

Risk and Reward

Patent Costs and Benefits: The Economics of Litigation, Part 2

By Samson Vermont

Last month, we reviewed numbers showing dramatic increases in patent filings, suits, awards and licensing income. We concluded that patents are more important than they used to be because the confluence of the Internet, global venture capital and cultural changes have eroded other traditional barriers to entry.

Patent Disadvantages

Nevertheless, sometimes patents are still poor investments. They are often narrowed substantially during prosecution through the Patent Office, often ending up much narrower than people think. In some areas, such as software, the technology may be moving so fast that it overtakes the prosecution process—the average time in prosecution for all patents is 2.8 years; the median is 2.2 years.¹ (For patents that end up being litigated, it's 3.6 years on average and 2.7 years at the median.²)

Other disadvantages of patents include: they expire; competitors can often design around them in just a few years; to enforce them you must litigate or at least threaten to litigate; and they're often invalidated in litigation. Companies must, of course, recoup the expenses of R&D, but studies indicate that more is recouped from the inherent lead time that R&D garners and by the complementary sales and services it facilitates.³ Plus, patents disclose a great deal of proprietary information that may be better protected through secrecy, which lasts forever and can provide broader protection than patents, i.e., for unoriginal subject matter.⁴ Trade secret misappropriation is also easier to prove in many cases.⁵

Patent Advantages

On the other hand, trade secrets must remain secret. Thus, they cannot be marketed or directly enhance company valuation. They also provide no protection against independent development. If someone else develops the same subject matter, only a patent can stop them from using, selling or making it. Finally, maintaining secrecy can impose onerous procedures

and increase bureaucracy, such that, the costs of trade secrets are very indirect and may therefore be underestimated.

The legal fees for patents are more conspicuous, and surprisingly reasonable. Unlike litigation, which must always be customized for the client, patent prosecution is something of a commodity in that it entails well-defined, standard procedures that predictably result in specific products (patents). In other words, market forces can fully work their magic because law firms can tacitly or overtly bid against each other and because companies can meaningfully compare those bids.

Accordingly, it is well known that patent prosecution has lower margins than other legal specialties. Indeed, when you think about it, it's moderately remarkable that a professional – with degrees in both law and science, good writing skills and at least two bar memberships – will spend a whole week or two intensively drafting your patent and only charge you \$3000-\$12,000 for it.⁶ (To prosecute the application to issuance generally costs about another \$2000 to \$7000 in attorney fees⁷ and \$2500 in Patent Office fees. The Patent Office maintenance fees on an issued patent cost another \$3000 for the first 11.5 years and \$3000 for the remaining life of the patent's 20-year term. But only about 37 percent of patents are maintained until the end of their term,⁸ and the Patent Office fees are cut in half for small entities having fewer than 500 employees.⁹)

It is also true that the nation's aggregate costs of patent prosecution are dwarfed by its aggregate patent license revenues. Applicants spend about \$4.5 billion every year obtaining U.S. patents.¹⁰ In 2000, annual license revenues reached about \$130 billion.¹¹ At very first glance, this implies a profit margin of 2900 percent (i.e., $130/4.5 = 29 * 100$ percent). The real costs behind patents, however, are not the legal fees but the R&D that creates the inventions on which those patents are based. On average, spending on intellectual property is only 2.5 percent of spending on R&D.¹² Arguably, the essential value of patents is only the difference between the value of the technology if patented and the value if not patented, minus the cost of the patents.

At any given time, over 95 percent of patents are unlicensed and over 97 percent are generating no royalties.¹³ This is often because the technology the patents protect is not useful, feasible or marketable. Many are never licensed, however, because the companies that own them secure more value by monopolizing the technology than by licensing it out.¹⁴

In other words, many people would argue that most of the value of patents comes not from what you actually collect from licensing but from the market advantage they secure for the patent owner or licensee. The real value lies in all the things your competitors could not do, i.e., they could not move into market X, they could not offer feature Y. Indeed, most law and legal instruments share this dynamic. For example, only about one percent of taxpayers is audited, and the real value of audits is not the revenue collected directly therefrom but the revenue collected from the rest of us who fear an audit.

At least one study suggests that, apart from effects due to licensing income, there is a positive, albeit “marginal,” relationship between companies’ stock prices and the quality of their patent portfolios.¹⁵ In fact, a patent for a method of picking stocks based on patent quality recently issued. The owner (CHI Research Inc.) claims its approach generated an average annual gain of 38 percent over 10 years, compared to the S&P 500 Index average annual gain of 16 percent, and the NASDAQ 's 25 percent.¹⁶

Another piece of evidence that patents are worth more than their licensing potential is the fact that 37 percent of U.S. patents are renewed 11.5 years after they issue¹⁷. Since far fewer than 37 percent of patents are licensed, licensing cannot be everything.

Average Patent’s Value

Some say that intangible assets now account for two-thirds of corporate value.¹⁸ Others say it’s more than 85 percent.¹⁹ Unfortunately, no one knows what portion of that two-thirds or 85 percent is attributable to patents as opposed to trade secrets, copyrights, trademarks, customer lists, know-how, goodwill, etc. There is a crude way, however, to get a rough idea of the value of patents. On average, a large company obtains one patent for every \$4.26 million it spends on R&D.²⁰ (IP intensive companies spend \$2.08 million in R&D for every patent.²¹) Therefore, the average patent cannot be worth more than \$4.26 million.²² Actually, it must be worth much less because most of the benefits of R&D are appropriated through other means, such as secrecy and first mover advantage.²³

On the other hand, we also know that the average patent cannot be worth much less than the average cost of filing and prosecution, which is about \$20K (including everything) for the 80-84 percent of U.S. patentees who don’t file a corresponding application overseas²⁴. If patents *were* worth much less, people wouldn’t apply for them. As a starting point, therefore, we know with some certainty that the average value of patents is somewhere between \$20K and \$4.26 million.

We can narrow this range. Since U.S. patents provide an “implicit subsidy” (a return) on R&D of about 15 percent,²⁵ the average patent should be worth somewhere around \$640K ($\$4.26\text{M} * .15$).²⁶ This figure of \$640K is probably not too far off. There are 2.75 million patents that issued less than 20 years ago and 1.3 million of them are active,²⁷ meaning their maintenance fees have been paid. If patent licensing revenues are \$130 billion per year, then the

average patent would seem to generate \$100K per year from licensing alone (\$130 billion / 1.3 million). Now consider that the average *effective* life of a patent—that is, the average time until the product or feature it covers in the marketplace is replaced by a better product—is only about five years from the date it issues. Assuming licensed patents are licensed for four of those five years²⁸ and discounting pro rata to present value at 10 percent from a date four years from today, we obtain a lifetime licensing value of \$326K for an issued patent.²⁹ If the market advantage of patents generates as much value as patent licensing, then we're up to about \$640K (2 * \$326 = \$652).

Created Unequal

It's a self-evident truth, however, that all patents are created unequal. One study found that the bottom 50 percent of patents accounts for only about 10 percent of aggregate patent value, while the top 10 percent of patents accounts for at least 40 percent of it.³⁰ (This is probably too generous to the bottom 50 percent.³¹) In other words, to say the average patent is worth around \$640K is misleading because the vast majority are worth very little. High values skew up the average. Recall your middle school math teacher: if you add together the income of 99 people who each make \$30K per year and one other person who makes \$100 million per year, the *average* income for this group is over \$1 million.

Thus, companies should avoid patent portfolio socialism. To the extent they can predict which of their inventions will be important, they should spend a great deal more for patent applications on those inventions—at least three times more. Applicants should perform prior art searches before filing³², and the applications should be detailed, containing around 50 claims or so.³³ As a rule of thumb, if your attorneys are charging you less than \$15,000 to draft each important application, then the applications probably aren't good enough.

The numbers in the last three sentences ought to be doubled for important biotech, chemical and pharmaceutical applications because a number of studies show that patents in these areas are almost twice as valuable as patents for electrical, mechanical and business method inventions.³⁴ One reason is that discovering, testing and obtaining approval for “the microscopic inventions” is extremely expensive, difficult and slow—on average it takes \$500 million and 14 years to go from discovery to government approval of a new drug³⁵—but making them is

relatively cheap, easy and fast. So for these inventions, the protection patents afford is more valuable.

The greater value is also due to the fact that the microscopic inventions often stand alone as buyable products, so if a patent covers the invention it covers the whole product that is sold. In contrast, electronic devices often contain a multitude of parts from a multitude of manufacturers, so a patent on any one part cannot monopolize the device. Accordingly, applicants spend almost twice as much for biotech, chemical and pharmaceutical patents;³⁶ these patents are litigated almost twice as often³⁷ (except chemical); and they take almost twice as long to get through the Patent Office.³⁸

Next month, we will examine the costs of patent litigation. We will also acquaint ourselves with analyzing suits with decision trees -- the main focus of this column.

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¹ Mark A. Lemley and John R. Allison, Who's Patenting What? An Empirical Exploration of Patent Prosecution, 52 *Vanderbilt L. Rev.* 2099, 2101, 2118 (2000).

² John R. Allison and Mark A. Lemley, Empirical Evidence on the Validity of Litigated Patents, 26 *AIPLA Quarterly J.* 185, 237 (no. 3) (Summer 1998).

³ Richard C. Levin et al., Appropriating the Returns from Industrial Research and Development, 3 *Brookings Papers on Economic Activity* 783 (1987); Wesley M. Cohen, Richard R. Nelson and John P. Walsh, Protecting their Intellectual Property Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent or Not, NBER Working Paper No. 7552 (2000); Ashish Arora, Marco Ceccagnoli and Wesley Cohen, Intellectual Property Strategies and the Returns to R&D, Working Paper (Nov. 2000).

⁴ Peter J. Toren, Protecting Inventions as Trade Secrets: A Better Way When Patents Are Inappropriate, Unavailable, 2 *IP Law Weekly* (May 24, 2000); Patents v. Trade Secrets, in Barufka and Einschlag, *supra* at 293-330.

⁵ *Id.*

⁶ *American Intellectual Property Law Association Report of Economic Survey 1999* (hereinafter, "AIPLA 1999") 63-64.

⁷ *Id.* at 64-65; Mark Lemley, Rational Ignorance at the Patent Office, fn. 14, Working Paper No. 2000-16 (U.C. Berkeley Law and Economics Working Paper Series 2000).

⁸ Office of PTO Spokesperson, Brigid Quinn, Personal Email Communication (Jan. 11, 2001). See also Lemley, Rational, *supra* at 12.

⁹ USPTO fee schedule, Oct. 1, 2000.

¹⁰ Lemley, Rational, *supra*.

¹¹ Derived from Kevin Rivette and David Kline, *Rembrandts in the Attic: Unlocking the Hidden Value of Patents* 4-6 (Harvard

Business School Press 2000); Emmett J. Murtha, 'Licensing as a Business,' in Jack Barufka and Michael Einschlag, *Patent Strategy & Management Seminar Handbook*, Samson Vermont (ed.), pp. 1-25 (American Lawyer Media Inc. Nov. 2000).

¹² 2000 U.S. Law Department Spending Survey 44, PricewaterhouseCoopers (2000).

¹³ See Emmett J. Murtha, Personal Email Communication (April 16, 2001); Murtha, Licensing, *supra* at 13. See also Lemley, Rational, *supra* at 16. These numbers are probably too generous because entire or large portions of patent portfolios are often licensed as a package even though the licensees care about only one or two of the patents. So the tag-along patents get credit they don't deserve.

¹⁴ Michael B. Einschlag, Speech, Patent Strategy & Management Seminar (Tysons Corner, VA Nov. 3 2000) (if you could make a 50 percent margin and instead you license at a 5 percent royalty, the licensee has to sell over 10 times what you could sell to make it worthwhile). See also Reiko Aoki and Jin-Li Hu, Imperfect Patent Enforcement, Legal Rules and Settlement, Working Paper (1999). But see Murtha, Licensing, *supra* at 13 (roughly less than 5 percent of patented inventions are used by the company that owns them).

¹⁵ See Mark Hirschey, Vernon J. Richardson and Susan W. Scholz, Value Relevance of Nonfinancial Information: The Case of Patent Data, <http://papers.ssrn.com> (1998). See also Bronwyn H. Hall, Innovation and Market Value, NBER Working Paper 6984 (NBER 1999).

¹⁶ Samson Vermont, *Patent Strategy & Management* (April 2001) (U.S. Patent No. 6,175,824).

¹⁷ Office of PTO, Quinn, *supra*. See also Lemley and Allison, Who's Patenting, *supra* at 2128.

¹⁸ Kevin Rivette, David Kline and Gerald Mossinghoff, "Wall Street's Untapped Patent Opportunities," in *Hidden Value: Profiting from the Intellectual Property Economy*, p.127, Bruce Berman (ed.) (21st Century Books 1999).

¹⁹ Russell L. Parr, Valuing and Determining Royalties for Technology, in Barufka and Einschlag, *supra* at 49.

²⁰ 2000 Intellectual Property Metrics, *supra* at 44. But see Murtha, Licensing, *supra* 13. Murtha says it's more than \$10M in R&D for every patent.

²¹ 2000 Intellectual Property Metrics, *supra* at 13.

²² Patents can't be worth more than their underlying costs because that'd be creating something out of nothing. More precisely, if ever there were a time when each patent (which costs about \$20K to get) was worth more than \$4.26 million (price), then filings would increase dramatically (supply) until the value of patents decreased to the point that they reflected their actual cost.

²³ Levin et al, *supra*; Cohen, Nelson and Walsh, *supra*

²⁴ Derived by comparing EPO application filing data with USPTO application filing data: In 1997, about 20,400 applications were filed by Americans in the EPO and about 130,000 were filed by Americans in the USPTO. (The other 102,000 U.S. applications were filed by foreign applicants). Assuming that all applications filed in the EPO by Americans are also filed in the USPTO as U.S. applications, then at least 16 percent of U.S. applications (20,400/130,000=.16) have corresponding applications abroad.

²⁵ Jean O. Lanjouw and Mark Schankerman, Characteristics of Patent Litigation: A Window on Competition, p.3 Working Paper (March 2000).

²⁶ She confirmed this interpretation (not the R&D numbers). Lanjouw, Personal Email Communication (April 13, 2001).

²⁷ Office of PTO, Quinn, *supra*.

²⁸ Ted O'Donoghue, Suzanne Scotchmer and Jacques-Francois Thisse, Patent Breadth, Patent Life and the Pace of Technological Progress, 7 *J. Econ. & Mngmt. Strategy* 2 (No. 1, Spring 1998); Samson Vermont, Patent Math as Experienced Through a Cost-Benefit Analysis of Reacting to *Festo*, *Patent Strategy & Management* (Jan. 2001).

²⁹ See also Jin-Li Hu and Reiko Aoki, Time Factors of Patent Litigation and Licensing, Working Paper (2000).

³⁰ Jean O. Lanjouw, Patent Protection: of what value and for how long? NBER Working Paper No. 4475 (NBER 1993).

³¹ See Dietmar Harhoff, Frederic M. Scherer and Katrin Vopel, Exploring the Tail of Patented Invention Value Distributions, Discussion Paper (Social Science Research Center 1997).

³² Searches by the EPO are superior to searches by U.S. examiners, and it may be advisable to commission a search there before filing in the U.S. because changes made after filing result in reduced claim scope.

³³ For technical legal reasons stemming from *Festo Corp. v. Shoketsu*, arguably at least 10 of those claims should be "independent," a term of art for a claim that stands alone in a patent application and for which the Patent Office charges extra if you exceed three in one application.

³⁴ Levin et al, *supra*. See also Arora, Ceccagnoli and Cohen, *supra*; Lemley, Who's Patenting, *supra* at 2125-2132.

³⁵ Ellen Licking, John Carey and Jim Kerstetter, Bioinformatics, 50 *The Business Week* 167 (Spring 2001).

³⁶ AIPLA 1999, *supra*.

³⁷ Jean O. Lanjouw and Mark Schankerman, Stylized Facts of Patent Litigation: value, scope and ownership, NBER Working Paper No. 6297 (NBER 1997); Lanjouw and Schankerman, Window, *supra*; Josh Lerner, Patenting in the Shadow of Competitors, 38 *J. Law & Econ.* 463 (Oct. 1995).

³⁸ Lemley and Allison, Who's Patenting, *supra* 2125-2127.