.” An indefiniteness standard that weeds out claims reasonably susceptible to multiple interpretations could reduce ambiguity and improve notice in a broad range of settings.

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

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

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

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

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


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

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

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

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

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

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

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\(^9\)The specification must (1) describe the invention sufficiently to convey to a person having skill in the art that the patentee/applicant was in possession of the claimed invention at the time the application was filed, and (2) enable third parties to make or use the invention without undue experimentation.
However, the factors traditionally considered in evaluating “undue experimentation” omit this commercial perspective.

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

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

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

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

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

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

In addition to the language of the patent itself, important evidence relevant to a claim’s meaning may appear in the prosecution history. Panelists registered considerable support for increasing and recording exchanges between examiners and applicants pertinent to patent scope. They explained that engaging the applicant in ways that build a prosecution history record
enables all participants in the patent system to better understand claim boundaries. The PTO very recently has exhorted its examiners to take steps in these directions.\textsuperscript{10}

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

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

\textbf{Improving the Ability to Foresee Evolving Claims}

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

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

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


\textsuperscript{11}2003 FTC IP Report, ch. 5, at 13-14.
recommendation is consistent with that made in the 2003 FTC IP Report, which noted the “benefits of publication to business certainty and the potential competitive harms and hold-up opportunities that flow from unanticipated ‘submarine’ patents.”

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

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

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

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

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

\footnote{\textit{Id.} at 15.}

\footnote{\textit{Kingsdown Med. Consultants, Ltd. v. Hollister, Inc.}, 863 F.2d 867, 874 (Fed. Cir. 1988).}
Continuation applications enable an applicant to extend the prosecution period, potentially for many years, while maintaining the benefit of the initial filing date. So long as the original application’s specification contains adequate support for any claim additions or amendments, continuation practice provides a means to broaden coverage of the application’s claims.

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

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

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

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

**Improving the Ability to Sift Through a Multitude of Patents**

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

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

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

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

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

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

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

**CHAPTER 4**

**THE ECONOMIC AND LEGAL FOUNDATIONS OF PATENT REMEDIES**

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