The Patent Ecosystem in IT: Business Practice and Arbitrage

Brian Kahin, Senior Fellow
Computer & Communications Industry Association[1]

> "Patents are not Nobel or Pulitzer prizes! They are not for exceptional inventors but for average inventors and should not be made hard to get…. Why must an invention be a commercially hot number to be patentable? If it is a total dud, how is the public injured by a patent on it? A monopoly on something nobody wants is pretty much of a nullity. That is one of the beauties of the patent system. The reward is measured automatically by the popularity of the contribution."
>
> Giles S. Rich, The Principles of Patentability, 28 Geo. Wash. L. Rev. 393, 407 (1960), reprinted in John Witherspoon, ed., *Non-Obviousness: The Ultimate Condition of Patentability*, at 2:1, 8 (BNA 1980).

Judge Rich was the co-author of the 1952 Act and the dean of Federal Circuit jurisprudence that pushed the patent system to its limits along many dimensions. Under his view, there is no harm in giving out patents freely, because patents are only assets that may or may not be of value. There is no downside to making patents easier to enforce, easier to get, more plentiful, more powerful, and harder to invalidate. The system takes care of itself because it is no more than an aggregation of self-limiting patents.

Judge Rich had in mind the market for the discrete "productized patent" – the "better mousetrap." This rough correspondence between patent and product is not that far from reality in certain sectors, including pharmaceuticals, the sector where patents are most important to the basic business model. However, it does not fit the complex IT product, with its thousands of patentable functions and components, layers of overlapping functionality, and, in the case of software, widely distributed independent innovation with low barriers to participation.

One great achievement of the 2003 FTC report, *To Promote Innovation*, was to show – for the first time in an official document – how (and to some extent, why) the system

[1] Based on testimony provided at December 5, 2008 hearing ("Developing Business Models" panel).

worked differently in different sectors as a matter of practical economics. This aspect of the report has been validated by the unprecedented inter-industry division over patent reform, as well as in the empirical evidence assembled by James Bessen and Michael Meurer in *Patent Failure*.[2] These developments reveal the growing gulf between process and results -- between the one-size-fits-all laws and the economic outcomes that the system is intended to promote.

The 2003 FTC report stands out as a landmark effort to bridge the gap between law and economics – rather than assuming the traditional article of faith that law inevitably leads to the right economic result. As Recommendation 10 reads, "*Expand Consideration of Economic Learning and Competition Policy Concerns in Patent Law Decisionmaking.*"[3]

The disconnect between the legal process and economic consequences of the patent system is due in part to the lack of information on how patents (or rather portfolios of patents) are used and experienced in the real world of business. We know little about what happens to patents after they go out the door. Only a very small number end up in litigation – in part because litigation is prohibitively costly and uncertain. Information about business practices is anecdotal, subjective, and fragmented, leaving this critical level of analysis missing because we lack coherent data.

(continued next page)

What is missing is the "meso" level in this framework for analyzing patent policy:

[2] Princeton University Press (2008).

[3] AIPLA's apoplectic reaction to Recommendation 10 made it all too apparent how great the gulf is. See http://www.aipla.org/Content/ContentGroups/Issues_and_Advocacy/Comments2/Patent_and_Trademark_Office/2004/ResponseToFTC.pdf

levels of analysis

1 -- micro	individual patent	law
2 -- meso	**portfolios, (cross-) licensing, pools, markets, trolls**	**business practice**
3 -- macro	System-level effects, aggregate private benefits vs private costs	economics
4 -- meta	relationship to other innovation models, means of appropriating returns	innovation economics

Note that the diagram includes a "meta" level as part of the overall patent ecology: how the patent system interacts with other innovation models and incentives. As the well-known 1994-95 Carnegie-Mellon survey shows,[4] there are other means for appropriating returns from innovation, and patents are not the most important in most industries. In addition, standards development plays an important complementary role in promoting innovation in IT. More recently, open source development has become an important innovation model for software. These practices need to be considered alongside patents, especially since we know that they interact with patents in problematic ways.

Keeping these levels in mind is important because it is not possible to opt out of the patent system, even if a company believes that patents are counterproductive in its field of technology.[5] While the researchers question the net benefits and costs of the patent system for certain sectors, patents, even bad patents, always have some value and are therefore worth having. In fact, trivial patents may be more valuable than one might think, because they can be used to extract modest settlements from a large of number of inadvertent infringers. The more trivial the patent, the greater the likely number of

[4] *See* footnote 8, *infra*.

[5] The problem of keeping the different levels straight is illustrated by an early New York Times report on Bessen and Meurer's research. The article's title, "A Patent is Worth Having, Right? Well, Maybe Not," confuses the researchers' system-level "macro" analysis with desirability from a business perspective ("meso"). http://www.nytimes.com/2007/07/15/business/yourmoney/15proto.html?scp=1&sq=bessen%20meurer&st=cse

infringers and the greater the free rider problem in invalidating the patent.[6]

The disconnect between legal process and economic results has worsened in the past five years, as the notion that patents serve as adjunct protection for technological assets has been left in the dust. Patents, divorced from the technology they represent, are used in increasingly diverse and creative ways as legal instruments that have value separate from the technology they represent. While the value of the patent is often confused with the value of the underlying technology,[7] the two are separate and have become increasingly divorced in practice. A patent is only a negative right to exclude others – an option to litigate, rather than a right to practice the technology. Although options to litigate may be assets, they also represent liabilities for others.

A cottage industry has grown up over the past ten years to help patent owners "extract value" from patents as assets distinct from the value of the underlying technology. Once liberated from the nominal ideal of protecting technology against imitators, patents become versatile instruments that can be used in a great variety of ways. The Carnegie-Mellon survey shows some of these business uses, although it still shows protection against copying to be the most common use:[8]

- measure performance 8%
- licensing revenue 29.5%
- for use in negotiations 55%
- prevent suits 72%
- **prevent copying 99%**
- patent blocking 80% [two different senses][9]

[6] *I.e.*, the company that steps forward to invalidate the patent creates a benefit for all that are threatened by the patent, but bears the full costs of invalidation.

[7] Remarkably, the European PatVal surveys do precisely that, valuing patents by asking inventors for the value of their patented invention so as to necessarily include the value of the underlying technology as well as the premium added by patent protection.

[8] W.M. Cohen, A. Goto, A. Nagata, R.R. Nelson & J.P. Walsh, "R&D Spillovers, Patents and the Incentive to Innovate in Japan and the United States," Research Policy, Vol. 31, Nos. 8-9, December, 2002, pp. 1349-1367.

[9] This was apparently realized after the survey. "Blocking" can mean preempting others from patenting, as can also be done with defensive disclosure. Or it may mean surrounding a rival's patent with improvement patents that constrain the rival's freedom of action and perhaps

- enhance reputation 37%

The survey was directed to R&D managers at manufacturing firms and speaks primarily to the use of patents toward competitors, so it may reflect a less strategic perspective than had it been directed to lawyers.

Despite the fact that the Carnegie-Mellon study was in many respects a follow-on to similar surveys conducted by Harvey Mansfield in the 1970s and Richard Levin in the 1980s, no similar survey has been undertaken in the 14 years since. This failure is especially unfortunate given the increased scope and presence of the patent system, including the shift to intangible subject matter and the proliferation of uses outside the paradigmatic protection against imitation. Many of the latter were missing or inadequately addressed in the Carnegie-Mellon survey. These include:

- inhibit market entry with portfolios
- hold up complex products with individual patents
- ambush standards with individual patents
- exploit imbalance in litigation resources
- exploit high cost of investigating patent validity and infringement[10]
- portfolio evergreening
- instill uncertainty in competitors' customers[11]
- collusive settlements (suppress prior art, transfer patents)[12]
- use of portfolios to defeat exclusive rights[13]

---

force cross-licensing.

[10] According to AIPLA figures, the cost of a validity and infringement opinion together exceeds $20,000, so that a rational accused infringer would be willing to license the patent for $10,000 to avoid the greater cost of assessing its position.

[11] *See, e.g.*, Microsoft's nonspecific claims that Linux violates a number of Microsoft patents.

[12] While the FTC has been concerned with collusive settlements that delay the entry of generics into drug markets, there are a variety of arrangements that can impose social costs separate from the interests of the parties. Suppression of prior art is one example; another is the transfer of patents from a firm's defensive portfolio to an NPE better positioned to extract value from others.

[13] The value of individual patents owned by start-ups is diminished by the need to access

- use of RAND licensing to extract cross-licenses[14]
- temporary assignments (both offensive and defensive)[15]
- assignments out of portfolios for surrogate attacks
- situational assertions (IPOs, product launches)
- track and capture standards under development

While some of these practices involve uses of manufacturers' portfolios, many reflect the growing presence and strategic behavior of non-practicing entities specializing in patent assertions. Some of these practices are directed to mere implementers and users, who may have little or no reason to be aware of patents that may be asserted against them. All these uses have incentive effects – *i.e.*, they add to the perceived value of patents, but they generally go beyond the ex ante value that the patents would have in transparent markets. They also have effects on competition that are not part of the traditional policy rationale for patents, such as making it harder for small entities to compete in markets for complex products.

Most of this is unreported private behavior, so it is very difficult to get a fix on how common these overlapping practices are. However, there are two divergent motivations.

One is the established practice of cross-licensing portfolios to achieve "freedom of action." The other is the "value extraction" that is increasingly in evidence as specialists becoming adept at using patents to extract value in the form of licensing income.

The two motivations can overlap, especially for portfolio owning producers, but they reflect the tension between product orientation and patent orientation, and they work to pull patent value in opposite directions.

---

the portfolios of incumbents.

[14] Unlike formal pools that license to all comers on disclosed terms, RAND licensing of patents essential to a standard is negotiated privately, a situation that gives the patent holder the flexibility and leverage to extract cross-licenses from smaller players.

[15] Temporal slicing of patent rights provides expanded opportunities to maximize the use of individual patents – whether by trolls or as a counterclaim in litigation (*e.g.*, IBM's sale of patents to Barracuda Networks to help it defend against a patent attack by Trend Micro).

Portfolio cross licensing allows major producers to, in effect, opt out of the patent system with respect to each other and to compete at the product level. Market-based expectations about competition and pricing of commodity components were set decades ago when there was little patenting of abstract functionality in software and semiconductors – in part because patents could be designed around easily, in part because of the early culture of the industry, and in part because of the cost and uncertainty of patent protection for abstract functionality. Encouraged by scale economies and network effects, products were priced low and were constantly competed to lower levels as both technology and the scope of the market advanced. In this context individual patents were generally not worth much but their value could be aggregated in large portfolios that could be held in reserve for defense and cross-licensed to other major producers in return for access to their patented technology. *Freedom of action* is critical for producing firms because of the hugely disruptive power of patents. Fortunately, this freedom could be had largely for barter (cross-licensing) rather than hard cash.[16]

Thanks to cross-licensing, as the number of patents per product grew, there was little effect on costs to manufacturers, in effect, further diluting the value of individual patents. As long as patenting remained commensurate with the scope of product sales, firms could treat each other as peers and swap nonexclusive rights to their portfolios.[17] At the same time, the scale of portfolio practice operates as a barrier to entry to product markets for new firms. While individual patents might still enable start-ups to enter certain niches in technology markets, the presence of large portfolios would naturally inhibit growth into

[16] Cross-licensing presents a major unresolved problems in valuing intangibles. Is value imputed to licenses flowing both directions – or only to net (balancing) payments? The large (BEA) figures cited for international transactions included imputed value in both direction. However, IRS regulations only require reporting of any cash payments received. Carol A. Robbins, "Measuring Payments for the Supply and Use of Intellectual Property," pp 15-17, available at http://www.nber.org/books_in_progress/criws06/robbins5-21-08.pdf

[17] In principle, as Dan McCurdy has put it, net users pay net innovators. More precisely, the current value of the cross-license is the scope of the accessed portfolio times the size of the user company's product market. So a large producer could swap rights of access to its large portfolio with a small producer with a small portfolio without the need for balancing payments. However, the larger company will have superior bargaining power (in part because it can better manage the costs of patent practice) and can argue that the larger portfolio offers the smaller company the *potential* for a larger range of products.

product markets. Instead, it encouraged startups to sell out to large firms that had the cross-licenses, capital, and complementary resources needed to create and market products.

However, the number and value of individual patents outside of portfolios grew as new uses emerged and companies looked outward to suppliers of components and R&D. At the same time, the complexity and opacity of the patent environment in IT grew. This was partly because of the increasing functional complexity of IT products, but also because of Federal Circuit jurisprudence that made patents easy to get, harder to invalidate, more powerful, and available for increasingly abstract subject matter. These developments reached an apogee with the *State Street* decision (authored by Judge Rich in 1998) and in the customer friendly ("help customers get patents") mission adopted by the PTO in the late 1990s.

By opacity, I mean generalized information failure, and this inevitably leads to information asymmetry – and arbitrage. This process is fed by high information costs and pervasive uncertainty, including:

- indeterminacy of claims construction (especially for abstract subject matter)
- the nature of the *ex parte* process, especially the
- secrecy of contemplated and filed applications before publication

- amendments of scope after publication, especially in continuations

- tension between enabling information (written description) and disabling information (claims)
- high cost of validity and infringement opinions

- practical impossibility of clearance searching for complex products

- free rider problem in invalidating low-quality patents

- low enablement standard in software and business method patents
- liability for willful infringement inhibits reading patents (even after *Seagate*)

- "thickets" – deliberate and *de facto*
- lack of information on assignments and licenses

- settlements leaving dubious patents standing and legal issues unresolved

- disincentives to share prior art information created by enhanced presumption of validity

- ambiguity surrounding obviousness

The 2002 hearings were especially useful in bringing many factors behind the opacity problem out on the table. In one of those most revealing moments, Frederick Telecky of Texas Instruments argued against disclosing TI's patents in the context of standards setting:

> "TI has something like 8000 patents in the United States that are active patents, and for us to know what's in that portfolio, we think, is just a mind-boggling, budget-busting exercise to try to figure that out with any degree of accuracy at all."

This may be self-serving in the standards context, but consider how much more difficult it is to know what's in the hundreds of thousands of patents that belong to somebody else. Especially for a small company that lacks the knowledge management capacities of a Texas Instruments. It explains why portfolio cross-licenses are negotiated en masse rather than trying to evaluate and calculate the specific value of thousands of individual patents. Cross-licensing enables the parties not only to opt out of the exclusivity that the patent system provides but to opt out of much of the cost of evaluating patents.

More recently, Bessen and Meurer emphasize "notice failure" as the principal reason that patents fail as property under their cost-benefit framework. Mark Lemley has written a

number of incisive articles on information failure in the patent system: *Probabilistic Patents* (with Carl Shapiro),[18] *Ignoring Patents*,[19] and *Copying in Patent Law* (showing very little evidence of copying; with Christopher Cotropia).[20] As Lemley describes it, component industries like IT have learned to live with these deficiencies by ignoring patents:

> [B]oth researchers and companies in component industries simply ignore patents. Virtually everyone does it. They do it at all stages of endeavor. From the perspective of an outsider to the patent system, this is a remarkable fact. And yet it may be what prevents the patent system from crushing innovation in component industries like IT.[21]

While litigation is costly and risky, the discounted costs are less than the aggregate costs of searching. The equilibrium in IT is to avoid rigorous product clearances, accepting infringement as a necessary cost of doing business, and working to make the inevitable settlement and litigation less costly. The different equilibria in practice lead to different approaches to policy – and explain why the system appears "broken." It really has become two systems: one centered in pharmaceuticals and biotech where there is genuine tech transfer with licensing – and the other centered in IT and services where much licensing is either in bulk or after the fact.

Context-driven Arbitrage

Information failure means information asymmetry which leads to arbitrage. But patent arbitrage is also driven by context-dependent differences in value. Patents are simply more valuable when they can be asserted without fear of counterclaims. And under Coase's theorem, private trade will lead to a reallocation of rights to those who value them most – as reflected in the "highest and best use" standard in real estate appraisal.

---

[18] Journal of Economic Perspectives, Vol. 19, No. 2, Spring 2005, 75-98, http://faculty.haas.berkeley.edu/shapiro/patents.pdf

[19] Michigan State Law Review, Vol. 2008, No. 19, 2008. Available at SSRN: http://ssrn.com/abstract=999961

[20] Stanford Public Law Working Paper No. 1270160. Available at SSRN: http://ssrn.com/abstract=1270160

[21] Abstract for *Ignoring Patents*, note 19, *supra*.

To be sure, there are transaction costs in getting there, but that is where the incentives for arbitrage come in. Migration of value from the tangible economy of products to the intangible economy of litigation options is pulled along both by opportunities for arbitrage and the efficiencies of specialization. A business model of "being infringed" will pay close attention to what patents mean and who is infringing them.[22] And it will lie in wait until the victim is deeply and irreversibly invested and unable to escape.

There are other models for context-related arbitrage. IBM recently assigned patents to Barracuda Networks, an open-source company facing a patent infringement lawsuit by Trend Micro. These patents enabled Barracuda to counterclaim against Trend Micro, often an effective defense in convincing producing companies to settle.[23]

But the big money lies in moving patents from producer portfolios to those who specialize in "being infringed." The more infringed, the more valuable the patent. Hence the tremendous incentive to assert patents inadvertently incorporated in industry standards – and to wait to sue until the standards are embedded industry-wide in mass-marketed products. Hence also, the growing temptation to release patents from portfolios to those who can make "better" use of them by evading the original owner's constraints and commitments, attacking the original owner's rivals, instilling fear in the marketplace, and extracting the maximum possible return without fear of counterclaims or adverse publicity.

It is the greatest of ironies that a patent system intended to promote public disclosure has become so shrouded in secrecy and uncertainty that it threatens to undermine markets for tangible products. In part, this happens because patent applicants and patent owners are allowed to exploit secrecy without accounting for the burden it imposes on innovators, competitors, and the market. Thanks to a jurisprudence that indulges patent applicants, the patent incentive includes the privilege of hiding patent information from productive

[22] *See* Markus G. Reitzig, Joachim Henkel, and Christopher Heath, On Sharks, Trolls, and Other Patent Animals - 'Being Infringed' as a Normatively Induced Innovation Exploitation Strategy. Available at SSRN: http://ssrn.com/abstract=885914

[23] http://arstechnica.com/news.ars/post/20080702-barracuda-bites-back-at-trend-micro-in-clamav-patent-lawsuit.html

businesses that make huge investments in all phases of innovation – design, integration, production, distribution, and marketing. As a result, an instrument designed to protect against imitators has turned into a license for a wide range of undocumented and unregulated private behavior, backed by the force of law. A vehicle for promoting innovation has created an open season for distributed private regulation, operating by stealth in a dense fog of deficient information.

The opacity of patent markets may remind some of credit default swaps, but unlike credit default swaps, patents are not privately created instruments. These are rights created by public grant. Patents should come with an obligation of accountability and public disclosure, disclosing not only the technology behind the individual patent, but also how the patent is used in business, and how that use works to promote innovation and economic well-being.