ARTICLE

IMPROVING (SOFTWARE) PATENT QUALITY THROUGH THE ADMINISTRATIVE PROCESS

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ABSTRACT

The available evidence indicates that patent quality, particularly in the area of software, needs improvement. This Article argues that even an agency as institutionally constrained as the U.S. Patent and Trademark Office ("PTO") could implement a portfolio of pragmatic, cost-effective quality improvement strategies. The argument in favor of these strategies draws upon not only legal theory and doctrine but also new data from a PTO software examination unit with relatively strict practices. Strategies that resolve around Section 112 of the patent statute could usefully be deployed at the initial examination stage. Other strategies could be deployed within the new post-issuance procedures available to the agency under the America Invents Act. Notably, although the strategies the Article discusses have the virtue of being neutral as to technology, they are likely to have a very significant practical impact in the area of software.

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I. INTRODUCTION

When critics bemoan "bad" or "poor-quality" patents that stifle innovation rather than promote it, they often mean software patents.[1] The available evidence suggests that complaints about quality have some merit, at least for software patents that have issued since the mid- to late-1990s.[2] Beginning in that time period, a number of important decisions emerging from the Court of Appeals for the Federal Circuit (the court with

1. *See, e.g.*, JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 18 (2008) (focusing on problems of notice in software patents); Peter S. Menell & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 2 (2013) ("Effective notice is a far greater challenge when the resources in question are intangible."); *see also* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CALIF. L. REV. 1, 12–13, 39, 56 (2001) (discussing excessive breadth in software patents).

2. *See infra* Part II.A.

intermediate appellate jurisdiction over all patent cases)[3] relaxed criteria for examining software applications with respect to such key statutory requirements as patent-eligible subject matter,[4] nonobviousness,[5] and appropriate notice and scope under Section 112 of the patent statute.[6]

Low-quality software patents issued by the United States Patent and Trademark Office (PTO) generate the usual negative static effects, in the form of either unnecessary licensing fees or deadweight loss.[7] They also generate deleterious dynamic effects, as firms in the information and communications technology industries must accumulate large defensive arsenals in order to avoid being sued.[8] Low-quality software patents also appear to be the primary tool used by patent assertion entities (PAEs) in the significant number of cases they bring against firms small and large.[9]

Faced with this diagnosis, scholars have formulated a plethora of prescriptions.[10] Unlike many scholars, I focus here on the administrative process. My aim is deliberately pragmatic. I take as a given almost all of the PTO's current institutional constraints. Additionally, I offer solutions that are agnostic as to technology. Remaining agnostic about technology not only avoids very difficult line-drawing regarding what constitutes a software patent but also takes

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3. Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 COLUM. L. REV. 1035, 1037 (2003).

4. *See* State St. Bank & Trust Co. v. Signature Fin. Grp., Inc., 149 F.3d 1368, 1373 (Fed. Cir. 1998); *In re* Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994).

5. *See, e.g.*, *In re* Lee, 277 F.3d 1338, 1343–45 (Fed. Cir. 2002); *In re* Zurko, 111 F.3d 887, 889–90 (Fed. Cir. 1997).

6. *See, e.g.*, Fonar Corp. v. Gen. Electric Co., 107 F.3d 1543, 1548–49 (Fed. Cir. 1997) ("[W]riting code for . . . software is within the skill of the art . . . once its functions have been disclosed. . . . [F]low charts or source code listings are not a requirement for adequately disclosing the functions of software.").

By using the term "appropriate notice" in the text, I emphasize that the goal cannot, and should not, be perfect notice. Not only is perfect notice an impossibility when the rights at issue involve intangibles, but any attempt to achieve perfect notice would likely undermine appropriate scope.

7. *See* Carl Shapiro, *Patent Reform: Aligning Reward and Contribution*, *in* 8 INNOVATION POLICY AND THE ECONOMY 111, 112, 125–26 (Adam B. Jaffe et al. eds., 2008).

8. *See infra* note 27.

9. EXEC. OFFICE OF THE PRESIDENT, PATENT ASSERTION AND U.S. INNOVATION 5 (June 2010), *available at* http://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf. In mentioning PAEs, I do not mean to suggest that PAE assertions of patents should necessarily be treated differently from assertions by practicing entities. Rather, I single out PAEs simply because the primary patents they are asserting appear to be software patents of low quality. *See infra* Part II.A. This Article also does not tackle complex questions of patent holdup or abusive patent litigation, whether by PAEs, the broader category of nonpracticing entities (which includes universities), or by practicing entities.

10. *See infra* Part III (detailing solutions promulgated by others).

into account the PTO's institutional need to avoid "discrimination" against any particular type of technology.[11]

The institutional context in which the PTO operates is challenging. Even with the fortification of agency power that emerges from the new post-issuance proceedings set up by the America Invents Act (AIA), the PTO lacks rulemaking authority over the content of patent validity requirements.[12] In addition to limiting the PTO's policymaking influence, this dearth of rulemaking power makes the PTO vulnerable to challenges that it has acted beyond its authority when it attempts to impose significant procedural constraints or work burdens on applicants.[13] Meanwhile, the presence of a vigorous union constrains the agency's ability to place additional work burdens on examiners conducting initial examination.[14]

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11. For this reason, although I agree that the various new administrative procedures created in the America Invents Act of 2011 could be improved by further expanding administrative opportunities to challenge patent validity, I have questions about current proposals that would limit expanded opportunities to software-enabled inventions only. *See* Letter to Congress Objecting to Covered Business Method Patent Legislative Proposals (Sept. 19, 2013), *available at* http://www.scribd.com/doc/170311368/Letter-100-Innovative-Businesses-and-Organizations-Send-Letter-to-Congress-Objecting-to-Covered-Business-Method-Patent-Legislative-Proposals (discussing proposals).

12. Arti K. Rai, *Growing Pains in the Administrative State: The Patent Office's Troubled Quest for Managerial Control*, 157 U. PA. L. REV. 2051, 2052–53 (2009); *see also* EXEC. OFFICE OF THE PRESIDENT, *supra* note 9, at 3. The other obvious institutional actor, Congress, is a favorite of judges who believe they should not be making policy determinations. The delegation doctrine emerged in significant part, however, because congressional attention and expertise are limited, and legislation that Congress prescribes in the face of rapidly changing technological circumstances can quickly become obsolete. *See* Margaret H. Lemos, *The Consequences of Congress's Choice of Delegate: Judicial and Agency Interpretations of Title VII*, 63 VAND. L. REV. 363, 368 (2010). Although administrative agencies are the typical recipient of delegated power, the judiciary can also be a delegate. *See id* at 365.

13. Most notably, the PTO's decision to limit the number of "repeat" patent applications that can be filed was met with a lawsuit challenging the PTO's authority to issue the rules. Rather than continue to fight the challenge, the PTO withdrew the rules. *See* Tafas v. Kappos, 586 F.3d 1369, 1371 (Fed. Cir. 2009). The PTO may in the future be emboldened by the Supreme Court's recent decision in *City of Arlington v. FCC*, 133 S. Ct. 1863 (2013). In that case, the Supreme Court held that an agency's interpretation of ambiguous language governing its statutory authority is entitled to *Chevron* deference. *Id.* at 1874–75. But this Article does not assume significant changes as a consequence of *Arlington*. Even if the Federal Circuit were to deem particular rules seen as onerous by patent applicants to be within the PTO's authority, it would likely be influenced by applicant arguments that the rules failed under the "arbitrary and capricious" hard look standard. *See* Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 41 (1983). And the Supreme Court might have little interest in taking a case that required delving into the details of PTO's examination process.

14. I discuss issues regarding misaligned incentives on the part of examiners, applicants, and the PTO in detail in a 2009 article. Rai, *supra* note 12, at 2056, 2062–63 (discussing a skewed incentives structure and how "the complexities of collective bargaining with a union that represents over 6000 examiners pose a formidable challenge"). One of then-Director David Kappos's first actions upon assuming office late in

Even taking all of these constraints as a given, however, the PTO can and should play a role in improving quality, including software patent quality. As this Article discusses, quality can be improved to some extent at the initial examination stage.[15] And the possibilities for improvement through the PTO's new post-issuance procedures are particularly promising.

The PTO has already done some work at the initial examination stage. Through examination guidelines issued in February 2011, and through two requests for comments issued in January 2013, the PTO has highlighted Section 112 validity requirements in the area of software.[16] In June 2013, President Obama issued a short Executive Order underscoring the importance of this work.[17] With the exception of the February 2011 guidelines, however, the details of how quality improvement should be accomplished administratively remain sparse. In this Article, I flesh out what the PTO should do, and why these actions might actually work.

With respect to initial examination, there is reason to believe that certain Section 112 requirements could be applied more strictly even by examiners working under severe time constraints. In fact, the available evidence suggests that the February 2011 guidelines on Section 112 have already had some

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2009 was to implement a modest increase in incentives for examiners to act quickly on patent applications. Ed O'Keefe, *New Boss Moves Quickly to Change Sluggish Patent Office*, WASH. POST, Oct. 20, 2009, at A17. Given union bargaining power, the policy space for dramatic changes in incentive structure may be limited, however. Additionally, despite the AIA's grant of some fee-setting authority to the PTO, the current cost structure remains one in which PTO recovers most of its application processing costs through back-end issuance and maintenance fees. *See USPTO Fee Schedule*, U.S. PATENT & TRADEMARK OFFICE, www.uspto.gov/web/offices/ac/qs/ope/fee031913.htm (last revised Oct. 4, 2013). Some scholars have argued that this cost structure gives the agency an incentive to grant applications, at least when it is under financial pressure. *See* Michael D. Frakes & Melissa F. Wasserman, *Does Agency Funding Affect Decision Making?: An Empirical Assessment of the PTO's Granting Patterns*, 66 VAND. L. REV. 67, 92, 101–03 (2013) (arguing, based on historical data, that the PTO has historically granted a higher percentage of patent applications during times when it has been under financial pressure).

15. *See infra* Part IV (discussing three "key" Section 112 requirements used to control breadth and vagueness—definiteness, scope limitations associated with means or step plus function claiming, and written description).

16. Request for Comments on Preparation of Patent Applications, 78 Fed. Reg. 2960, 2960–61 (Jan. 15, 2013); Request for Comments and Notice of Roundtable Events for Partnership for Enhancement of Quality of Software-Related Patents, 78 Fed. Reg. 292, 292–93 (Jan. 3, 2013); Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7163–70 (Feb. 9, 2011).

17. *Fact Sheet: White House Task Force on High-Tech Patent Issues*, WHITE HOUSE (June 4, 2013), http://www.whitehouse.gov/the-press-office/2013/06/04/fact-sheet-white-house-task-force-high-tech-patent-issues.

impact.[18] Similarly, data I have gathered on an Art Unit set up to examine rigorously a particular category of software applications (bioinformatics) reveal that the Section 112 definiteness requirement was actually deployed in the vast majority of cases.[19] This bioinformatics Art Unit also provides useful specific illustrations of how written description, a requirement often criticized by patent scholars (myself included) as being overly formalistic,[20] might productively be deployed.[21] As this Article discusses, proper use of written description could do substantial work in addressing concerns about so-called functional claiming, even if the PTO does not adopt proposals to further expand the application of Section 112(f) restrictions to such claiming.[22]

Post-issuance, pursuant to the new authorities that Congress has given the PTO under the AIA,[23] the agency may be poised to assert significant control over quality. The congressional directive that the post-grant proceedings be completed within one year should make it easier for district courts to justify staying parallel litigation pending PTO review.[24] Recent Federal Circuit cases indicating that post-issuance administrative proceedings can cancel patent claims even after a district court has found those claims "not invalid" should further enhance the attractiveness of stays.[25]

At the post-issuance stage, mechanisms other than Section 112—most notably, a robust nonobviousness analysis—could be used. The congressional instruction that PTO post-issuance proceedings be conducted using the sorts of formal procedures that typically yield Chevron deference may further enhance PTO authority, giving the PTO a significant role in

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18. David Kappos, Dir., U.S. Patent & Trademark Office, Keynote Address at the Center for American Progress: An Examination of Software Patents (Nov. 20, 2012), *available at* http://www.uspto.gov/news/speeches/2012/kappos_CAP.jsp.

19. Arti Rai, Research Conducted on Applications from 2003, Art Unit 1631 (2013) (on file with author).

20. Rai, *supra* note 3, at 1073–74; Arti K. Rai, *Intellectual Property Rights in Biotechnology: Addressing New Technology*, 34 WAKE FOREST L. REV. 827, 835–36 (1999); *see also* Mark D. Janis, *On Courts Herding Cats: Contending with the "Written Description" Requirement (and Other Unruly Patent Disclosure Doctrines)*, 2 WASH. U. J.L. & POL'Y 55, 85 (2000); Janice M. Mueller, *The Evolving Application of the Written Description Requirement to Biotechnological Innovations*, 13 BERKELEY TECH. L.J. 615, 650–51 (1998).

21. Rai, *supra* note 19.

22. *See infra* Part IV.

23. *See* 35 U.S.C. § 316(a) (2012) (granting the Director of the PTO authority to implement new regulations in accordance with the Act).

24. *Id.* § 316(a)(11).

25. Fresenius USA, Inc. v. Baxter Int'l, Inc., 721 F.3d 1330, 1346 (Fed. Cir. 2013).

promoting quality not only through individual validity determinations but also through decisions on law and policy.

Part II of the Article briefly summarizes the literature on the economic difficulties created by poor-quality software patents and also addresses why the PTO needs to be part of the solution. Part III outlines why, more so than other patent validity requirements, certain Section 112 issues are a useful area of PTO focus in the context of initial examination. Part IV discusses these Section 112 requirements in detail, outlines what the PTO has done to date, and discusses steps it should take going forward. Part V discusses how the post-grant proceedings available to the PTO under the AIA could place the PTO at the center not only of patent validity questions in individual cases but also patent law and policy more generally.

II. THE SOFTWARE PATENT CHALLENGE

This Part briefly summarizes the extant economic literature and also makes the case for why the PTO needs to be part of the solution not only post-grant but also at the initial examination stage.

A. The Economics of the Issue

The number of software patents that issue each year is debatable, in significant part because the definition of "software patent" is hotly contested.[26] What is clear is that firms, both large and small, that produce products involving software must accumulate significant patent portfolios in order to avoid being sued.[27] The cost associated with this tactic of "mutual assured destruction" is nontrivial. In the smartphone arena alone, the cost of acquiring defensive patent portfolios has run into the tens

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26. For an extended discussion of the debate over the definition, see Arti K. Rai, John R. Allison & Bhaven N. Sampat, *University Software Ownership and Litigation: A First Examination*, 87 N.C. L. REV. 1519, 1526–33 (2009). In a group of university patents, the overlap between the patents identified as software by Rai, Allison, and Sampat (RAS), using a definition originally developed by John Allison, had only about a 50% overlap with patents identified as software through a prominent keyword-based algorithm used by James Bessen and Bob Hunt. *Id.* at 1531 n.60, 1532. However, the total *number* of software patents identified by the two approaches was similar. *Id.* at 1531 n.60. Approaches that rely on PTO or IPC technology classes, such as those employed by Graham and Mowery, yield even less overlap with the RAS approach. *Id.* at 1530 n.54 (noting that the approach employed by Graham and Mowery did not classify as software 86% of the patents classified as software by RAS).

27. *See, e.g.*, Colleen V. Chien, *From Arms Race to Marketplace: The Complex Patent Ecosystem and Its Implications for the Patent System*, 62 HASTINGS L.J. 297, 306, 321–22 (2010) (discussing defensive patenting strategy); Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 26–27, 43–50 (2005) (same).

of billions.[28] Meanwhile, the extent to which the underlying patents in these portfolios were responsible for significant smartphone innovation is unclear. In any event, in this arena, mutual assured destruction has been less than fully successful—firms with massive portfolios have recently spent many millions of dollars suing each other over a variety of software-enabled smartphone features.[29]

To be sure, patents that large corporate players choose to assert in smartphone litigation may be of relatively high quality.[30] Concerns about quality in *litigated* patents are likely to be more acute with respect to patents asserted by those entities that do not manufacture products. I turn next to these patents.

As has now been widely documented, many patent-holding entities that do not produce products, and thus are not, even in theory, subject to the logic of mutual assured destruction, bring a substantial percentage of patent cases.[31] For purposes of this Article, I do not need to engage the extensive debate over how NPEs (a term that includes universities but excludes product manufacturers) or patent-assertion entities (PAEs) (a term that does not include universities or product manufacturers) should be viewed.[32] No matter one's views on NPEs and PAEs,

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28. EXEC. OFFICE OF THE PRESIDENT, *supra* note 9, at 11.

29. Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 931–34.

30. Stuart Graham and Saurabh Vishnubhakat, *Of Smart Phone Wars and Software Patents*, 27 J. ECON. PERSPECTIVES 67, 73 (2013) (finding that of twenty-one software patents in smart phone litigation that had been the subject of a judicial or administrative decision, only four had been found invalid or likely invalid). Of course twenty-one is a very small sample size.

31. In 2011, NPEs brought almost 40% of cases, up from 22% in 2007. Sara Jeruss, Robin Feldman & Joshua Walker, *The America Invents Act 500: Effects of Patent Monetization Entities on US Litigation*, 11 DUKE L. & TECH. REV. 357, 361, 381 (2012). Since 2011, the nominal percentage has risen even further (to over 60%), but the recent increases appear to be an artifact of the AIA's misjoinder provisions, which make it more difficult for NPEs to sue large numbers of defendants in a single case. Dennis Crouch & Jason Rantanen, *Patent Trolls by the Numbers*, PATENTLY-O BLOG (Mar. 14, 2013, 6:31 AM), http://www.patentlyo.com/patent/2013/03/chien-patent-trolls.html.

32. Commentators have expressed opinions on the question of whether NPEs and PAEs simply engage in rent-seeking based on the threat of costly litigation or could, at least potentially, facilitate markets for technology. *See, e.g.*, James E. Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. (forthcoming 2014). Others have attempted to quantify the economic impact of NPEs and PAEs. In one prominent analysis, James Bessen and Michael Meurer rely on stock market event studies tied to lawsuit filings to estimate that NPEs have imposed on publicly traded technology firms costs on the order of perhaps $500 billion over the last 20 years. James Bessen, Jennifer Ford & Michael J. Meurer, *The Private and Social Costs of Patent Trolls*, REGULATION, Winter 2011–2012, at 26, 29–31. Bessen, Ford, and Meurer further argue that these costs have been particularly high in recent years, on the order of over $80 billion per year. *Id.* at 26. In another paper, Bessen and Meurer rely on survey data and a proprietary database of NPE litigation compiled by RPX, to estimate that in 2011 the

presumably significant amounts of litigation fueled by low-quality patents is problematic.

The available evidence suggests that NPE litigation, and litigation more generally, is indeed fueled by low-quality software patents. Using a definition of software he has developed with Bob Hunt,[33] James Bessen estimates software patents represent 62% of NPE patent assertions.[34] Similarly, according to research done by John Allison, Mark Lemley, and Joshua Walker (and using a different definition of software developed by John Allison), software patents represent the majority of frequently litigated patents.[35] The Allison/Lemley/Walker (ALW) research also indicates that software patent litigation typically involves patents of dubious quality. In a sample of litigated cases studied by ALW (and using Allison's definition of software patent), software patentees won only 12.9% of the cases that were litigated to judgment. By contrast, nonsoftware patent owners won 51.1% of the cases.[36]

Thus, at least for patents that have already issued, and in all likelihood for patent examination going forward, quality is a central challenge. The next Subpart makes the argument for why the PTO should play a role in addressing quality issues and for why this involvement is likely to be useful not only at the post-issuance stage but also during initial examination.

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direct costs of NPE patent assertions—both assertions that led to litigation and assertions that were settled prior to the filing of a lawsuit—ran as high as $29 billion. Bessen & Meurer, *supra*.

David Schwartz and Jay Kesan have taken issue with the Bessen and Meurer numbers, arguing that, with respect to the $29 billion calculation, the extrapolation that Bessen and Meurer do from survey data is unreliable. David L. Schwartz & Jay P. Kesan, *Analyzing the Role of Non-Practicing Entities in the Patent System*, 99 CORNELL L. REV. (forthcoming 2014). Schwartz and Kesan also argue that the calculation relies on an overly broad definition of what sorts of firms should be counted as NPEs and insufficiently justifies a conclusion that all of the $29 billion represents a "cost" (as contrasted with compensation for a legitimate patent). *Id.*

33. Robert Hunt & James Bessen, *The Software Patent Experiment*, BUS. REV., Third Quarter 2004, at 22, 24.

34. Bessen, Ford & Meurer, *supra* note 32, at 29.

35. According to Allison, Lemley, and Walker, software patents represent 74% of the patents that have been litigated more than eight times since 2000. John R. Allison, Mark A. Lemley & Joshua Walker, *Patent Quality and Settlement Among Repeat Patent Litigants*, 99 GEO. L.J. 677, 695–96 (2011).

36. *Id.* at 696–97. These statistics include default judgments for the plaintiff. *See also* Shawn P. Miller, *What's the Connection Between Repeat Litigation and Patent Quality? A (Partial) Defense of the Most Litigated Patents*, 16 STAN. TECH. L. REV. 313, 316 (2013) (disagreeing with some of ALW's conclusions regarding repeat litigation but "confirm[ing] their finding that software and NPE-owned patents lose more decisions regardless of the number of lawsuits in which they are asserted").

B. Why the PTO Needs to Be Part of the Solution

The argument for a relatively minimal PTO role rests on data indicating that, even in software, most patents are the subject of neither licensing disputes nor litigation.[37] Moreover, to the extent that firms in software-intensive industries do not bother to conduct freedom-to-operate searches,[38] the deterrent effect on innovation that such patents impose prior to licensing or litigation is unclear. Thus devoting significant resources to administrative examination of software patents would not be cost-effective.

At least with respect to post-issuance administrative review, the argument has largely been settled. Commentators have persuasively argued that the inability of firms to internalize fully the benefits of a successful patent invalidation, as well as their ability to pass on to consumers the cost of licensing bad patents, will result in suboptimal numbers of challenges to patent validity through expensive litigation in Article III courts.[39] Presumably the requirement that a party generally pays its own attorneys' costs even when it wins adds to the burden of litigating invalidity.[40] The importance of post-grant issuance proceedings where patents can be challenged under a preponderance of the evidence standard is further highlighted by the Supreme Court's 2011 decision in *Microsoft Corp. v. i4i Ltd. Partnership*, which holds that those who challenge issued patents in court will continue to bear the burden of proving invalidity by "clear and convincing evidence."[41]

The more challenging question involves what level of resources should be deployed to improve quality at the initial

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37. BESSEN & MEURER, *supra* note 1, at 153 (indicating that only 4.6% of software patents are likely to be involved in a patent suit).

38. *See, e.g.*, Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 21–22 ("[B]oth researchers and companies in component industries simply ignore patents. . . . [Rather than conducting a search for prior patents], they wait and see if any patent owner claims that the new product infringes their patent.").

39. *See, e.g.*, Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Review Might Help*, 19 BERKELEY TECH. L.J. 943, 955–60 (2004) (concluding through mathematical analysis that it is economically favorable for an alleged infringer to pay a license fee rather than have the patent invalidated through litigation).

40. The Federal Circuit's interpretation of when the losing party in a patent case should be ordered to pay the attorneys' fees of the winning party is the subject of two cases on which the Supreme Court has granted certiorari. Octane Fitness, LLC v. Icon Health & Fitness, Inc., No. 12-1184, 2013 WL 1283843 (U.S. Oct. 1, 2013); Highmark Inc. v. Allcare Health Mgmt. Sys., Inc., No. 12-1163, 2013 WL 1217353 (U.S. Oct. 1, 2013). Congress is also considering legislation on this issue. *See, e.g.*, Innovation Act, H.R. 3309, 113th Cong. § 3(b)(1)(a)–(b) (2013).

41. Microsoft Corp. v. i4i Ltd. P'ship, 131 S. Ct. 2238, 2242, 2252 (2011).

examination stage, at least for the "ordinary" applicant who does not deem her application sufficiently pressing to pay for fast-track agency procedures.[42] A first-best answer to this interesting question awaits further study. For purposes of this Article, however, I am taking as a given the limited amount of time that examiners have. I am also taking as a given the likelihood that applicants will object to, and potentially even challenge through litigation, PTO rulemaking that imposes significant burdens. If initial examination can be improved with tools readily deployable within these constraints, these tools represent a Pareto improvement and are worth deploying. Thus, in the next Part, which focuses on initial examination, I assess potential quality-enhancement tools through the lens of whether they are inexpensive to deploy.

III. POTENTIAL QUALITY-ENHANCEMENT SOLUTIONS: INITIAL EXAMINATION

Many commentators view the key problems with software patent quality (as contrasted with remedies and potential defenses such as independent invention or prior use, which I do not address here) as including: overly broad eligibility for patenting; obviousness; the grant of patents with scope that exceeds their level of disclosure; and the grant of patents with unclear claim language that fails to provide adequate notice.

A. Patent-Eligible Subject Matter

Some commentators have argued that software (or at least "pure software") should not represent subject matter eligible for patenting under Section 101 of the patent statute.[43] On this view, because pure software is simply disembodied information processing, its bounds are difficult to articulate using tools of patent claiming that borrow from tangible property.[44]

Categorically excluding pure software from the realm of patentability presumably requires a definition of software. As noted earlier, analysts have struggled over what sorts of patent

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42. Through the PTO's Track One prioritized examination, applicants receive a final determination in approximately twelve months. *USPTO's Prioritized Patent Examination Program*, U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/patents/init_events/Track_One.jsp (last visited Nov. 20, 2013).

43. A classic reference is Pamela Samuelson, Benson *Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1134–35 (1990). *See also Against Software Patents: The League for Programming Freedom*, 14 HASTINGS COMM. & ENT. L.J. 297, 311 (1992) (arguing that software should be excluded from patents).

44. BESSEN & MEURER, *supra* note 1, at 10.

claims focus sufficiently on data processing such that they should be deemed to represent software patent claims.[45] The overall agreement between prominent analysts such as John Allison; Bessen and Hunt; and Graham and Mowery has been, at best, only about 50%.[46] Thus it is perhaps not surprising that, for over forty years, in cases involving both process and product claims, the PTO and the courts have struggled with categorical rules for defining software.[47]

The so-called machine-or-transformation test for software process claims, suggested by the Supreme Court in the 1981 case *Diamond v. Diehr*,[48] and advocated by the PTO before the Supreme Court in the 2010 case of *Bilski v. Kappos*,[49] is the most prominent example of a categorical rule.[50] Under this test, the patent claim in question may contain an algorithm, but the algorithm must be limited to a particular machine or involved in a transformation of matter in order to be patent-eligible.[51]

In *Bilski*, the Supreme Court rejected the categorical approach in favor of a more flexible, transtechnological "abstraction" standard for determining what sorts of invention should be patent-eligible.[52] From the standpoint of appropriate innovation policy, the most attractive reading of this abstraction test is that it targets overly broad scope.[53] Numerous commentators have made persuasive arguments that proprietary rights of excessive scope imperil innovation.[54] Whether concerns about broad scope are couched in the language of

45. *Supra* note 26 and accompanying text.

46. *Supra* note 26.

47. BESSEN & MEURER, *supra* note 1, at 187–89; Nathan Oleen, *Software Patent Debate: Will the U.S. Supreme Court Weigh In?*, TECH., MFG. & TRANSP. INDUS. INSIDER (Sept. 27, 2013), http://www.tmtindustryinsider.com/2013/09/27/software-patent-debate-will-the-u-s-supreme-court-weigh-in/ (commenting on the "long running and heated debate" over the patent eligibility of software patents and noting that the "uncertainty [of standards for software patents] has led to a number of conflicting and arguably irreconcilable decisions").

48. Diamond v. Diehr, 450 U.S. 175, 192 (1981).

49. Bilski v. Kappos, 130 S. Ct. 3218, 3225–27 (2010).

50. *Id.* at 3227.

51. *In re* Bilski, 545 F.3d 943, 961 (Fed. Cir. 2008).

52. *Bilski*, 130 S. Ct. at 3227, 3231. (disapproving of an exclusive machine-or-transformation test and instead holding that "[t]he patent application here can be rejected under our precedents on the unpatentability of abstract ideas").

53. Mark A. Lemley et al., *Life After* Bilski, 63 STAN. L. REV. 1315, 1328–29 (2011).

54. A classic reference in patent law is Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 908–09 (1990), which states that issuing broad patents in cumulative technologies has led to blockages in innovation. *See also* Cohen & Lemley, *supra* note 1, at 52.

"infrastructure,"[55] "platform technology,"[56] "basic research,"[57] or preemption of future work,[58] such concerns are ubiquitous.[59] Similarly, in the trilogy of Section 101 cases the Supreme Court has decided over the last three years—the 2010 decision in *Bilski v. Kappos*, the 2012 decision in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, and most recently the 2013 decision in *Association for Molecular Pathology v. Myriad Genetics, Inc.*—the Court has invoked scope.[60] In *Bilski*, the majority opinion argued that proprietary rights over abstract ideas, such as the idea of hedging risk in commodities markets claimed by the applicant, could "pre-empt" future innovation.[61] The Court's unanimous decision in *Mayo*, rendered in the context of applying patentable subject matter doctrine to a diagnostic testing patent, also discussed the danger of patent grants on laws of nature "inhibit[ing] future innovation premised upon them."[62] Similarly, in *Myriad*, the Court struck down certain gene patent claims in the context of cautioning against inhibitions on future research.[63]

Actually applying the patentable subject matter requirement to police scope can, however, be quite challenging, even for Supreme Court Justices. In *Mayo*, for example, the unanimous

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55. BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES 282, 286–87 (2012); Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 923–24 (2005).

56. Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85, 107–09 (2003).

57. Arti K. Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 109 (1999).

58. *See* Rai, *supra* note 20, at 829 (expressing concern for the patent grant's ability to limit future work).

59. Patent practitioners often argue Section 112 is the appropriate mechanism for policing scope. Although Section 112 is adequate in most cases, it may not be fully effective. The factual situation facing the Supreme Court in its most recent Section 101 case, *AMP v. Myriad Genetics*, illustrates the limitations of Section 112. Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2110–14 (2013). That case included claims covering genomic DNA (gDNA) encoding BRCA1 and BRCA2 polypeptides that had simply been isolated from the human chromosome. *Id.* at 2112–13. At least some of the gDNA claims probably met the requirements of Section 112—they appeared enabled, definite, and adequately described. *See* 35 U.S.C. § 112 (2012) (listing the requirements for specification of inventions). Nonetheless, the claim presented serious obstacles to independent work on discovering mutations in BRCA1 and BRCA2. Arti K. Rai & Robert Cook-Deegan, *Moving Beyond "Isolated" Gene Patents*, SCIENCE, July 12, 2013, at 137, 138. The gDNA patents also cast a shadow of infringement liability over whole genome sequencing. *Id.*

60. *Myriad Genetics, Inc.*, 133 S. Ct. at 2116 (invoking scope while citing *Mayo*).

61. Bilski v. Kappos, 130 S. Ct. 3218, 3225, 3231 (2010).

62. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294, 1301 (2012).

63. *Myriad Genetics, Inc.*, 133 S. Ct. at 2111, 2116–18.

Court rejected on subject matter grounds a claim on administration of a thiopurine drug that was quite narrow.[64] These judicial challenges in applying Section 101 caution against allowing examiners to wield the requirement liberally. Regardless of whether courts can successfully use the test within the relatively small number of cases they have to adjudicate,[65] a sophisticated approach to Section 101 is unlikely to be a useful tool in the mine run of cases that examiners must address in an average time allotment of about twenty to forty hours.[66] Although a crude and underinclusive machine-or-transformation test should have some utility, patentable subject matter doctrine has limited potential at the initial examination stage.[67]

B. A Robust Nonobviousness Standard

As a consequence of the Supreme Court's decision in the 2007 case of *KSR International Co. v. Teleflex, Inc.*, examiners making an obviousness rejection no longer have to bear the considerable administrative burden of finding a specific written teaching, suggestion, or motivation (TSM) to combine prior art when they reject a patent application.[68] While the Court's

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64. *Mayo Collaborative Servs.*, 132 S. Ct. at 1294–95. The claim covered adjusting thiopurine drug dosage according to whether metabolite levels of the drug fell within a specific picomole per red blood cell range. *Id.* at 1295. For its part, the Federal Circuit has also struggled mightily with questions of subject matter eligibility. However, the lower court's struggle may reflect not so much challenges of application but instead a deep division over whether, notwithstanding the Supreme Court's views, Section 101 should play any significant role. The range of division was on full display in the Federal Circuit's en banc decision in the § 101 software case. *See* CLS Bank Int'l v. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1273–84, 1292–93 (Fed. Cir. 2013) (en banc) (showing the differences between the majority and concurrence). The only conclusion that drew a majority (based on different rationales) was that the relevant method claims in the patents were invalid. *Id.* at 1273–84, 1292–1305.

65. Some would argue that Section 101 questions are sufficiently challenging that even courts should try to adjudicating them if an "easier" issue involving less controversy could conclusively resolve the case. *See, e.g.*, Dennis Crouch & Robert P. Merges, *Operating Efficiently Post-*Bilski *by Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673, 1681 (2010) (offering a pragmatic rationale for avoiding Section 101 decisions). That said, some courts have granted motions to dismiss on Section 101 grounds when the claim in question was broad and lacked a machine or transformation. *See, e.g.*, Memorandum Opinion and Order at 4–5, Uniloc USA, Inc. v. Rackspace Hosting, Inc., No. 6:12-CV-375 (E.D. Tex. Mar. 27, 2013).

66. Rai, *supra* note 12, at 2063–64 (discussing time allotment, which is based on the technological complexity of the applications the examiner receives and examiner GS level).

67. *See* Crouch & Merges, *supra* note 65, at 1690 (noting that subject matter eligibility is difficult for anyone to implement at the initial examination stage).

68. KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406–07 (2007); *see* Rai, *supra* note 12, at 2053 n.9 (explaining the Federal Circuit's interpretation of the TSM requirement). Notably, in that case, the PTO successfully worked with the Justice Department's Office of the Solicitor General to shape Supreme Court interest in, and reform of, the Federal Circuit's TSM requirement. *Id.*

rejection of a rigid TSM test makes it easier for examiners to reject software applications that are merely straightforward combinations of pre-existing art,[69] the nonobviousness standard at the PTO is still some distance from a sophisticated economic inquiry that would grant patents only when necessary to induce innovation (i.e., either initial invention or subsequent development).[70] Such an inquiry would presumably have significant force in the area of software, where copyright, first-mover advantages, network effects, and layering of services on top of software code (particularly prevalent in open-source models) provide considerable incentive to innovate independent of patents.[71]

For purposes of initial examination, however, such an economically sophisticated inquiry would be quite costly to administer. The ordinary nonobviousness test enunciated in the case law, which uses a scientific and technical inquiry into prior art as a proxy for assessing the larger economic question, is difficult enough to administer.[72]

C. Resolving Issues of Excessive Breadth and Vagueness

For the reasons noted above, patentable subject matter and nonobviousness are unlikely to operate as robust mechanisms for initial screening at the PTO. However, Section 112 tools that target excessive breadth and vagueness could usefully be deployed. The PTO recognized this point in a set of Section 112 guidelines focused on computer-enabled inventions that it issued in February 2011.[73] In January 2013, the PTO went a step further, requesting comments on claims that use functional language and commentary on the preparation of patent applications.[74] President Obama's June 2013 Executive Order hews closely to these ongoing PTO efforts.[75]

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69. *See KSR Int'l Co.*, 550 U.S. at 418–19 (demonstrating the Court's rejection of a rigid TSM test).

70. *Cf.* Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1599 (2011) (advocating for a dynamic inducement standard).

71. *See id.* at 1601–02, 1614–15 (emphasizing that mechanisms in the field of software other than patents provide inducement for innovation).

72. *Cf. KSR Int'l Co.*, 550 U.S. at 417–18 (offering an example of case law that uses the ordinary nonobviousness test).

73. *See* Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7167–68 (Feb. 9, 2011) (providing examiners guidance on Section 112).

74. Request for Comments and Notice of Roundtable Events for Partnership for Enhancement of Quality of Software-Related Patents, 78 Fed. Reg. 292, 292–95 (Jan. 3, 2013).

75. *Fact Sheet: White House Task Force on High-Tech Patent Issues*, *supra* note 17. Thus even for those who are wary of aggressive assertions of presidential power over

Before turning to the specifics of how three Section 112 requirements—definiteness, scope given to functional claims, and written description—could usefully be deployed, I first address how concerns regarding breadth and vagueness are distinct conceptually but can overlap as a practical matter.

As a conceptual matter, breadth and vagueness are quite distinct. Consider, for example, the first claim of the *Bilski* patent, which purported to cover any method for hedging risk in commodity markets.[76] Although this claim was relatively clear in terms of delineating boundaries, it was quite broad.[77] Similarly, vagueness is an issue separate from breadth. For example, in the 2005 case of *Datamize, LLC v. Plumtree Software, Inc.*, the Federal Circuit struck down as unduly vague a patent for software used to create an "aesthetically pleasing" kiosk interface.[78] According to the court, the specification failed to provide a "workable objective standard" for determining the meaning of "aesthetically pleasing."[79] The issue in *Datamize* was not breadth but notice.[80]

Although breadth and vagueness are distinct conceptually, they can also overlap, particularly in the area of functional claiming. This overlap of excessive breadth and vagueness is perhaps most apparent with respect to functional claiming in the biological sciences. For example, in *Ariad Pharmaceuticals v. Eli Lilly & Co.*, a 2010 case decided en banc by the Federal Circuit, the patentee claimed a method for selectively inhibiting a biological pathway, the NF-kB cell signaling pathway, that is implicated in a broad range of disease processes.[81] The claim thus covered the entire genus of molecules that would work by selectively inhibiting that pathway, even though at the time of patent filing neither the patentee nor potential infringers knew the structure of any of these molecules with any specificity.[82] Indeed, only well after the application was filed did either the patentee, Ariad, or the infringer, Eli Lilly, determine that the accused molecules, Eli Lilly's Evista and Xigris, in fact worked by

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executive branch agencies, the order should be unproblematic. It simply emphasizes what the PTO has been doing.

76. Bilski v. Kappos, 130 S. Ct. 3218, 3223–24 (2010).

77. *See id.* at 3233–34.

78. Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1344, 1354–55 (Fed. Cir. 2005).

79. *Id.* at 1350.

80. *See id.* (emphasizing the importance of providing direction to the public).

81. Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1340–41 (Fed. Cir. 2010) (en banc).

82. *See id.* at 1341 (indicating that the specification hypothesized three types of molecules that might reduce NF-kB activity).

inhibiting NF-kB signaling.[83] Thus the functional claims at issue in *Ariad* were not simply overly broad. They also did not adequately delineate boundaries.

The type of notice problem found in *Ariad* (and the biological sciences more generally) is not precisely mirrored by functional claiming in software. Unlike Eli Lilly in the *Ariad* case, the potential software patent infringement defendant presumably knows how her software functions. Even in software, however, if software designers actually want to do freedom-to-operate searches for patents, such patents would probably be easier to search (and certainly to understand) if some structure—for example, a detailed algorithm—were included in the specification. The search strategy for examiners would presumably also be easier to implement.

In the next Part, I discuss in detail the three Section 112 requirements I see as key for controlling breadth and vagueness—definiteness, scope limitations associated with means or step plus function claiming, and written description. I also note the manner in which, with respect to each requirement, the PTO has pushed the envelope in useful ways and could go even further.

IV. THE KEY SECTION 112 REQUIREMENTS

A. Definiteness

The definiteness requirement emerges from the patent statute's requirement that the patent specification "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention."[84] This requirement has long been understood as playing a key role in promoting the goal of notice. For example, as the Supreme Court observed in 1942, requirements of particularity and distinctness serve innovation policy goals by "distinguish[ing] what is claimed from what went before in the art and clearly circumscrib[ing] what is foreclosed from future enterprise."[85] Indeed, "[a] zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure."[86]

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83. *See id.* at 1340–41 (stating that Ariad filed a patent application in April 1989 and brought suit against Eli Lilly in June 2002—the day after the patent issued).

84. 35 U.S.C. § 112 (2012).

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

86. *Id.*

Prior to the creation of the Federal Circuit in 1982, the regional federal courts of appeal adhered faithfully to the Supreme Court standard. As the Third Circuit stated in 1981, "The definiteness requirement is more than a linguistic quibble . . . . Its purpose is to demarcate the boundaries of the purported invention, in order to provide notice to others of the limits beyond which experimentation and invention are undertaken at the risk of infringement."[87] By the 1990s, however, the definiteness requirement had assumed a more limited role, at least in the context of court challenges. One study found that only 5.8% of judicial invalidations in this time period were based on indefiniteness.[88] In 2001, the Federal Circuit took a significant step towards further relaxing the definiteness requirement. In *Exxon Research & Engineering Co. v. United States*, the court determined that, at least in the context of litigation, claims were indefinite only where they were "insolubly ambiguous, and no narrowing construction [could] properly be adopted."[89] With *Exxon Engineering*, the Federal Circuit clearly took a significant turn away from requiring notice ex ante.

Exxon Engineering did suggest in passing, however, that a different indefiniteness standard might be appropriate at the PTO.[90] In September 2008, the PTO's then-Deputy Commissioner for Patent Examination Policy, John Love, took up the suggestion with vigor, instructing examiners that they could reject claim language that had "more than one reasonable interpretation."[91] In its November 2008 *Ex parte Miyazaki* decision, the PTO's Board of Patent Appeals and Interferences (BPAI) similarly held that "if a claim is amenable to two or more plausible claim constructions," an examiner is justified in invoking indefiniteness to require that the applicant more precisely define the metes and bounds of the claimed invention.[92]

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87. *See* Rengo Co. v. Molins Mach. Co., 657 F.2d 535, 551 (3d Cir. 1981) (citations omitted) (quoting Norton Co. v. Bendix Corp., 449 F.2d 553, 555 (2d Cir. 1971)) (internal quotation marks omitted); *see also* Ellipse Corp. v. Ford Motor Co., 452 F.2d 163, 169–70 (7th Cir. 1971); *Norton*, 449 F.2d at 557.

88. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 207–08 (1998).

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

90. *See id.* at 1384 (suggesting the examiner might demand that the applicant more clearly define the invention).

91. Memorandum from John Love, Deputy Comm'r for Patent Examination Policy, to Tech. Ctr. Dirs. & Patent Examining Corps 2 (Sept. 2, 2008), *available at* http://www.uspto.gov/web/patents/memoranda.htm.

92. *Ex parte* Miyazaki, No. 2007-3300, 2008 WL 5105055, at *5 (B.P.A.I. Nov. 19, 2008).

The first part of the PTO's two-part February 2011 guidelines is entirely devoted to highlighting the definiteness requirement as it should be applied in light of *Miyazaki*.[93] The guidelines particularly emphasize the need for definiteness requirements to be met when the claims in question use functional language.[94] Such language includes, but is not limited to, situations (discussed further below) where it could be argued that a claim is invoking Section 112(f).[95]

In general, according to the PTO, the February 2011 guidelines have led to a 20% increase in Section 112 rejections.[96] Additionally, with respect to definiteness in particular, we have some evidence suggesting that definiteness can be applied in the software context, even by examiners who are highly time constrained. This evidence emerges from data I have gathered on the performance of an Art Unit that was set up in 1999 to examine one specific category of software application—software applied to biological systems, or bioinformatics.

In the late 1990s, as the project to sequence the human genome was entering into full force, the PTO began to receive patent applications in the area of bioinformatics.[97] Such applications went to examiners in many diverse Art Units, often Art Units outside PTO's "Technology Center 1600," which handles biotechnology and pharmaceuticals.[98] The real problem with these applications was not one of inappropriate assignment, however. Rather, as the Director of Technology Center 1600, Jasemine Chambers, noted at the time, "the claims [in these applications] are very broadly written . . . frequently to the point of incomprehensibility."[99] In order to examine these applications

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93. *See* Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7163–70 (Feb. 9, 2011) (setting examination guidelines around definite claim language).

94. *See id.* at 7164–65 (discussing functional claiming).

95. *See* 35 U.S.C. § 112 (Supp. V 2011) (amending the last undesignated paragraph by inserting "(f) Element for a Claim in Combination—An element").

96. Kappos, *supra* note 18.

97. *See* Douglas Steinberg, *New PTO Unit Examines Bioinformatics Applications*, SCIENTIST (Nov. 27, 2000), http://www.the-scientist.com/?articles.view/articleNo/13144/title/New-PTO-Unit-Examines-Bioinformatics-Applications/ (reporting the "flood of filings" received by the PTO regarding patent applications for bioinformatics inventions); *see also* Scott D. Locke & David A. Kalow, *Preparing for Bioinformatics Litigation: How Will the Courts Confront the Next Generation of Biotechnology Patents?*, 1 BUFF. INTELL. PROP. L.J. 76, 78 (2001) (stating that the first stage of the Human Genome Project was completed in 2000).

98. Steinberg, *supra* note 97; *see also* Todd Dickinson, *Commissioner's Page*, PTO TODAY, Mar. 2000, at 2.

99. Steinberg, *supra* note 97.

appropriately, the PTO set up Art Unit 1631 (AU 1631).[100] AU 1631 consists of biologically trained examiners who also have some familiarity with computer science.[101] The examiners are not, however, given any more time to examine these applications than comparable examiners in other Art Units that process software applications.[102]

Nonetheless, according to data I have gathered, 73% of all AU 1631 applications filed in calendar year 2003 sustained a definiteness rejection in the first round of examination.[103]

To overcome a definiteness rejection, the applicant either has to provide further information about the meaning of the term or has to replace it with an alternative term that is not subject to ambiguity.[104] Consistent use of definiteness rejections would

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100. *Id.*

101. *Id.*; Interview with Marjorie Moran, head of Art Unit 1631, and George Elliott, TC 1600 head (May 16, 2012).

102. Allocation of hours is based on a combination of the technology class into which applications in a given Art Unit are deemed to fall and the examiner's seniority level. The technology class assigned to AU 1631 applications (Class 703 Data Processing: Structural Design, Modeling, Simulation, and Emulation) is a traditional "software" class. More generally examiners in AU 1631 face the conventional incentives faced by examiners at the PTO: The compensation system under which they receive credits, or "counts," for two specific actions taken during the initial examination period—"first office actions" and "disposals." Rai, *supra* note 12, at 2063 (internal quotation marks omitted).

> [E]xaminer[s] receive[ ] first-office-action count[s] by making a preliminary communication to the applicant as to whether the application is allowable (thereby permitting the applicant to amend claims as necessary or to contest the examiner's conclusion). A variety of actions on the part of either the examiner or the applicant can produce a subsequent disposal count. Such actions included allowance of the application and abandonment . . . .

Id.

103. Rai, *supra* note 19. The data from this Art Unit (which is from calendar year 2003) suggest that, even during the period after *Exxon Engineering* and before *Miyazaki*, at least some examiners continued to view definiteness as a robust requirement. Indeed, even after *Exxon Engineering*, the PTO continued to adhere in its Manual of Patent Examining Procedure (MPEP) to the ten definiteness-related form paragraphs it first enunciated in 1995. U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 706.03(d) (8th ed. Rev. 1, Feb. 2003), *available at* http://www.uspto.gov/web/offices/pac/mpep/old/E8R1_700.pdf. These include a form paragraph on relative terms that emphasizes notice. *Id.* A 2003 revision to the eighth edition of the MPEP also emphasizes the overarching goal of notice for all definiteness rejections. *Id.* In considering whether the requisite notice function has been served, the examiner must determine whether there is "clear warning to others as to what constitutes infringement of the patent." *Id.* § 2173.02. *Exxon Engineering* is ultimately mentioned in a 2012 revision to the MPEP but only in passing. U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 2173.02 (8th ed. Rev. 9, Aug. 2012) [hereinafter USPTO 2012 MANUAL], *available at* http://www.uspto.gov/web/offices/pac/mpep/mpep-2100.pdf.

104. U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 2173.02 (8th ed. Rev. 3, Aug. 2005), *available at* http://www.uspto.gov/web/offices/pac/mpep/old/E8R3_2100.pdf.

presumably motivate applicants to define terms better ex ante.[105] Thus, even without the potentially contentious glossary requirement currently being mooted by both the PTO and President Obama, we would see greater applicant use of such glossaries where appropriate.[106] Of course, any glossary would itself have to be examined to ensure it actually furthered compliance with the definiteness requirement.[107]

The PTO's February 2011 guidelines also discuss in detail the important interaction of the definiteness requirement with means, or step, plus function claiming under Section 112(f).[108] More generally, the guidelines discuss at length restrictions on scope associated with 112(f) claiming.[109] I turn next to the issue of 112(f) claiming.

B. Claiming Under 112(f)

While the Federal Circuit has adopted a lax view of definiteness generally, it has deployed the requirement more vigorously in the context of means-plus-function claim limitations.[110] Of late, the Federal Circuit has been relatively assertive in striking down as indefinite Section 112(f) software

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105. *See* USPTO 2012 MANUAL, *supra* note 103, § 2173.02 ("It is highly desirable to have applicants resolve ambiguity by amending the claims during prosecution of the application rather than attempting to resolve the ambiguity in subsequent litigation of the issued patent.").

106. Both the PTO's January 2013 Request for Comments on Preparation of Patent Applications and the President's June 2013 Executive Order refer to the possibility of a glossary requirement. *See* Request for Comments on Preparation of Patent Applications, 78 Fed. Reg. 2960, 2961 (Jan. 15, 2013); *Fact Sheet: White House Task Force on High-Tech Patent Issues*, *supra* note 17. Comments on such a requirement have been negative, not only from patent bar groups that have objected to added burdens, but also from groups that favor stricter standards for patent validity such as the IT-firm heavy Coalition for Patent Fairness (CPF). *See, e.g.*, Letter from Joseph M. Potenza, Intellectual Prop. Law Section Chair, Am. Bar Ass'n, to Margaret Focarino, Comm'r for Patents, U.S. Patent & Trademark Office 5–6 (Mar. 18, 2013) (advocating against the adoption of glossaries in response to request for comments on preparation of patent applications); Comments of the Coalition for Patent Fairness in Response to Request for Comments on Preparation of Patent Applications, No. PTO-P-2011-0046, at 19–20 (Apr. 15, 2013) [hereinafter Comments of the Coalition for Patent Fairness] (same).

107. Comments of the Coalition for Patent Fairness, *supra* note 106, at 19–20.

108. *See* Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7164–65 (Feb. 9, 2011) (discussing functional claiming and the definiteness requirement).

109. *Id.* at 7167–68.

110. *See* Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1333 (Fed. Cir. 2008) ("In cases involving a computer-implemented invention in which the inventor has invoked means-plus-function claiming, this court has consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor.").

claim limitations that contain no accompanying disclosure of algorithm.[111] In these cases, the Federal Circuit has held that appropriate structure cannot be a general purpose computer but rather must be the special purpose computer created when a general purpose computer runs the disclosed algorithm.[112] The PTO's February 2011 guidelines emphasize these cases at length.[113]

Because of this potential for indefiniteness, and because all 112(f) claims are, under the terms of the patent statute, limited to the structure, materials, or acts disclosed in the specification,[114] the issue of what constitutes a 112(f) claim can become very important. The February 2011 guidelines emphasize that claims need not specifically recite "means for" or "step for" language in order to fall within 112(f).[115] Nonstructural terms like "mechanism for," "module for," "device for," "unit for," "component for," "element for," "member for," "apparatus for," "machine for," "system for," and the like will be deemed to invoke 112(f).[116] The guidelines further cite the PTO's own administrative case law for the proposition that examiners should specifically check either the specification, established dictionaries, or prior art to ensure that a particular claim invokes structure that will safely take it outside the bounds of 112(f).[117]

At the same time, the PTO guidelines equivocate somewhat by dutifully noting Federal Circuit cases holding that if a claim limitation does not use the canonical "means for" or "step for" language, it is presumptively *not* within 112(f).[118] According to the Federal Circuit, this "strong" presumption must be overcome

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111. *See, e.g.*, Finisar Corp. v. DirecTV Grp., Inc., 523 F.3d 1323, 1340–41 (Fed. Cir. 2008) (holding that the software claim was indefinite under Section 112(f) because the patent must disclose, at least to the satisfaction of one of ordinary skill in the art, enough of an algorithm to provide the necessary structure); *Aristocrat Techs.*, 521 F.3d at 1338 (holding that the software claim was indefinite under Section 112(f) for failing to disclose the algorithm).

112. *Finisar Corp.*, 523 F.3d at 1340. In its 1994 *In re Alappat* decision, the Federal Circuit held en banc that software run on a general purpose computer creates a special purpose computer that is patent-eligible. *In re* Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (en banc), *abrogated by In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008).

113. Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. at 7168 (citing *Aristocrat Techs. Austl. Pty Ltd.* and *Finisar Corp.*).

114. 35 U.S.C. § 112(f) (2012).

115. Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. at 7167.

116. *Id.*

117. *Id.*

118. *Id.* at 7167 & n.68; *see also* Lighting World, Inc. v. Birchwood Lighting, Inc., 382 F.3d 1354, 1358 (Fed. Cir. 2004).

by showing that the claim limitation contains no structural language.[119]

Professor Mark Lemley has recently argued that a less formalistic approach to determining what claim limitations fall within the 112(f) box is not only a good idea as a policy matter but is also a sensible construction of the 1952 patent statute that enacted 112(f).[120] As Lemley rightly points out, under current Federal Circuit case law, a claim limitation to a "computer programmed" to perform a certain function might not fall within the means-plus-function category.[121] In contrast, a claim limitation to a "means for" performing the same function would fall within 112(f), thereby requiring algorithmic support in the specification and with scope limited to that algorithm plus equivalents.[122]

Lemley appears to contemplate 112(f) expansion through judicial decision-making.[123] Even so, the PTO has recently asked for commentary about whether the agency should treat claim limitations that recite a computer for performing certain functions as invoking 112(f), even if the claim limitations are not set forth in conventional means-plus-function format.[124]

The PTO would be venturing somewhat beyond existing case law if it set forth a guideline instructing examiners to apply 112(f) broadly in the context of any claim limitation (irrespective of how it was worded) for which the only structure disclosed was a computer. In and of itself, this sort of PTO entrepreneurship in creating test cases is hardly unusual. The PTO has previously brought test cases involving such validity requirements as utility and nonobviousness.[125] Here, the challenge for purposes of bringing a test case would be that application of 112(f) does not necessarily lead to a rejection. Unless the applicant disagrees with 112(f) application, the rejection must take place on other grounds.[126] And even if the applicant disagrees, the current path

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119. *Lighting World, Inc.*, 382 F.3d at 1358.

120. Lemley, *supra* note 29, at 943–49.

121. *Id.* at 944–47.

122. *Id.*

123. *Id.* at 928–30, 948 ("[T]his is a problem courts have created, and . . . courts should be the ones who solve it.").

124. Request for Comments and Notice of Roundtable Events for Partnership for Enhancement of Quality of Software-Related Patents, 78 Fed. Reg. 292, 294 (Jan. 3, 2013).

125. Arti K. Rai, *Who's Afraid of the Federal Circuit?*, 121 YALE L.J. ONLINE 335, 342–44 (2011), http://yalelawjournal.org/2011/12/20/rai.html.

126. *See, e.g.*, Comments of the Electronic Frontier Foundation, In the Matter of Request for Comments and Notice Regarding Preparation of Patent Applications 6–7, No. PTO-P-2011-0046 (Mar. 25, 2013), *available at* https://www.eff.org/files/eff_pto_

for appeal of such disagreement is not entirely clear.[127] So, the PTO would have to think very carefully about ensuring that any guidelines it put forward could actually result in a test case.

Moreover, in any test case involving 112(f) brought up through an ordinary rejection, the PTO would receive no formal deference from the Federal Circuit on its legal construction.[128] By contrast, if the issue of 112(f) construction came up through a challenge to a granted patent under the AIA's new post-grant review procedure, any PTO position should receive *Chevron* deference.[129]

Another important challenge to applying 112(f) capaciously is ensuring that not too much pressure is placed on this single requirement. When a huge amount turns on any single type of line-drawing, huge resources will be devoted to disputes over such line-drawing. Fortunately, as discussed in the next Subpart, much of the work in ensuring appropriate structure, even for claim limitations that are deemed not to fall within 112(f), can be done through appropriate application of the written description requirement.

C. Written Description

In relevant part, Section 112(a) of the patent statute requires that the patent specification contain

> a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.[130]

The reference to "written description" in this paragraph has been the subject of textualist parsing, most recently in the 2010

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comments_regarding_patent_clarity.pdf (explaining that the applicant should be required to agree or disagree with the application of 112(f) and that if the applicant agrees with the application of 112(f), the claim obviously cannot be rejected on the grounds that 112(f) applies).

127. *But see id.* at 7 (indicating that current form paragraphs provide grounds for a rejection based on disagreement over the application of 112(f), and suggesting different options for applicants who disagree). The Electronic Frontier Foundation (EFF) comments also make the valuable point that any 112(f) construction made by the examiner should not only be clear from the record, but the examiner should clearly secure the applicant's agreement. *Id.* at 8. Otherwise the patent may issue under a 112(f) construction, and the patentee may try to argue for a broader construction in litigation. *Id.*

128. *In re* Baker Hughes Inc., 215 F.3d 1297, 1301 (Fed. Cir. 2000) ("[C]laim construction by the PTO is a question of law that we review *de novo* . . . .").

129. *See infra* Part V.C (discussing doctrinal argument for the Federal Circuit applying *Chevron* deference when reviewing legal determinations made by the PTO in post-grant and inter partes review proceedings under the AIA).

130. 35 U.S.C. § 112(a) (2012).

en banc Federal Circuit decision in *Ariad Pharmaceuticals, Inc. v. Eli Lilly & Co*.[131] Lawyers and Federal Circuit judges have used textualist tools to parse whether written description constitutes a separate requirement, judged by its own standards,[132] or whether the appropriate standard by which to judge written description is simply enablement—that is, whether the written description "enable[s]" persons skilled in the art "to make and use the same."[133]

Even to some of its practitioners, however, this textualist parsing ultimately proves unsatisfactory. For example, although Judge Lourie's majority opinion in *Ariad* notes that the existence of a comma after the term "making and using it" within Section 112 (a) supports written description as a separate requirement,[134] he acknowledges that the issue should not, at the end of the day, turn on grammatical nuance.[135]

Determining the proper role (if any) for a separate written description requirement calls for attention to history and function. The original Patent Act of 1790 contemplated written description performing a notice function, in significant part because claims were not a part of the first patents.[136] The argument against a separate written description requirement thus emphasizes that claims, instituted in 1836, now perform the notice function, at least when the claims are not changed over the course of the prosecution.[137] The view is encapsulated in the patent law maxim that original claims provide their own written description.[138]

This maxim has some merit, particularly to the extent that the definiteness requirement can be used to ensure that claims actually identify clearly what is being claimed. Even for original claims, however, written description can play an important role. Originally filed functional claims, such as the claims at issue in *Ariad*, pose problems for notice.[139] These problems cannot be

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131. Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1342, 1344–45 (Fed. Cir. 2010) (en banc).

132. *Id.* at 1343–44.

133. 35 U.S.C. § 112(a).

134. *Ariad*, 598 F.3d at 1343–45.

135. *Id.* at 1360.

136. *Id.* at 1345; Lemley, *supra* note 29, at 910–11.

137. *See generally* Michael Risch, *America's First Patents*, 64 FLA. L. REV. 1279, 1288 (2012) (stating that claims were not required prior to 1836).

138. *See, e.g.*, Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1, "Written Description" Requirement, 66 Fed. Reg. 1099, 1100 (Jan. 5, 2001) (discussing the original claim doctrine's interaction with the written description requirement).

139. *See Ariad*, 598 F.3d at 1347 ("Claims define and circumscribe, the written description discloses and teaches."); *see also* Lemley, *supra* note 29, at 915 ("[B]road

adequately addressed through even a capacious requirement of definiteness—for example, a requirement that would strike down any term that was susceptible to more than one interpretation. In the case of the *Ariad* claim, the problem was not that the person having skill in the art would have been unclear about what the claim terms meant. Rather, from reading the patent document, the skilled artisan would not have known what sorts of molecules actually performed the function.[140] In the notice context (as contrasted with the enablement context), the skilled artisan should not have to engage in experimentation.[141]

Notice is important not only for potential infringers but also for PTO examiners. In its *Ariad* brief, the PTO made a version of the notice argument, arguing if an invention is claimed solely by reference to "function or effect," it may be enabled but is nonetheless very difficult to examine.[142]

> Though such claims may be enabled, PTO is not an experimental laboratory: it lacks both the facilities and the statutory mandate to determine, through empirical testing, whether any of millions of prior art inventions may have exhibited the recited function.[143]

As noted earlier, the notice problem posed by functional claiming in biopharmaceuticals is not precisely the same as that posed by functional claiming in the context of most software.[144] In general, those who write code not only do so with a particular function in mind but also disclose that function. Even so, for both the PTO and potential infringers, searching patents is presumably easier when the patent's specification contains significant structural disclosure.

Used properly, written description can do more than improve notice. It can also regulate appropriate patent scope. To be sure, as many others and I have argued, certain interpretations of written description are unduly formalistic and narrow scope too dramatically. For example, a requirement that obliged applicants to describe every structural embodiment encompassed by their claim—even structural embodiments that were just a mechanistic extension

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functional language . . . did not sufficiently put the world on notice of what the patentee was removing from the world.").

140. *See* 35 U.S.C. § 112(a) (2012); *Ariad*, 598 F.3d at 1351, 1355.

141. *Ariad*, 598 F.3d at 1352.

142. Brief for the United States as Amicus Curiae on Rehearing En Banc in Support of Respondent at 21, *Ariad*, 598 F.3d 1336 (No. 2008-1248).

143. *Id.*

144. *See supra* Part III.C.

of listed embodiments—would go too far.[145] Current interpretations of written description are not so formalistic, however. *Ariad*'s author, Judge Lourie, was presumably able to secure the large majority he did by moving beyond the highly formalistic, and flawed, vision of his 1997 decision in *Regents of the University of California v. Eli Lilly & Co.* While the 1997 decision appeared to require those claiming gene sequences to promulgate in their specification a nucleotide-by-nucleotide recitation of structure, *Ariad* explicitly disavows the need for such mechanical recitations.[146] In fact, the decision suggests that written description should invoke certain contextual factors similar to those used in enablement analysis—"the existing knowledge in the particular field, the extent and context of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue."[147]

Of course, for purposes of conceptual clarity, and in order for the requirement to be truly useful in curbing scope, written description should play a role distinct from that played by enablement. Kevin Collins, commenting on the *Ariad* decision, has suggested a useful clarifying distinction. He has suggested that the written description requirement might be seen as playing a role with respect to all claims similar to that played by the Section 112(f) reference to structure for the subset of claims deemed to fall within 112(f).[148] In other words, if the specification contains no structure with respect to a given claim limitation, the claim limitation should fail written description. If the specification provides some structure, then the applicant is entitled to claim scope that includes that structure and equivalents thereof (with equivalents being judged as of the time of filing).[149] As discussed further below, this is also the approach to written description that the bioinformatics Art Unit appears to have taken.[150]

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145. *See* Rai, *supra* note 3, at 1072–73 (discussing how narrow scope can become a problem as research moves downstream).

146. *Compare* Regents of the Univ. of Cal. v. Eli Lilly & Co., 119 F.3d 1559, 1568 (Fed. Cir. 1997), *with Ariad*, 598 F.3d at 1352.

147. *Ariad*, 598 F.3d at 1351 (alteration in original) (quoting Capon v. Eshhar, 418 F.3d 1349, 1359 (Fed. Cir. 2005)).

148. *See* Kevin E. Collins, *An Initial Comment on* Ariad*: Written Description and the Baseline of Patent Protection for After-Arising Technology*, 2010 PATENTLY-O PATENT L.J. 60, 62–65.

149. *Id.* at 63–64. Similarly, a plethora of comments to the PTO's recent January 2013 request for comments emphasizes the importance of applying written description to software, citing *Ariad* for the proposition that written description requires structural support for functional claiming even where the specification is enabling. *See* Comments of the Electronic Frontier Foundation, *supra* note 126, at 10.

150. *See infra* text accompanying notes 154–60.

For the examiner, monitoring compliance with written description should not pose a significant burden. If the applicant has failed to disclose *any* structure within the four corners of the patent document, a written description rejection should not only be easy to make but also to sustain.[151] In contrast, a rejection based on lack of compliance with enablement may be difficult to sustain if the applicant chooses to rebut through extensive evidentiary showings of what the applicant considers ordinary skill in the art.[152] At the same time, applicant compliance with written description should also be relatively straightforward. To the extent a claim is enabled, it should not be difficult for the applicant to show some structure in the specification.

Some commentators have noted the relatively sparse occurrence of written description issues in appeals of patent rejections to the Board of Patent Appeals and Interferences (now the Patent Trials and Appeals Board) to question whether written description is indeed useful at the PTO.[153] In cases where the specification provides no structure, however, the grounds for an appeal of an examiner's rejection are likely to be tenuous at best. Data on the use of written description at the examiner level are more meaningful. Notably, in the bioinformatics Art Unit that I have studied, 28% of applications received written description rejections.[154]

Various patent applications from AU 1631 also illustrate well the role that written description could play in software. In one case, the applicant claimed the use of "Quadratic Discrimination Analysis" to determine the translation initiation codon in a nucleotide sequence.[155] The applicant's specification did not, however, provide an actual algorithm.[156] In rejecting the application, the examiner noted that while the specification disclosed certain scoring procedures applied to training sets to generate optimal "feature variables," the application provided no written description of a specific algorithm as it related to those variables.[157]

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151. *See Ariad*, 598 F.3d at 1351.

152. *See* USPTO 2012 MANUAL, *supra* note 103, § 2164.05 (describing evidence that may be presented by applicant).

153. Christopher M. Holman, *Is* Lilly *Written Description a Paper Tiger?: A Comprehensive Assessment of the Impact of* Eli Lilly *and Its Progeny in the Courts and PTO*, 17 ALB. L.J. SCI. & TECH. 1, 78–82 (2007).

154. Rai, *supra* note 19.

155. U.S. Patent Application No. 10/620,796 (filed July 16, 2003).

156. *Id.*

157. Letter from Pablo S. Whaley, Patent Exam'r, U.S. Patent & Trademark Office, to Jack E. Tabaska, Application No. 10/620,796, at 6–7 (May 18, 2006), http://portal.uspto.gov/pair/view/BrowsePdfServlet?objectId=ENDN79HZPP1GUI3&lang=DINO.

In other cases, the software application in question explicitly used means-plus-function language.[158] Just as Kevin Collins's analysis of written description would suggest, examiners in AU 1631 equated written description and indefiniteness, holding that lack of structure in the specification raised problems for both requirements.[159] As noted, however, written description applies as a requirement for all claim limitations, not just limitations to which 112(f) is deemed applicable.[160]

In 2003, when examiners in AU 1631 were applying written description liberally to software, the question of whether the doctrine's application to original claims extended beyond biotechnology and pharmaceuticals was not clear.[161] What was creative extension to software in 2003 was ratified by the en banc *Ariad* decision in 2010.[162] Without a doubt, then, written description can now be applied by the PTO to all software patent applications.

Indeed, the PTO's February 2011 guidelines discuss in some detail the role written description should play in policing functional claiming in software.[163] They elaborate on the Federal Circuit cases that have applied written description to software and explicitly extrapolate the holding in *Ariad* to the software context.[164]

Written description is far from perfect. Its contours need to be developed further.[165] Ideally, such development would take

158. U.S. Patent Application No. 10/465,472 (filed June 19, 2003).

159. Collins, *supra* note 148, at 62–64; Rai, *supra* note 19.

160. *See supra* text accompanying note 148.

161. *See generally* Mueller, *supra* note 20, at 617.

162. Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1349 (Fed. Cir. 2010) (en banc). Even earlier, a three-judge panel of the Federal Circuit had applied written description to software in *LizardTech v. Earth Research Mapping*, a 2005 case involving a method of compressing digital images using seamless discrete wavelet transformation (DWT). LizardTech, Inc. v. Earth Research Mapping, Inc., 424 F.3d 1336, 1337, 1344–45 (Fed. Cir. 2005). There the court used written description to reject the applicant's attempt to claim all methods for using seamless DWT when it had only shown one method for performing seamless DWT, a method involving "maintaining updat[ed] sums." *Id.* at 1345–46 (internal quotation marks omitted). And by 2010, a further-refined version of written description had become a doctrine accepted by the court as a whole, applicable to original claims in all technologies. *Ariad*, 598 F.3d at 1349.

163. Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7168 (Feb. 9, 2011).

164. *Id.* at 7170–71.

165. For example, the recent Federal Circuit trend towards narrowing the so-called antibody exception to written description needs to be taken to the logical conclusion of eliminating this exception. *See* Centocor Ortho Biotech, Inc. v. Abbott Labs., 636 F.3d 1341, 1352 (Fed. Cir. 2011) ("While our precedent suggests that written description for certain antibody claims can be satisfied by disclosing a well-characterized antigen, that reasoning applies to disclosure of newly characterized antigens where creation of the

place with active recognition of the policy role the doctrine can play in delineating appropriate scope and improving notice. Notably, however, one prominent criticism of the doctrine—that it undermines the longstanding patent law principle that a claim term can expand in meaning over time, so as to encompass later-developed technologies unforeseeable at the time of patent application[166]—could be seen as a favorable development, at least on balance.

A full discussion of how later-developed technologies should be treated is beyond the scope of this Article.[167] For present purposes, suffice it to say that allowing key claim terms to encompass after-arising technologies obviously undermines notice. This practice can also substantially expand scope, particularly in the software industry, where the rapid pace of change may allow patentees to assert coverage over technologies that represent significant improvements over the prior technology.[168] The policy argument for allowing earlier inventors such broad scope is far from clear. Indeed, a substantial literature on dividing rights between earlier and subsequent inventors suggests that overly broad rights for earlier inventors have the potential to diminish downstream research inappropriately.[169] Thus, a written description requirement that was applied through the lens of Section 112(f) jurisprudence could play a valuable role in both improving notice and regulating scope.

The foregoing analysis comes with several major caveats. First, the extent to which the PTO's recent emphasis on definiteness, restrictions associated with means-plus-function claiming, and written description will be successful depends on factors like how vigorously examiners are trained on these issues and whether evaluations of examination quality take into

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claimed antibodies is routine."). The Federal Circuit has also deemed written description to be a strictly factual inquiry, a conclusion that seems peculiar given the emphasis of written description doctrine on revealing structure within the four corners of the specification. *Id.* at 1347–48 (citing *Ariad*, 598 F.3d at 1355).

166. *Ariad*, 598 F.3d at 1365 (Rader, C.J., dissenting) (enunciating this criticism).

167. For one recent approach that draws upon linguistic theory, see Collins, *supra* note 148. Rob Merges (who coined the term "temporal paradox" to describe the ability to encompass later-developed technologies in earlier-filed claims) and I are currently studying this issue further.

168. *See* Lemley, *supra* note 29, at 955–58.

169. Christopher A. Cotropia, *"After-Arising" Technologies and Tailoring Patent Scope*, 61 N.Y.U. ANN. SURV. AM. L. 151, 180–81 (2005); Merges & Nelson, *supra* note 54, at 916. For this reason, courts may, in practice, rarely credit significant claim expansion. *See, e.g.*, Wang Labs., Inc. v. Am. Online, Inc., 197 F.3d 1377, 1381–83 (Fed. Cir. 1999) (rejecting a broad definition of the claim term "frame" that would have encompassed not only character-based protocols but also bit-based protocols).

account appropriate attention to these factors. The fact that examiner training on the February 2011 guidelines has resulted in a 20% increase in Section 112 rejections[170] does bode well, however.

Second, even the most vigorous initial examination of software patents going forward obviously will not affect the mass of poor-quality patents that have already issued.[171] However, through assertive use of its new post-grant review powers, the PTO could play an important role in addressing existing poor-quality software patents. For these patents, the new inter partes review (IPR) proceedings are most relevant.[172] From the standpoint of policing quality, Congress's decision to limit these proceedings to challenges based on prior art is unfortunate.[173] That said, the one-year period allowed for such review should, in contrast to the initial examination process, allow for sophisticated use of the nonobviousness requirement.[174]

The next Part discusses the role that IPR could play with respect to existing patents. It also discusses the post-grant review procedure that is available for patents with an effective filing date after March 16, 2013. With respect to both of these procedures, a key open question is how administrative outcomes will be viewed by the courts.

V. THE PTO'S NEW POWERS POST-ISSUANCE

A. Inter Partes Review

Petitioners who invoke IPR may use patents or printed publications to challenge one or more claims on grounds of obviousness or lack of novelty.[175] The petition will be granted if the PTO Director, upon consideration of the petition and any response filed by the patentee, finds a "reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition."[176] As of September 16, 2013

170. Kappos, *supra* note 18.

171. *Cf.* Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. 112 and for Treatment of Related Issues in Patent Applications, 76 Fed. Reg. 7162, 7168 (Feb. 9, 2011) (mandating vigorous guidelines for initial examinations of software patents without discussion of previously granted applications).

172. *See* Changes to Implement Inter Partes Review Proceedings, Post-Grant Review Proceedings, and Transitional Program for Covered Business Method Patents, 77 Fed. Reg. 48,680, 48,682 (Aug. 14, 2012).

173. 35 U.S.C. § 311(b) (2012).

174. *See supra* Part III.B (discussing scholars' advocacy of a sophisticated approach to nonobviousness).

175. 35 U.S.C. § 311(b).

176. *Id.* § 314(a).

(one year after the inception of IPR), about 55% (265/485) of IPR petitions filed involve patents in the information technology and electrical engineering sectors.[177] In keeping with the PTO's suggestion that the reasonable likelihood standard is a relatively liberal one,[178] the Patent Trial and Appeals Board (PTAB) has granted 87% of the petitions upon which it has decided (155/178).[179]

Petitioners are using IPR with some frequency even though it has limited scope as well as a strict estoppel provision that prevents the petitioner from raising before a district court or the International Trade Commission any ground that it "raised or reasonably could have raised" during the IPR.[180] The procedure is nonetheless attractive because in the administrative context the burden of proof for overturning a patent claim is preponderance of the evidence rather than clear and convincing evidence.[181]

For purposes of PTO power, a key variable is whether district courts will choose to stay any concurrent litigation pending the outcome of the PTO review.[182] The AIA contains only limited language regarding the circumstances under which courts may (or may not) grant such stays.[183] Thus much of the decision-making will be within the discretion of district courts. In the context of the old reexamination system, courts used a three-factor test when considering contested motions for a stay.[184] They looked to whether a stay would simplify the issues in question;

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177. HARNESS DICKEY, HARNESSING PATENT OFFICE LITIGATION: VOLUME III (Sept. 16, 2013), *available at* http://ipr-pgr.com/wp-content/uploads/2013/09/IPR-PGR-Report-Vol.-31.pdf.

178. Changes to Implement Inter Partes Review Proceedings, Post-Grant Review Proceedings, and Transitional Program for Covered Business Method Patents, 77 Fed. Reg. 48,680, 48,702 (Aug. 14, 2012) ("A 'reasonable likelihood' requirement is a lower threshold than a 'more likely than not' requirement.").

179. *See* HARNESS DICKEY, *supra* note 177.

180. 35 U.S.C. § 315(e).

181. *In re* Baxter Int'l, Inc., 678 F.3d 1357, 1364 (Fed. Cir. 2012). Additionally, although the $23,000 IPR fee (filing fee of $9,000 and additional payment of $14,000 if review is instituted) is higher than the $8,800 fee for the predecessor (inter partes reexamination), it is obviously still much lower than the cost of litigation. *USPTO Fee Schedule*, *supra* note 14; *IPX vs. IPR: A Cheat Sheet*, STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. (2012), *available at* http://ptolitigationcenter.com/wp-content/uploads/2009/08/ipx-v-ipr.pdf.

182. In 81% of the IPR petitions filed thus far, the patent owner and the patent challenger are in concurrent litigation. *See* HARNESS DICKEY, *supra* note 177.

183. 35 U.S.C. § 315(a)(2) (granting an automatic stay of any litigation *subsequently* brought an IPR challenger/petitioner until either "(A) the patent owner moves the court to lift the stay; (B) the patent owner files a civil action or counterclaim alleging that the petitioner or real party in interest has infringed the patent; or (C) the petitioner or real party in interest moves the court to dismiss the civil action").

184. *See* Southwire Co. v. Cerro Wire, Inc., 750 F. Supp. 2d 775, 778 (E.D. Tex. 2010).

the status of the district court proceedings (e.g., whether discovery was complete and whether a trial date has been set); and prejudice to the nonmoving party.[185] When courts applied that three-factor test to the old reexamination system, they granted contested motions to stay 59% of the time.[186]

With respect to the new IPR proceedings, courts have, thus far, continued to use the three-factor test.[187] Under this test, courts should be willing to grant stays more readily than in the past. One notorious feature of reexaminations was their prolonged duration, on the order of twenty-nine to thirty-eight months.[188] These reexaminations then had to be appealed to the Board of Patent Appeals and Interferences.[189] By contrast, the post-AIA reviews are conducted in the first instance by the newly formed PTAB.[190] Moreover, they should typically be concluded within one year (with an extension of six months in unusual cases.)[191] As compared with the situation prior to the AIA, this relatively expeditious review procedure should tilt all three factors in favor of a stay.[192]

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185. *Id.*; TouchTunes Music Corp. v. Rowe Int'l Corp., 676 F. Supp. 2d 169, 177 (S.D.N.Y. 2009); *In re* Cygnus Telecomms. Tech., LLC, 385 F. Supp. 2d 1022, 1023 (N.D. Cal. 2005); Argos v. Orthotec LLC, 304 F. Supp. 2d 591, 598 (D. Del. 2004); Xerox Corp. v. 3Com Corp., 69 F. Supp. 2d 404, 406 (W.D.N.Y. 1999).

186. *See* Joshua L. Sohn, *Can't the PTO Get a Little Respect?*, 26 BERKELEY TECH. L.J. 1603, 1611 & n.33 (2011) (citing a 2009 report). Grants were substantially higher in the Northern District of California and substantially lower in the Eastern District of Texas. *See* Greg H. Gardella & Emily A. Berger, *United States Reexamination Procedures: Recent Trends, Strategies and Impact on Patent Practice*, 8 J. MARSHALL REV. INTELL. PROP. L. 381, 398 (2009) (reporting that the Northern District of California granted 68% of stays from 1981 to 2009 while the Eastern District of Texas granted 34% of stays).

187. *See, e.g.*, ImageVision.Net, Inc. v. Internet Payment Exch., Inc., No. 12-054-GMS-MPT, 2013 WL 663535, at *1 (D. Del. Feb. 25, 2013); Semiconductor Energy Lab. Co. v. Chimei Innolux Corp., No. SACV 12-21-JST (JPRx), 2012 WL 7170593, at *1 (C.D. Cal. Dec. 19, 2012).

188. *See Reexaminations—FY 2013*, U.S. PATENT & TRADEMARK OFFICE (Mar. 31, 2013), *available at* http://www.uspto.gov/patents/stats/Reexamination_operational_statistic_13_Q2.pdf.

189. Gardella & Berger, *supra* note 186, at 383.

190. 35 U.S.C. § 6(b) (2012); *see also* Rules of Practice for Trials Before the Patent Trial and Appeal Board and Judicial Review of Patent Trial and Appeal Board Decisions, 77 Fed. Reg. 48,612, 48,614 (Aug. 14, 2012).

191. 35 U.S.C. § 316(a)(11).

192. Both before and after the AIA, software patent cases involving nonpracticing entities rather than direct competitors would presumably be more likely to receive stays than cases brought by direct competitors.

Courts have been reluctant to stay proceedings where parties are direct competitors lest money damages not compensate for loss of market share during the period of the stay. *See, e.g.*, ADA Solutions, Inc. v. Engineered Plastics, Inc., 826 F. Supp. 2d 348, 351 (D. Mass. 2011) (explaining that when parties are direct competitors, courts presume that a stay will prejudice the nonmovant); Cooper Notification, Inc. v. Twitter, Inc., No. 09-865-LPS, 2010 WL 5149351, at *5 (D. Del.

As a practical matter, district court decisions to grant stays are also likely to be influenced by recent Federal Circuit decisions indicating that the Federal Circuit may affirm PTO administrative cancellation of patent claims even in situations where it has previously affirmed district court decisions finding those same claims "not invalid" under the clear and convincing standard that applies in judicial proceedings.[193] The Federal Circuit has also held that so long as the judicial proceeding has not concluded entirely, an administrative cancellation that it has affirmed eliminates any judicial cause of action on the part of the patentee.[194]

All that said, there is reason to be cautious about predicting significant increases in district courts' willingness to stay. The Federal Circuit cases discussed above do not specifically address the new IPR proceedings. Moreover, one year into the IPR procedures, there appears to have been no increase in grant rates with respect to contested motions. Of the sixty-two contested motions to stay pending concurrent litigation that have been filed, 59% have been granted.[195] Overall, 71% of motions to stay have been granted.[196]

Where a district court has stayed patent litigation, and the PTO has canceled the claims over which litigation is occurring, presumably the district court will dismiss the litigation.[197] In contrast, when the PTO upholds claims, the

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Dec. 13, 2010) ("Courts are reluctant to stay proceedings where the parties are direct competitors.").

193. *See, e.g.*, *In re* Baxter Int'l, Inc., 678 F.3d 1357, 1364–65 (Fed. Cir. 2012) (discussing the distinction between a reexamination and a district court proceeding). The *Baxter* court emphasized not only the different burden of proof in administrative proceedings but also the PTO's reliance in that case on prior art not raised in the trial court proceedings. *Id.* Prior Federal Circuit cases have similarly emphasized the importance of the different burdens of proof in administrative and judicial proceedings and have further noted that a district court proceeding merely finds a patent "not invalid." *See, e.g.*, *In re* Swanson, 540 F.3d. 1368, 1377–78 (Fed. Cir. 2008).

194. Fresenius USA, Inc. v. Baxter Int'l, Inc., 721 F.3d 1330, 1340 (Fed. Cir. 2013). In *Fresenius*, Judge Dyk, writing for the majority, concluded that Congress clearly intended for administrative cancellation of claims in ex parte examination proceedings to apply to concurrent judicial proceedings. *Id.* at 1339. This case was the judicial companion to the administrative decision upheld in *In re Baxter*. *Id.* at 1334. The district court had repeatedly denied motions to stay the litigation pending an administrative determination of the validity of the key Baxter patent. *Id.* at 1335.

A normative discussion of the very interesting administrative law issues raised by these Federal Circuit decisions is beyond the scope of this Article. I plan to address these questions in a subsequent paper.

195. *See* HARNESS DICKEY, *supra* note 177. As noted, in 81% of the IPR cases, the patent owner and patent challenger are involved in concurrent litigation. *Id.*

196. *Id.*

197. *See Fresenius*, 721 F.3d at 1332 (affirming the district court dismissal of the infringement case after the PTO cancelled the asserted claims of the patent).

interesting issue of how the district court should treat the PTO's action arises.[198]

In a 2007 article, I invoked the Supreme Court's endorsement of administrative law principles in a 1999 patent case, *Dickinson v. Zurko*, involving direct Federal Circuit review of the PTO,[199] to make the doctrinal argument that collateral district court review of PTO decision-making in the context of granted patents that are the subject of infringement or declaratory judgment suits should also be governed by administrative law principles.[200] Since that time, however, the Supreme Court's 2011 decision in *Microsoft Corp. v. i4i Limited Partnership* on collateral judicial review of PTO patent grants has called into question whether the Court believes that administrative law principles apply to such review.[201] In that case, the Court did not mention administrative law, even for purposes of briefly stating that default administrative law principles were superseded by specific statutory language. Instead the Court went straight to Section 282 of the patent statute, imbuing its language that a granted patent shall be "presumed valid" with great significance.[202] According to the Court, the language of Section 282 codified earlier Supreme Court case law purportedly holding that an issued patent could be overturned only by "clear and convincing evidence."[203] The failure of the *i4i* decision even to mention administrative law suggests that analysts thinking about collateral judicial review of the new AIA procedures (as contrasted with direct review by the Federal Circuit, discussed below), may need to adopt a different framework.

Presumably this framework would be highly deferential, however. Indeed, according to certain Federal Circuit cases, those who might wish to challenge in a judicial proceeding a patent

198. *See* Ethicon, Inc. v. Quigg, 849 F.2d 1422, 1428 (Fed. Cir. 1988) ("[W]e see nothing untoward about the PTO upholding the validity of a reexamined patent which the district court later finds invalid [for that] is essentially what occurs when a court finds a patent invalid after the PTO has granted it.").

199. Dickinson v. Zurko, 527 U.S. 150, 152 (1999) ("We must decide whether [the Administrative Procedure Act] applies when the Federal Circuit reviews •ndings of fact made by the Patent and Trademark Office (PTO).").

200. Stuart Minor Benjamin & Arti K. Rai, *Who's Afraid of the APA? What the Patent System Can Learn from Administrative Law*, 95 GEO. L.J. 269, 280–84 (2007) (arguing that Section 282 of the Patent Act, which merely states that a patent "'shall be presumed valid,'" should not be seen as supplanting the Administrative Procedure Act (quoting 35 U.S.C. § 282 (Supp. II 2002))).

201. Microsoft Corp. v. i4i Ltd. P'ship, 131 S. Ct. 2238, 2242, 2252–53 (2011) (holding that an invalidity defense must be proved by clear and convincing evidence).

202. *Id.* at 2242–43, 2245.

203. *Id.* at 2246.

that has been reaffirmed by the PTO bear a burden even higher than the "clear and convincing evidence" standard.[204]

One approach to deference might involve the district court's moving immediately to the issue of infringement. A problem that at least one district court judge has cited with this approach is that a claim construction made during a PTO proceeding may not be identical to that a judge would have made during a *Markman* hearing.[205] Traditionally, the PTO has used a "broadest reasonable interpretation consistent with the specification" approach to claim construction.[206] Under this approach, even if an IPR upheld a claim under one claim construction, the district court may have to do its own claim construction for purposes of infringement analysis. In that circumstance, the amount of work saved by issuance of the stay pending administrative review would be reduced substantially.

Indeed, proposed legislation introduced by Representative Robert Goodlatte in October 2013 has recognized this issue and has directed the PTO, in the case of IPR proceedings (as well as post-grant review proceedings) to use the same approach to claim construction that is used by courts.[207] Even without such legislation, however, the PTO could proactively adopt a vision of the broadest reasonable interpretation (BRI) approach that does not pose an obstacle to realizing efficiencies. As Federal Circuit Judge Pauline Newman has recently noted, BRI is a matter of internal PTO examination protocol that can, and should, be clarified. Specifically, the PTO should clarify that the BRI approach is the starting point for the PTO's inquiry into whether claims need to be amended.[208] At the end of any review that it conducts, the PTAB should issue a claim construction that need

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204. *See, e.g.*, Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc., 807 F.2d 955, 961 (Fed. Cir. 1986) (explaining that the burden of proving invalidity is greater than clear and convincing evidence when the PTO has examined the patent post-grant); Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1139 (Fed. Cir. 1985).

205. Marilyn L. Huff & Luiz Arroyo, A District Judge's Perspective of Patent Case Management and the America Invents Act 5 (2013) (unpublished manuscript) (on file with author).

206. *In re* Am. Acad. of Sci. Tech Ctr., 367 F.3d 1359, 1364 (Fed. Cir. 2004) (internal quotation marks omitted).

207. Innovation Act, H.R. 3309, 113th Cong. § 9 (2013).

208. For "additional views" of Judge Newman, see Flo Healthcare Solutions, LLC v. Kappos, 697 F.3d 1367, 1382 (Fed. Cir. 2012) (Newman, C.J., additional views) ("The 'broadest reasonable interpretation' is an examination protocol, not a rule of law."). In contrast with post-grant proceedings, claim constructions are rarely issued during initial examination. But the goal of public notice would probably be better served if BRI was not used even for claim constructions issued in an initial examination. *See, e.g.*, Michael Risch, *The Failure of Public Notice in Patent Prosecution*, 21 HARV. J.L. & TECH. 179, 192 (2007) (arguing that BRI fails to eliminate many types of ambiguous claims).

not, and should not, be seen through the lens of BRI. Arguably, this view of BRI as a starting point for claim amendment would also be consistent with any Congressional legislation instructing the PTO to use district court claim construction methodology.

How the Federal Circuit will review IPR proceedings is of course also extremely important. Because the role of the Federal Circuit is also central to the post-grant review discussion, however, I first introduce post-grant review.

B. Post-Grant Review

IPR is attractive because it can apply to existing patents.[209] But its scope is limited.[210] In contrast, a post-grant review petition can challenge first-to-file patents on any ground.[211] The PTO Director is authorized to institute a review proceeding if the information presented in the petition, and any rebuttal thereto, makes it "more likely than not" that at least one of the challenged claims in the petition will not be patentable.[212]

Intriguingly, under Section 324(b) of the amended patent statute, the PTO Director is also allowed to grant a petition upon a showing that the petition "raises a novel or unsettled legal question that is important to other patents or patent applications."[213] The plain language indicates that Congress intends it as a vehicle for resolving general legal and policy questions.[214] As for legislative history, the provision is identical to Section 327(b) of Senate Bill 3600, introduced in the 110th Congress.[215] Senator Kyl, speaking in favor of Section 327(b) in 2008, stated that it was "designed to allow parties . . . to resolve important legal questions early in the life of such controversies."[216] Although the PTO has stated that it intends to

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209. 35 U.S.C. § 311 (2012).

210. *Id*. § 311(b); *see also* Changes to Implement Post-Grant Review Proceedings, 77 Fed. Reg. 7060, 7061 (Feb. 10, 2012) (to be codified at 37 C.F.R. pt. 42) (noting the limited grounds for IPR).

211. 35 U.S.C. § 321(b); *see also* Changes to Implement Post-Grant Review Proceedings, 77 Fed. Reg. at 7061.

212. 35 U.S.C. § 324(a).

213. *Id.* § 324(b).

214. *See id.*

215. *Compare id.*, *with* Patent Reform Act of 2008, S. 3600, 110th Cong. § 327(b).

216. 154 CONG. REC. S9982, S9988 (daily ed. Sept. 27, 2008) (statement of Sen. Jon Kyl). The Senator goes on to say:

> Currently, for example, if there is debate over whether a particular subject matter or thing is really patentable, parties who disagree with PTO's conclusion that it is patentable must wait until a patent is granted and an infringement dispute arises before the question can be tested in court . . . . [S]ubsection (b) creates an avenue by which the question can be conclusively resolved by the

use Section 324(b) "sparingly,"[217] even sparing use may have substantial policy implications.

Since post-grant review can only be brought within nine months of patent issuance,[218] issues of interaction with concurrent trial court proceedings are not likely to be as important as in IPR.[219] Rather the key issue will be Federal Circuit review. How Federal Circuit review will work is of course also important for IPR proceedings. The next Subpart discusses why *Chevron* deference is probably applicable as a doctrinal matter. It also discusses whether such deference is normatively desirable.

C. The Federal Circuit and Chevron *Deference*

The AIA establishes detailed trial-type procedures for both post-grant and IPR proceedings.[220] The statute is, however, silent on the standard by which courts should review these proceedings, at least on direct review. Meanwhile, the Supreme Court has made it clear that, absent statutory language to the contrary, courts must apply *Chevron* deference in any direct review of legal determinations made by agencies in trial-type proceedings.[221] Consequently, as several commentators have now observed, doctrinal analysis would indicate that the Federal Circuit should give *Chevron* deference to any legal determinations made by the agency in these new proceedings.[222] To put the point another way, the PTO will now be able to argue for the first time that its interpretations of the patent statute's validity requirements are entitled to *Chevron* deference.[223]

> Federal circuit before a large number of improper patents are granted and allowed to unjustifiably disrupt an industry. . . . [S]ubsection (b) allows PTO to reconsider an important legal question and to effectively certify it for Federal circuit resolution when it appears that the question is worthy of early conclusive resolution.

Id. at S9988.

217. Changes to Implement Inter Partes Review Proceedings, Post-Grant Review Proceedings, and Transitional Program for Covered Business Method Patents, 77 Fed. Reg. 48,680, 48,629 (Aug. 14, 2012).

218. 35 U.S.C. § 321(c).

219. Moreover, the AIA flatly provides that post-grant review petitioners may not previously have brought a civil action and that district courts may not stay requests for preliminary injunctions brought within three months of a granted patent on the grounds that post-grant review has been sought. *Id.* § 325(a)(1), (b).

220. *See id.* §§ 311–315, 321–324.

221. United States v. Mead Corp., 533 U.S. 218, 226–27 (2001).

222. Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237, 1280 (2012); Melissa F. Wasserman, *The Changing Guard of Patent Law:* Chevron *Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1977–78, 1985–89 (2013).

223. Because the PTO does not have rulemaking authority for purposes of interpreting the validity requirements of the patent statute, and it has not thus far been

With *Chevron* deference, the PTO could exercise significant power over legal issues raised by specific patents.[224] The PTO could also further develop the law of patent validity. Such development would be particularly apt in situations where a post-grant review petition was granted pursuant to the Section 324(b) provision allowing the PTO to adjudicate "novel or unsettled legal question[s] . . . important to other patents or patent applications."[225]

To be sure, as Melissa Wasserman has recently argued, because IPR and post-grant review proceedings involve patents that have already been granted, the PTO may be inclined to uphold these patents. Accordingly, it may invoke lax interpretations of various validity requirements and then seek *Chevron* deference for these lax interpretations.[226] Although this is a legitimate concern, the PTO's record on the old inter partes reexamination proceedings provides some reassurance. Of 398 reexamination certifications in those proceedings, 11% confirmed all claims, 42% canceled all claims, and 40% made claim changes.

Additionally, as I have discussed elsewhere, although the PTO is certainly susceptible to capture by "pro-patent" groups and may have certain financial incentives to grant patents,[227] a variety of countervailing forces, ranging from pressure from other executive branch players to concerns about workload, operate to check pro-patent tendencies.[228] In the case of software patent quality, White House interest in the subject has been quite acute.[229]

A very different concern about *Chevron* deference involves the fear that the PTO, and the executive branch more generally, could use such deference to change patent law significantly, perhaps in ways that were influenced by political

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authorized to conduct trial-type adjudications in making validity determinations, Supreme Court case law would indicate that *Chevron* has not, thus far, been applicable to PTO validity determinations. *Mead Corp.*, 533 U.S. at 229 ("We have recognized a very good indicator of delegation meriting *Chevron* treatment in express congressional authorizations to engage in the process of rulemaking or adjudication that produces regulations or rulings for which deference is claimed.").

224. Wasserman, *supra* note 222, at 2003–04 (stating that because many issues are more likely to appear before the PTO first, and not before a district court, the Federal Circuit would likely uphold the PTO's decision under *Chevron* deference).

225. 35 U.S.C. § 324(b).

226. *See* Wasserman, *supra* note 222, at 1971 ("[E]very PTO validity determination could theoretically warrant strong judicial deference.").

227. *Id.* at 2013–14 (arguing that, historically, the patent fee structure encouraged the PTO to issue patents because a significant amount of its patent operating budget would only be collected by granting patents).

228. Rai, *supra* note 125, at 336–38.

229. *Fact Sheet: White House Task Force on High-Tech Patent Issues*, *supra* note 17.

considerations.[230] Indeed, given the Supreme Court's decision in *National Cable & Telecommunications Association v. Brand X Internet Services*, holding that administrative interpretations of statutes entitled to *Chevron* deference trump prior judicial determinations unless those prior judicial determinations held that the interpretation in question was the only permissible one,[231] the PTO might even be able to reverse longstanding judicial precedent. This concern is likely to be particularly acute for those who view patents as property rights with respect to which "settled expectations" are paramount.[232]

Commentators concerned about settled expectations may draw some comfort from two points, one doctrinal and one realist. First, because any ability by the PTO to claim *Chevron* deference on questions of substantive law is of very recent vintage, almost all patent case law developed through the judicial process was developed at a time when the PTO enjoyed no such claim.[233] It is unclear whether the reasoning of *Brand X* applies to assertions of *Chevron* deference made in attempts to overturn judicial interpretations rendered prior to the time the agency enjoyed any such deference. Second, the empirical data indicate that, at least at the Supreme Court level, one very important factor in determining agency victory is whether the agency's view is longstanding.[234] Thus, to the extent that the Federal Circuit wants to curb very significant legal and policy shifts by the executive branch, it might be assisted in that endeavor by the Supreme Court.

The biggest concern about PTO policymaking through adjudication of "novel or unsettled" questions is that, from a normative standpoint, notice-and-comment rulemaking is the preferred policymaking vehicle.[235] Ideally, such rulemaking allows the agency to operate explicitly and transparently as an

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230. John F. Duffy, *The Federal Circuit in the Shadow of the Solicitor General*, 78 GEO. WASH. L. REV. 518, 546–48 (2010).

231. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 982 (2005).

232. *See* Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 739 (2002) (discussing this concern).

233. Wasserman, *supra* note 222, at 1971, 1973, 1993 (explaining that, historically, the PTO has not received any judicial deference, and the calls to accord *Chevron* deference to the PTO culminated in 2011 when Congress enacted the AIA).

234. William N. Eskridge, Jr. & Lauren E. Baer, *The Continuum of Deference: Supreme Court Treatment of Agency Statutory Interpretations from* Chevron *to* Hamdan, 96 GEO. L.J. 1083, 1147–49 (2008).

235. *See* Richard J. Pierce, Jr., *Rulemaking and the Administrative Procedure Act*, 32 TULSA L.J. 185, 188–89 (1996) (describing the numerous advantages of agency rulemaking over adjudicative processes).

expert policymaker, weighing the costs and benefits of a wide range of perspectives in a transparent manner.[236] The problem is a real conundrum and may fuel the desire of the part of the PTO to use Section 324(b) "sparingly." That said, to the extent that the costs and benefits associated with particular "unsettled" questions of patent law had been vetted thoroughly—such as through a request for comments of the sort that the PTO has sought on the application of Section 112(f)—policymaking through administrative adjudication might be a reasonable option.

VI. CONCLUSION

Without a doubt, the institutional context within which the PTO operates is highly challenging. Even taking current institutional constraints as a given, however, the agency could, and should, do a substantial amount to improve patent quality. Drawing on patent and administrative law theory and doctrine, as well as new data from a software Art Unit with relatively strict examination practices, the Article has put forward a portfolio of pragmatic, cost-effective strategies. Strategies that revolve around Section 112 of the patent statute could usefully be deployed at the initial examination stage. Other strategies could be deployed within the new post-issuance procedures available to the agency under the America Invents Act. Notably, although the strategies the Article has discussed have the virtue of being neutral as to technology, they are likely to have a very significant practical impact in the area of software.

236. *See* M. Elizabeth Magill, *Agency Choice of Policymaking Form*, 71 U. CHI. L. REV. 1383, 1390 (2004) (discussing how notice-and-comment rulemaking allows an agency to inform the public of its proposed rules, solicit comments, and respond to objections).