

## LEVERAGE: REVIEW OF DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT

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*The Patent Crisis and How The Courts Can Solve It*<sup>1</sup> is an invaluable book for anyone interested in patent law. The book serves two goals. First, it suggests how patent reform in the United States can best be accomplished: not through Congressional amendment of the Patent Statute, but by judicial implementation of industry-specific reforms, in interpreting the existing Act. Some jurisdictions, such as India, already differentiate between industrial sectors more explicitly in patent policy than the United States. Second, of interest to patent law worldwide, the book provides a clear and concise explanation of the many applications of economics to patent law and theory over the past few decades, especially with respect to how the diverse forms in innovation in different industries are reflected in patent economics, and could bolster patent reform.

The patent system in the United States has systemic problems. But when patent reform legislation is drafted, different industries see entirely different problems. In the pharmaceutical industry it seems that “*claims are clear, patents are subject to significant scrutiny, and strong protection is necessary to allow companies to recover hundreds of millions of dollars in investment.*”<sup>2</sup> Similar conditions exist in other industries such as “*medical devices and chemistry.*”<sup>3</sup> Patent reform, from the viewpoint of these patent-reliant industries, should include stronger protection (such as greater damages and more available injunctions), fewer challenges to validity for alleged failures to make the necessary disclosure, and harmonizations with the patent laws of other countries (especially to increase protection of pharmaceuticals). By stark contrast, information technology companies increasingly regard patents as much a cost as an asset.<sup>4</sup> Reform to them would mean limits on remedies (so a single patent on one element of a complex product would not yield market-wide damages or support an injunction against marketing the entire product) and readier means to invalidate suspect patents.<sup>5</sup> Not surprisingly, with the two main industry sectors seeking conflicting goals, legislative patent reform in the

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1. DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* (The University of Chicago Press 2009).
2. *Ibid.* at 3.
3. *Ibid.* at 3.
4. *Ibid.* at 4.
5. *Id.* at 4.

United States has ground to a standstill in successive Congressional sessions.<sup>6</sup> The reason is that “innovation works differently in different industries.”<sup>7</sup> The book sets out to explain how that affects the operation of patent law. In addition, it supports reform not through legislation (where industry groups will either deadlock or exacerbate problems in many instances), but through judicial interpretation of patent law in a manner sensitive to its effects.<sup>8</sup> To the objection that courts should make policy, the answer is that courts already make policy in interpreting the broad requirements of the patent statute, and so would make better policy if they better understood the consequences of their decisions.<sup>9</sup>

The systemic problems in United States patent law have several sources. First, the USPTO is staggering under a huge workload.<sup>10</sup> The USPTO receives around half a million applications a year, and now is sufficiently backed-up that it typically takes three to five years to decide whether to issue a patent.<sup>11</sup> Unlike many jurisdictions, there is no opposition process while the application is pending, so the decision depends on input only from the applicant and the overburdened examiner (who can only devote a few dozen hours at best to that particular application over those several years).<sup>12</sup> The applicant must disclose prior art only of which she is aware, and the examiner’s access to prior art in many areas is severely limited.<sup>13</sup> The easiest path is for the examiner to grant the application, avoiding disputes with the applicant and clearing the case load a little.<sup>14</sup> The process also suffers from the ability of applicants to manipulate the process. Continuation rules allow the applicant, not the USPTO, to decide when an application is finally denied (because the applicant can always continue an application), when a patent issues (because even if the examiner allows claims, the applicant can keep the process going by adding new claims), or if the patent issues at all (because the applicant can likewise abandon the claims and start the process from square one).<sup>15</sup>

This unitary system faces increasing pressure from differences between industries: “In the pharmaceutical industry, the medical device field, or the traditional mechanical field, an individual may only have one or two patents covering his invention. In IT, however, one product regularly involves the

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6. *Id.* at 4-5.

7. *Id.* at 5.

8. *Id.* at 3.

9. *Id.* at 8-9.

10. *Id.* at

11. *Id.* at 22-23.

12. *Id.* at 23.

13. *Id.* at 23.

14. *Id.* at 23.

15. *Id.* at 24.

combination of fifty, one hundred, even one thousand, or - as Intel lawyers themselves say with respect to their own core microprocessor- five thousand different patent rights.”<sup>16</sup> Added to this uncertainty is a distinct feature of patent law, the lack of a defense of independent creation, meaning that someone who develops technology is liable to another who invented it first, even if the defendant had no knowledge of the patent.<sup>17</sup> In information technology industries especially, many factors combine to leverage the risks of infringement, and reward of holding even uncertain patents: “The combination of injunctive relief, patent damages that do not take sufficient account of the contributions made by others, and the prospect of treble damages for willful infringement even if the defendant developed its product on its own, all lead to a litigation system that is skewed in favor of patent plaintiffs, and that therefore encourages patent owners to roll the dice of litigation in hopes of reaping a large reward.”<sup>18</sup> The chance that a patent holder may obtain an injunction can lead to “patent holdup,” where a patent on a small component of a product gives the right to shut the product from the market, allowing the patent holder great strength in negotiation.<sup>19</sup> “Royalty stacking” may also result from overlapping patents, where a product maker must account for licenses to numerous patents on aspects of the product, a duplication that courts have not accounted for sufficiently.<sup>20</sup> Even where an injunction is not available, the prospect may skew the calculation of a “reasonable royalty,” for courts think of the value of continuing to allow the product to be marketed at all, as opposed to the actual contribution to the product from that single component.<sup>21</sup> Adding these risks together, it may well be the case that in many industries, the overall costs of patents (including the risks of patent litigation involving invalid patents) may outweigh the benefit to the industry – although of course for individual market actors the balance may be quite different.<sup>22</sup> In addition, companies appear to react to the large magnitude but infrequent occurrence of patent litigation costs with “rational ignorance.”<sup>23</sup> Because there are so many patents out there that could read on a product, because searching for applicable patents is so uncertain and costly, and because the chance of actually being sued is relatively small, the pragmatic course is often for companies, in effect, to simply close their eyes, cross their fingers, and pretend that great pile of patents does not threaten them.<sup>24</sup> An instructive comparison is

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16. *Id.* at 27.

17. *Id.* at 28.

18. *Id.* at 28-29.

19. *Id.* at 29.

20. *Id.* at 29.

21. *Id.* at 30.

22. *Id.* at 30-31.

23. *Id.* at 31-32.

24. *Id.* at 31-33.

with the pharmaceutical industry, where there is far less uncertainty. Patent owners must list their patents in the Orange Book, ensuring that potential generic competitors are aware of them (as opposed to patentees in some industries, who are best advised to wait in the weeds until their patents cover valuable products).<sup>25</sup> There is less uncertainty about claim construction – because the generic manufacturer must copy the patented drug in order to piggyback on its Food and Drug Administration approval.<sup>26</sup> So patents as a form of title to property can work, at least in some industries, without the rampant uncertainty present in most sectors.<sup>27</sup>

Innovation functions quite differently in specific industries. The cost of research and development varies enormously between sectors.<sup>28</sup> “The R&D, drug design, and testing of a new drug can take a decade or more and cost, on average, hundreds of millions of dollars.”<sup>29</sup> A new generation of semiconductors, with a new fabrication facility – entails years and likely four billion dollars.<sup>30</sup> Software, by contrast, is likely to cost less. The days of garage start-ups may be over, but developing a new software package is likely to be an investment of a different order of magnitude, some millions of dollars.<sup>31</sup> In some industries (software, biotech, manufacturing), the costs of innovation are coming down with the use of automated design tools.<sup>32</sup> Likewise, advances in gene-sequencing and bioinformatics have dramatically lowered the cost of innovation in some areas of biotechnology.<sup>33</sup> Variations among industries also include the importance of being first to market, as opposed to the importance of having a product that cannot be copied, which reduces the importance of being the first mover.<sup>34</sup> Generally, innovation is now less frequently the work of the prototypical inventor working alone in her lab or garage; innovation now comes from collaboration among teams, often requiring considerable laboratory and other resources.<sup>35</sup>

Other aspects of innovation have differential impacts among industries. The importance of patent protection depends in part on the availability of other incentives to innovate. If there are other incentives (such as peer recognition or prizes for scientists, or alternative forms of intellectual property protection, such as trade secrets for manufacturing processes), then the impact of patent

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25. *Id.* at 32-33.

26. *Id.* at 32-33.

27. *Id.* at 33.

28. *Id.* at 38.

29. *Id.* at 39.

30. *Id.* at 39.

31. *Id.* at 40.

32. *Id.* at 40.

33. *Id.* at 40.

34. *Id.* at 43-44.

35. *Id.* at 40-41.

protection may be diminished.<sup>36</sup> Innovators also vary by industry with respect to how much the value of their innovation they can capture in a market, and how much of that value flows to the public without monetary compensation (“spillover effects,” a term that captures the idea that intellectual property law need only provide incentive to innovate, rather than allow innovators to capture all the market value of their innovation – and also the idea that externalized benefits are better than deadweight losses).<sup>37</sup> Perhaps the biggest difference between industries lies in the amount of cumulative innovation: pharmaceuticals tend “to be a stand-alone process generating a single finished product.”<sup>38</sup> By contrast, software products “will be incrementally improved over time.”<sup>39</sup> In different industries, innovation also poses different negative risks: impeding standardization in markets requiring overall coordination, such as information technology; decreasing stability of existing products, especially in software; and risks to health and safety in areas such as biotech and nanotechnology, where the long-term risks of innovations are not immediately apparent.<sup>40</sup>

These differences are reflected in the different ways industries make use of the patent system. Whether to seek patent protection at all is a much different decision with respect to pharmaceuticals, where companies depend on patents to exclude competition for their overall product, and computer-related industries, where one patent will not protect a product, but a bulging patent portfolio may be necessary to keep up with the competition.<sup>41</sup> Patent prosecution also shows marked differences. Pharmaceutical, chemical, and biotech applications appear to receive more thorough scrutiny, with more prior art cited, more time spent on examinations, and more actions by the applicants during the process.<sup>42</sup> Computer-related inventions, especially software, show considerably fewer prior art references, perhaps because the sources of such information are less accessible in those areas; rather than being in patents and professional journals, prior art may simply be embodied in products or user manuals.<sup>43</sup> The value assigned to patents depends on sector as well. Pharmaceutical patents are more likely to have a predictable value, whereas software patents are likely to be subject to a higher range of valuations, where such a patent could prove worthless or be a money-spinner if its technology is

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36. *Id.* at 43-44.

37. *Id.* at 46-47.

38. *Id.* at 47.

39. *Id.* at 47.

40. *Id.* at 47-48.

41. *Id.* at 50-51.

42. *Id.* at 50.

43. *Id.* at 51.

incorporated in a best-selling product or industry standard.<sup>44</sup> The scope of patents is also highly technology-specific.

*“In some industries, such as chemistry and pharmaceuticals, a single patent normally covers a single product. . . In industries such as semiconductors, by contrast, new products are so complex that they can incorporate hundreds and even thousands of different inventions – inventions frequently patented by different companies.”*<sup>45</sup>

In such industries, a valuable asset is a patent portfolio; a mass of patents is worth more than their sum, because the portfolio owner is less likely to be sued by an industry competitor, who would fear a counterstrike.<sup>46</sup> Accordingly, the companies receiving the most patents are all in the computer hardware and electronics industries.<sup>47</sup>

Licensing practices, including litigation to protect licensing markets, vary depending on the industry. The vast majority of patents are never litigated.<sup>48</sup> Litigation in pharmaceuticals is likely to involve a dispute over who can market the most popular drug in a market. Litigation in software is more likely to involve application of an outdated patented technology to a newer generation of software, given the quick turnover in software products and the slow process of patenting.<sup>49</sup> Likewise, the value of patents as a part of the overall company varies with respect to pharmaceuticals, where a single patent could cover a multibillion dollar market, and information technology, where a company is more likely to point to a patent portfolio.<sup>50</sup>

The Federal Circuit, the court in the United States that hears patent appeals (subject to occasional review by the Supreme Court) has applied patent law differentially. The starkest example is biotechnology and software.<sup>51</sup> In biotechnology, the court has applied a strict written description requirement (such as requiring disclosure of genetic sequences, as opposed to functional descriptions, even where the description lays out a clear plan to get the sequence) and a relatively low obviousness requirement (by stressing that biotechnology is an unpredictable art, so even apparent inventions are risky and therefore not

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44. *Id.* at 49-50.

45. *Id.* at 54-55.

46. *Id.* at 55.

47. *Id.* at 55.

48. *Id.* at 55.

49. *Id.* at 57.

50. *Id.* at 57.

51. *Id.* at 60.

obvious).<sup>52</sup> In software, the court has applied a lax written disclosure requirement, accepting functional descriptions, on the theory that writing the software code to implement them is well within the typical skill in the art. The court has, however, applied a higher obvious requirement for software, if not always consistently.<sup>53</sup>

Patent theory responds to this industry diversity with a diversity of theories. Prospect theory suggests that patents should be sufficiently strong to protect not just invention, but the entire process of investing in innovation, and “coordinating the development, implementation, and improvement of an invention.”<sup>54</sup> Competitive innovation theory suggests that patents do not provide a monopoly (as is often thought), but rather serve to foster competition by giving parties rights in competing inventions.<sup>55</sup> Cumulative innovation theory looks to balancing incentives to inventors against the costs of their patent to other inventors, using “tailored incentives” to encourage both initial inventors and improvers.<sup>56</sup> Anti-commons theory raises concerns that patents can result in economic inefficiencies, such as where many different technologies must be aggregated for innovation, raising hazards of holdouts, rent-seeking, and transaction costs.<sup>57</sup> Closely related to that is the idea of the patent thicket, where so many patents have been awarded within an industry that innovation is slowed by the uncertainty and costs of resolving and licensing the competing claims.<sup>58</sup>

This broad-ranging analysis of the economics of patents is brought to bear with the idea of “policy levers,” applying the rules of patent law “with sensitivity to the characteristics of particular industries.”<sup>59</sup> Such differential application of patent law already exists. The requirement that an invention be useful has little bite in software and mechanical inventions, where anything that works is sufficiently useful, but often proves an obstacle in biotechnology and chemistry, where a specific useful application must be shown.<sup>60</sup> Paying more attention to industry reality leads to some prescriptions. Experimental use, obviousness, remedies, and the written description requirement are all doctrines that offer considerable leverage to affect the role of patents in various industries, and already have such effect through case law, although very likely

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52. *Id.* at 60-61.

53. *Id.* at 61.

54. *Id.* at 69-71.

55. *Id.* at 72-73 .

56. *Id.* at 73-75.

57. *Id.* at 75-77.

58. *Id.* at 77-78.

59. *Id.* at 108.

60. *Id.* at 110-12.

without the courts considering the secondary impact of their interpretation of the law.<sup>61</sup>

Presently, courts apply patent law differently in different industries. By taking an instrumental approach, courts could improve the patent system in ways that legislative reform would likely never achieve. In biotechnology, courts could reverse the present trend of case law, and apply a less strict written description standard coupled with a heightened obviousness requirement.<sup>62</sup> Biotechnology would then have fewer, broader patents - which would fit both the high-risk, high-cost nature of innovation in the field (a classic prospect theory sector), and reduce the anti-commons problem with such technologies as DNA, where machines can now discover genes (a form of invention that could then be deemed obvious) that could be necessary for future innovators.<sup>63</sup> Likewise, the utility and subject matter rules could be applied to prevent patenting of biological substances before their specific usefulness was proved, similarly reducing problems of anti-commons and patent thickets.

Patent law could likewise be judicially reformed in the information technology industries. Again reversing present law, courts could apply a more relaxed obviousness standard and raise the presently lax written description standard. This would fit the cumulative innovation nature of the field, because patents would be permitted for incremental innovations, but would be narrow, so as to reduce hazards of patent thickets. Both the changes, along with adjustment to injunctive and damage remedies, would also reduce the hazards of patent holdups.<sup>64</sup>

The industry-specific approach to patent law is already here, so courts might as well try to apply it in a way that furthers the goals of the patent system. The use of policy levers will not always be perfect, because many levers could have unanticipated results, and different judges may have different views of the most important policy in a case. But, it is better that courts should act with awareness of differences in industries and the effects of doctrine upon different types of innovation. Unlike legislative reform, the analysis of this book requires no act of Congress or even of the courts for adoption. Rather, its clear explanation of patent law and economics will inevitably become influential in patent law, as it spreads, like other innovations. The biggest challenge will come from the fact that industries are not static. Information technology gradually is becoming a part of every industry, so how to categorize

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61. *Id.* at 112-30.

62. *Id.* at 142-55.

63. *Id.*

64. *Id.* at 160.

an invention may become increasingly tricky. In addition, research may show that some variation in patents is not due to technology, but to the practices in patent drafting within the industry, so even such disciplines as sociology and literary analysis may come to bear. But courts can use moderate, policy sensitive interpretation in lieu of formulating rigid interpretations of the patent statute.<sup>65</sup> If courts can handle the policy levers with sufficient skill (the book speaks of such fine adjustments as modulating and recalibrating patent law)<sup>66</sup>, it is a consummation devoutly to be wished.

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65. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006) (rejecting Federal Circuit's rigid "rule that courts will issue permanent injunctions against patent infringement absent exceptional circumstances," in favor of flexible four-factor test); *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118 (2007) (rejecting Federal Circuit's strict requirement that a licensee breach license agreement in order to have jurisdiction for declaratory judgment action); *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007) (rejecting Federal Circuit's rigid "teaching-suggestion-motivation" test for obviousness, in favor of more flexible approach).

66. *Supra* n. 64 at 102, 155.