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WHY DO START-UPS PATENT?

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ABSTRACT

Numerous scholars have proposed many different explanations for why inventors and innovative companies patent. Few scholars, however, have conducted empirical studies seeking to confirm or deny these theories. Furthermore, there are only a handful of studies examining how entrepreneurs and start-up companies use and are affected by the U.S. patent system, and none answers the question presented in our title.

We first briefly survey the dominant theories of why innovators file for patents and why they forgo patenting, focusing on how well, if at all, these theories apply to start-up companies. Next, we examine the existing empirical data on the topic and find it generally inconclusive.

Last, we describe the 2008 Berkeley Patent Survey, the first survey in the United States examining patents and entrepreneurship, which is currently underway at the direction of the authors and other investigators. In particular, we discuss the survey questions designed to answer why entrepreneurs and start-ups patent (or choose not to do so) and offer some hypotheses based on previous research.

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I. INTRODUCTION: THE PUZZLE OF PATENTS

The standard theory explaining why inventors or their employers file for patents assumes that patentees generate greater-than-average returns on the patented products they sell by preventing others from making, using, and selling those products.¹ According to this theory, society benefits because these supernormal returns compensate for a market defect—namely, that the copying and selling of innovative products by competitors can often be achieved cheaply and easily, which can sub-optimally stymie innovation. Introducing patents and attendant liability for infringement makes this copying by others costly. The patent system thereby promotes a more optimal level of innovation by providing incentives to inventors to invent, market, and sell innovative products, and to disclose the knowledge underlying those innovations in the form of published patent documents.

The reality is, however, much more complicated. In fact, there are at least ten other bases commonly used to explain why patentees file for patents, and there has been no consensus on which of them are the primary drivers of patenting. First, some patentees don't sell any products. Viewed in a favorable light, these non-practicing entity ("NPE") patentees solve a market failure by providing technology to other entities in a better position to use it. In such an ideal world, NPE patentees license their patents and related know-how to non-innovators who possess the manufacturing capacity or market channels to manufacture and sell a patented product or to use a patented process to realize efficiencies. Of course, the world of patent law (like other worlds of law) is not so ideal, and some NPE patentees use their patents as a proverbial club, effectively taxing those companies who were clever enough to have invented the product or process but not quick enough to have patented it.² The NPE patentee can use the patent to stage a hold-up, forcing royalty payments from those using the patented technology. Some scholars and much of the media call these types of patentees—rightly or wrongly, depending on one's take—"patent trolls."³

¹ More specifically, patents can also cover methods, processes, and services. See 35 U.S.C. § 101 (2000). The reference to "products" in the text is illustrative.

² Furthermore, a patent covering any component of a product typically leads to damages that are calculated from sales of the *entire product*, and often leads to an injunction that prevents the manufacture and sale of the *entire product*. See, e.g., *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1580 (Fed. Cir. 1989); *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 900-01 (Fed. Cir. 1986); Amy L. Landers, *Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law*, 46 SANTA CLARA L. REV. 307, 354-62 (2005) (describing the current use of the "entire market value" rule).

³ See, e.g., Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2009 (2007) (arguing that awarding "patent trolls" injunctive remedies distorts the economic purpose of the patent system); John M. Golden, Commentary, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111 (2007) (criticizing Lemley and Shapiro's theoretical model, empirical data, and policy recommendations); Steven Levy, *Changes in Patents May Be Pending*, NEWSWEEK, March 12, 2007, at 19; Joe Nocera, *Tired of Trolls, A Feisty Chief Fights Back*, N.Y. TIMES, Sep. 16, 2006, at C1; Tracey Steiner & Stephen Guth, *Beware Patent Trolls*, MGMT. Q., Sep. 22, 2005, at 38.

Second, many companies acquire patents for what they claim are merely “defensive” reasons. Far from using patents offensively to stop others from making or selling their products, these companies view patents as necessary evils that shield others from suing them for patent infringement.⁴ If a plaintiff sells products, an accused infringer can file a counterclaim accusing the plaintiff of infringing any of its patents that plausibly encompass those products. Any such game of “mutually assured destruction” raises the likelihood of a timely settlement or, if the defendant is known for countersuing, a settlement prior to the suit being filed. In reality, most companies do not exclusively use patents defensively; it is but one of many motivations to acquire patents.⁵

Third, some patentees, often large companies, acquire patents as bargaining chips in cross-licensing negotiations with their competitors. For instance, the major players in the hard disk drive industry, after some initial skirmishes, found a mechanism to avoid suing one another for patent infringement: they cross-licensed each other’s entire patent portfolio, thereby allowing each to practice any of the other companies’ patents.⁶ When cross-licensing agreements come up for renewal, companies will commonly count the number of patents they hold, and demand royalty payments from other companies that have fewer patents.⁷ The upshot is that the companies with the most patents demand a tax from the others.⁸ Accordingly, there are strong incentives for companies to engage in a sort of patent arms race, with companies continuously filing for patents to ensure that they are not forced to pay for their cross-licenses. Moreover, firms that allow their patent numbers to shrink relative to their competitors may actually be kicked out of the cross-

⁴ According to a general counsel of a major software publishing company:

Software companies tend to be either offensive or defensive in their use of patents, generally not both. . . . [Patents] are not a particularly valuable asset for our company—they’ve been nothing but trouble. . . . [But] that’s not to say that patents are useless: We are now, all of us [the software companies], accumulating patents for defensive purposes.

Interview with anonymous general counsel of a major packaged-software firm, one of the top performers in the industry by revenue from 1995 to present, in Cal. (Nov. 20, 2004).

⁵ In fact, none of the reasons for patenting we provide herein are mutually exclusive, and more than one will typically play a role in an inventor’s or company’s decision to file. For instance, Microsoft patents for a number of different offensive and defensive reasons. See *infra* note 10; Andrew Orłowski, *Microsoft Aiming IBM-Scale Patent Program at Linux?*, THE REGISTER, Dec. 8, 2003, http://www.theregister.co.uk/2003/12/08/microsoft_aiming_ibmscale_patent_program.

⁶ See *Samsung, Hitachi Sign License Deal on Hard Drives*, REUTERS, Dec. 21, 2007, <http://www.reuters.com/article/technologyNews/idUSSEO20627720071221>; *Quantum Corporation and Fujitsu Limited Complete Patent Cross-License Agreement*, BUS. WIRE, Oct. 13, 1999; *Seagate and Read-Rite Forge Patent Cross-Licensing Agreement*, BUS. WIRE, Apr. 18, 1995 (describing Seagate’s strategy of cross-licensing patent portfolios with Read-Rite, IBM, Quantum, Western Digital, Maxtor, NEC, Hitachi, Toshiba and others); *Seagate/Toshiba Cross-License, Criticize Patent Fights*, NEWSBYTES, Apr. 20, 1994; *Hard Disk Drive Leaders Announce Broad Patent Cross-Licensing Agreement*, BUS. WIRE, July 13, 1992.

⁷ In this regard, the value of individual patents arguably increases when part of a large portfolio. See Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 31-43 (2005).

⁸ See *id.* at 30-31; Lemley & Shapiro, *supra* note 3; Rajiv P. Patel, *Patent Portfolio Strategy for Start-Up Companies: A Primer*, PAT. STRATEGY & MGMT., Nov. 2002, at 1.

licensing cohort, and thereby become subject to the threat of patent infringement actions in court with their attendant costs.⁹ Perhaps it is not a coincidence that of the twenty companies with the highest number of patents issued in 2007, many are part of vast cross-licensing networks that span multiple technology fields.¹⁰

Fourth, some patentees do not consider patents useful for increasing revenues or avoiding costs but do believe that having them improves their chances of securing investment.¹¹ One explanation is that there are “information asymmetries”; in particular, either the patentee or the investor knows something the other does not. One species of this argument is that one of the parties is mistaken: either the investor mistakenly believes that patents are useful to the patentee’s business or the patentee doesn’t realize that patents are in fact useful to its business. The reality may be a bit muddier—the investor could merely overestimate, and the patentee merely underestimate, the value of patents to the business. Another related possibility is that investors use patents as a signal or proxy for hard-to-measure capabilities and assets in the company. For instance, investors might view a company’s securing fifty nanotechnology patents as a mark of its mastery of cutting-edge technology.¹²

The fifth reason is similar to the fourth: some patentees file for patents simply to improve their chances of being acquired, take their company public in an initial public offering (IPO), or just to increase the value of their assets in bankruptcy.¹³ Like the

⁹ Based on the experience of one of the authors, usually these sorts of cross-licensing breakdowns are short-term strategic moves, often coupled with litigation, by dominant players in the cohort to extract greater monetary or other benefits from a less powerful competitor.

¹⁰ See Press Release, IFI Patent Intelligence, IFI Patent Intelligence Announces 2007’s Top U.S. Patent Assignees (Jan. 14, 2008), available at <http://www.ificlaims.com/IFI%20Patent%20Release%201-9-08.htm> (listing the top 50 patenters). Cross-licensing Deals: Google Search, <http://www.google.com/search?source=ig&hl=en&rlz=&=&q=cross-licensing+deals&btnG=Google+Search> (current through March 29, 2008); see also Ina Fried, *Microsoft—License to Deal*, CNET NEWS.COM, Nov. 8, 2004, http://www.news.com/Microsoft--license-to-deal/2100-1012_3-5440881.html (first hit in Google search reporting that David Kaefer, Microsoft’s director of intellectual property licensing, believed that if Microsoft was “able to strike cross-licensing deals with the top 30 technology companies, that alone would provide us access to a vast majority of the patents in areas we care about,” and noting that Microsoft had boosted its filing to rate to “3,000 applications” in 2004). A print-out of the Google search results is available from the authors.

¹¹ See, e.g., Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-ups* (U. of Tex. Sch. of L., UT L. & Econ. Research Paper No. 057, 2006), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=802806 (finding a significant correlation between patenting activity and total financing as well as the number of rounds of financing, but acknowledging that they could not determine whether increased patenting caused increased financing).

¹² See generally Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625 (2002).

¹³ For instance, an unpublished study of Rosemary Ziedonis and others finds that increased patenting by target companies is significantly correlated with higher amounts paid by acquirers. See Joyce E. Cutler, *Patent Filing: Is it a Predictor of Survival?*, Patent, Trademark & Copyright Law Daily (BNA), No. 48 (Mar. 12, 2008); see also Gregory L. Alexander, *Don’t Overlook Patent Damages*, 16-6 AM. BANKR. INST. J. 26 (1997) (“One of the most valuable claims a bankruptcy estate may have is the right to enforce a patent.”).

patentees who acquire patents to secure investment, although these patentees may know *what's* good for them, they don't always know *why*.

Sixth, some companies use patents to bully their competitors, either to drive up their competitors' costs, to gain access to their technology, or to push them out of the market. One might argue that this sort of behavior falls under the rubric of boosting profits by preventing others from practicing the patent. In an ideal world, where all issued patents are valid and enforceable, and infringement is clearly identifiable, it would be easier to make such a case. But patent litigation is uncertain, costly, and takes a long-time to resolve. Thus, patentees with weak patents are able to exploit the patent system by suing, or even by simply threatening to sue, their competitors. Because the costs and risks of defending a patent suit can be high, even if the accused infringer believes it will likely win the infringement suit, the patentee is typically able to force a nuisance-value settlement.¹⁴ Thus, like the non-practicing entities out to generate licensing revenue by using their patents as a club, these "patent bullies" use their patents to beat their competitors into submission or sometimes into oblivion.¹⁵

Seventh, some patentees acquire patents on their inventions to preempt competitors from acquiring patents on the same inventions and later turning around and suing them. This preemptive strategy is possible because patents trump trade secrets. Suppose, for instance, that a would-be patentee Secret Co. invents a new manufacturing process but decides to keep it as a trade secret. Six months later, Public Co. independently invents the same manufacturing process, and files for a patent which is granted two years later. Public Co. later discovers Secret Co.'s use of the process by reverse engineering its products.¹⁶ Other than a few exceptions that fall under the "prior use" exemption to patent infringement,¹⁷ Public Co. can then sue Secret Co. for patent infringement—even though Secret Co. actually invented the manufacturing process first. One can imagine that the next time Secret Co. invents a new process (or product) that it could keep as a trade secret, it will weigh in the balance whether it might be sued for patent infringement on its own invention. If the risks are great enough, it may decide that suffering the costs of filing for a patent to preempt others from patenting its invention is in its interests.

¹⁴ See S. COMM. ON THE JUDICIARY, REVIEW OF THE AMERICAN PATENT SYSTEM, S. REP. NO. 84-1464, at 5 (1956) ("[Patents] have a high nuisance value in the hands of large corporate owners, since they can wreak financial havoc upon smaller competitors by infringement suits, even though the ultimate judgment is in favor of the infringer."); Kimberly A. Moore, *Populism and Patents*, 82 N.Y.U. L. REV. 69, 90-91 (2007) ("[L]arge corporations may file nuisance suits against smaller defendants because smaller defendants cannot afford to litigate and thus are likely to settle quickly, regardless of the merits.").

¹⁵ See Ted Sichelman, Patent Bullies: How Industry Incumbents Abuse the Patent System (Jul. 22, 2008) (unpublished manuscript, copy on file with authors).

¹⁶ See, e.g., *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 475-76 (1974) (noting that reverse engineering is a legitimate means of discovering a trade secret).

¹⁷ See 35 U.S.C. § 273(b) (2000) (limiting the "prior use" exemption to business methods reduced to practice at least one year before the effective filing date of the patent and commercially used before the effective filing date of the patent).

Eighth, in a strategy almost the reverse of preempting others from patenting one's own invention, a company can focus its inventive efforts on patenting essential or improved components of *patented* products sold by others.¹⁸ This “blocking patents” phenomenon occurs because patent law provides no right to practice one's patent, only a right to exclude others from practicing the patent.¹⁹ Suppose that a patentee, Chip Co., invents a new and non-obvious type of microchip processor that shows a significant increase in performance over the best processor currently in the market. Chip Co. applies for a patent on the processor and it issues. However, suppose another patentee, Comm Co., holds a patent on the communications protocol necessary for microchips to communicate with the rest of the PC infrastructure. If Chip Co. wants to manufacture a PC with its microprocessor inside, it will need to secure a license from Comm Co. This is so even if Chip Co. patents a microprocessor with the communications protocol, which in some cases it might be able to do. Thus, Comm Co. can block Chip Co. from practicing its own patented invention and may later gain significant financial benefits by licensing its patents to Chip Co.²⁰

Ninth, in studies probing the realm of human psychology and market “signaling,” evidence suggests that attaching a “patented” or “patent-pending” moniker to commercials and marketing literature for products like exercise equipment or knife sets boosts sales. Apparently, even when the patent has not yet issued (e.g., a “unique patent-pending design”), consumers attach meaning or importance to the “patent” label.²¹

And, tenth, some inventors just want a patent so they can frame it and put it on the wall.²²

Yet, despite being able to list, describe, and explain all of these explanations for patenting, scholars are not quite sure which of these reasons are the primary drivers of

¹⁸ Of course, a company can do the same for unpatented products, but the ability to do so for patented products illustrates an important difference between patent and traditional property rights. *See, e.g.*, John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 456 (2004) (“The absence of . . . blocking rights . . . is generally consistent with the common law of real property, which loathes creating bilateral-monopoly problems.”).

¹⁹ *See* 35 U.S.C. § 271(a)-(c) (2000).

²⁰ *See* generally Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75 (1994).

²¹ *See, e.g.*, Pops-A-Dent: Professional Quality Dent Remover, <http://www.asseenontv.com/pages/pops-a-dent.html> (last visited Mar. 29, 2008) (“Unique patent-pending arched bridge design eliminates the chance for additional damage. Other systems without this design are known to actually add dents to the surface.”).

²² *See, e.g.*, Patent Awards, <http://www.patentawards.com/> (last visited June 25, 2008) (selling “premium” customized “Patent Plaques”). But perhaps this is the best reason, for “What profit hath a man of all his labor which he taketh under the sun?” other than “Vanity.” *Ecclesiastes* 1:2-4 (“Vanity of vanities, saith the Preacher, vanity of vanities; all is vanity. What profit hath a man of all his labour which he taketh under the sun? One generation passeth away, and another generation cometh . . .”).

patenting. Nor has anyone defined which differing characteristics of inventors, companies, technologies, and industries may make some of these explanations meaningful in some circumstances, but not in others. This lack of satisfactory understanding becomes even more pronounced when coupled with the host of reasons why inventors and companies decide *not* to patent innovations, including not wanting to disclose the innovation, the high costs of prosecuting or enforcing patents, the ease of designing around potential patents, viewing copyright or trade secrets as adequate protection, or simply being too busy to file.²³

In short, why individuals and firms patent remains mostly a mystery. Although a few scholars have attempted to answer these questions with empirical surveys and informal interviews, none of these studies has been systematic enough to provide conclusive answers. Of course, performing a comprehensive survey across multiple industries and patentees of all sizes and ages would be a monumental undertaking. On the other hand, it is possible to chip away at the mountains of data looming in the patent system's landscape.

This year, with funding from the Ewing Marion Kauffman Foundation, the Berkeley Center for Law & Technology at the University of California, Berkeley School of Law, is undertaking the first comprehensive survey of patents and entrepreneurship in the United States ("the Survey"). The authors, along with other investigators,²⁴ are administering the survey to approximately 16,000 start-up and early-stage companies in the biotech, software, and "cleantech" industries. A section of the survey asks why entrepreneurs, start-ups, and early-stage companies do (and do not) patent. We expect that the resulting data will yield significant insights, allowing us to begin to solve this important puzzle in intellectual property.

This article lays the groundwork for our inquiry into why start-ups patent, examining the theory, common observations, and existing data on the topic. We begin with a review of the dominant theories used to explain patenting, including the decision to forgo patenting, focusing on how those theories apply to start-up companies. In so doing, we catalogue common observations and anecdotes, and examine the existing empirical data on the topic, generally finding it inconclusive. Last, we describe the 2008 Berkeley Patent Survey, including a discussion of the portion designed to answer the question "Why do start-ups patent?"

II. THE DECISION TO PATENT: MANY THEORIES BUT INCONCLUSIVE DATA

In this part of the article, we review in more detail the dominant theories of why inventors decide (or not) to file for patents, and discuss the available empirical evidence supporting and rejecting those theories. In so doing, we pay particular attention to how these theories and data apply to entrepreneurs, start-ups, and early-stage companies.

²³ See *infra* Part II.B.

²⁴ These investigators include Professors Robert Merges and Pamela Samuelson, UC Berkeley School of Law, and Berkeley Center for Law & Technology Executive Director Robert Barr.

Although some robust data is available for publicly traded companies and some scattered data exists for entrepreneurial companies, we find that the empirical studies are generally inconclusive.

A. *Why Patent?*

1. Maintaining Supra-Competitive Prices

As we described in Part I, likely the most common explanation for why patentees file is to protect their ability to maintain supra-competitive prices on their products and services.²⁵ This explanation is wrapped up in the theory of intellectual property—that without strong incentives (here, supernormal profits), innovators will not innovate.²⁶ When a patentee invents a new product it plans to sell, it risks that others may copy or independently invent the product, which can diminish and even eliminate the patentee's profit.²⁷ A rational patentee will first assess the magnitude of the risk of copying, including its likelihood. If the overall risk is small to nil, then the patentee can forgo additional protection.²⁸ If the risk is not insignificant, the patentee will then weigh its options to reduce the risk. It might consider non-legal options, such as increased marketing expenditures to promote the new product. Alternatively, or in addition, it can opt for legal protection, such as trademark, copyright, trade secret or patent protection.²⁹

Of all these options, only two are exclusive—either a patentee can keep the invention as a trade secret or it must disclose it either during the application process or, at the very least, when the patent issues.³⁰ If the invention is easy to copy or reverse engineer, and the invention is accessible to competitors,³¹ then a patentee will not benefit

²⁵ See generally WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 298 (2002); W.D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE: A THEORETICAL TREATMENT OF TECHNOLOGICAL CHANGE* (1969); JOHN W. SCHLICHER, *PATENT LAW: LEGAL AND ECONOMIC PRINCIPLES* § 2.15 (2007).

²⁶ Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, reprinted in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITIES: ECONOMIC AND SOCIAL FACTORS* 609 (Richard R. Nelson ed., 1962).

²⁷ See generally LANDES & POSNER, *supra* note 25, at 294.

²⁸ On the other hand, the patentee may wish to publish its results to prevent others from patenting the invention and forcing the patentee to pay royalties on its own invention. See *infra* Part II.A.7 (discussing patenting for “preemption”).

²⁹ See, e.g., H. JACKSON KNIGHT, *PATENT STRATEGY FOR RESEARCHERS AND RESEARCH MANAGERS* 36-38 (2001) (providing advice to company managers on the use of patents, copyrights, trademarks, and trade secrets to protect innovations).

³⁰ See generally LANDES & POSNER, *supra* note 25, at 294-95. As we note below, however, in some instances a patentee may keep portions of its invention secret. See *infra* notes 110-111 and accompanying text.

³¹ An internal manufacturing process, for instance, might be easy to copy, but may not have to see the light of day, and thus be protected from prying eyes.

from trade secret protection.³² Since filing for a patent usually costs about \$20,000 including attorney's fees,³³ in this instance, companies with sufficient resources are likely to file for a patent. Interestingly, even if it is difficult to copy or reverse engineer the product, trade secret protection may not be optimal.

Although trade secret protection never expires and is relatively inexpensive,³⁴ as described in Part I, a company that maintains a trade secret risks that competitors will independently invent, enabling them to sell the same product or use the same process. In a well-functioning market, competition will tend to erode supernormal profits. Additionally, for most inventions, the competitor may actually patent the invention—and if it is able to determine that the company maintaining the trade secret is practicing it—can then sue the original inventor for patent infringement. Thus, trade secrets are often fraught with significant risk.³⁵

Patents, on the other hand, provide a strict liability claim against any third-party that makes, uses, or sells the patented product—regardless of whether the third party independently invented the product.³⁶ As such, despite their limited term, patents are often viewed by companies as an optimal form of legal protection to maintain the supra-competitive pricing of a new product. Society justifies these high prices—and their associated “dead-weight” losses in the form of reduced public consumption of the product—in the belief that in the absence of patent protection, companies would expend too little on R & D and product commercialization, because the ease of copying by others would diminish an appropriate return on investment.³⁷

Compared with large companies, start-up and early-stage technology companies arguably face a different pay-off decision when deciding whether to file a patent to maintain supra-competitive prices. First, unlike mature companies, these companies will

³² Importantly, trade secret protection does not prevent a third-party from copying or reverse engineering a product that it has legally obtained. Uniform Trade Secrets Act §§ 1-3 (1985).

³³ See, e.g., Kimberly A. Moore, *Xenophobia in American Courts*, 97 NW. U. L. REV. 1497, 1544-55 (2003).

³⁴ In this regard, the requirement of making “reasonable” efforts to maintain the secret is not usually stringent. See JAMES POOLEY, TRADE SECRETS § 4.04[2][b] (2008).

³⁵ See, e.g., MICHAEL J. LENNON, DRAFTING TECHNOLOGY PATENT LICENSE AGREEMENTS § 1.06[A] (2001), at 1-38 to 1-40 (describing the disadvantages of trade secrets relative to patents for proprietary information technology); POOLEY, *supra* note 34, § 3.01[5][c]-[d] (2008) (describing advantages of patent protection).

³⁶ There is, however, a narrow “prior use” defense for business methods. See *supra* note 17.

³⁷ Whether this belief is justified is the subject of a separate debate in the field, well beyond the scope of this article. See, e.g., FTC, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited Apr. 16, 2008); ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT (2004); NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., A PATENT SYSTEM FOR THE 21ST CENTURY (Stephen A. Merrill et al. eds., 2004).

often not have revenues to protect, which can make the value of filing for a patent seem remote.³⁸ Second, because start-up companies generally are focused on research and development—often in highly productive “brainstorming” modes—they may invent numerous products in a short period of time, only some of which will be marketable.³⁹ Third, these companies will frequently have very limited IP budgets and related resources, allowing them to file but a small number of patent applications.⁴⁰

As such, start-up companies may face more constrained decisions on whether to use patent versus trade secret protection, if the latter is available at all. Currently, the patent system eases this burden to some degree by using the date of conception of the invention, as opposed to date of patent filing, as the priority date for determining whether the patent is valid in view of so-called “prior art.”⁴¹ This approach provides the patentee—especially when coupled with the ability to file a scaled-down provisional patent application a year before having to file a full utility application—the ability to delay by a few years its decision whether to patent.⁴² Nonetheless, for very young companies with small budgets, even a few years leeway may not solve the difficulty in choosing appropriate protection. If a patentee forgoes patenting, it may see a decrease in the profits it can realize from its innovations. Ex ante, the lower profits may in course reduce the company’s rate of innovation. The extent to which start-up and early-stage companies—as well as society—are harmed by the costs of patenting is in great need of empirical study.

2. Generating Licensing Revenues

As we noted in Part I, another important reason for innovators to patent is to generate revenue in the form of licenses or damage awards in patent litigation. First, even a company that practices its patents may find that it cannot fulfill all the demand for its patented products. For instance, it may not have the know-how or skill to sell its products in foreign markets. Or, it may be prevented by another’s patent from combining

³⁸ See Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 TEX. L. REV. 961, 985 (2005) (“Because [small] firms do not yet have a product, they have no opportunity for revenues. Thus, the benefits they reap from excluding competitors are minimal at best.”).

³⁹ See, e.g., Raymond Van Dyke, *Biotech Growth in 2003: The Catalysts For Success*, WASH. BUS. J., Mar. 3, 2003, available at <http://www.washington.bizjournals.com/washington/stories/2003/03/31/focus6.html> (“[V]ery few [pharmaceutical] products show promise of being marketable and even fewer make it through the years-long approval process of the U.S. Food and Drug Administration.”).

⁴⁰ See Mann, *supra* note 38, at 982-84 (describing how start-up firms must allocate money between products and patents, and often choose less effective forms of patent protection including provisional applications in order to save money for product development).

⁴¹ See 35 U.S.C. § 102 (2000).

⁴² On the other hand, an inventor has a strong incentive to use “reasonable diligence” in reducing the invention to practice (essentially, building a prototype) after conception, as not doing so may result in a forfeiture of rights. See *id.* § 102(g). Additionally, delaying filing may prevent the start-up from disclosing or using its invention publicly, since doing so starts a one-year clock ticking to file a patent. See *id.* § 102(b).

its patented product with other features that consumers demand. In these situations, a practicing patentee will often license its patents for use in other geographic or product markets to extract value it otherwise could not. Second, and perhaps more common, a patentee will not have the resources, know-how, or desire to practice its patents.⁴³ In this regard, unlike some foreign regimes, the U.S. patent system has no “working” requirement—like a piece of farmland, the owner may work it himself, lease it out to a tenant, or allow it to lay fallow.⁴⁴

The threat of damages and, often, injunctive relief, is a proverbial club that patentees can use to extract license fees from alleged infringers. Also, because the costs of litigation are substantial⁴⁵ and the uncertainty is great,⁴⁶ alleged infringers often will pay for licenses even when they believe that they do not infringe a patent. Of course, these distortions in suit and settlement will increase license fees even when some fees are deserving.

Thus, there is a significant incentive for companies to seek a patent in order to generate license fees from third-parties that practice it. One example of a typical licensor is a company that sells products, but does not sell across all available product and geographic markets.⁴⁷ For instance, IBM generates a significant portion (\$41 billion) of its total yearly revenue (\$88 billion) from the sale of hardware and software, but generates about \$1 billion from merely licensing its patents.⁴⁸ With so much licensing

⁴³ There is a third form of licensing as well—cross-licensing—which we discuss in the next section. *See infra* Part II.A.3.

⁴⁴ *Compare, e.g.*, The Patents Act, No. 39 of 1970; India Code (1999) § 83(a) (setting forth a working requirement under Indian patent law) *with* Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176, 215 (1980) (rejecting the argument that the failure to license would result in a loss of statutory rights and noting that such a position “runs contrary to the long-settled view [under U.S. law] that the essence of a patent grant is the right to exclude others from profiting by the patented invention”).

⁴⁵ Litigating a patent case through trial costs on the order of \$3-5 million. *See* AM. INTELLECTUAL PROP. LAW ASS’N, REPORT OF THE ECONOMIC SURVEY 25–26 (2007).

⁴⁶ Arguably, uncertainty is especially high with lay juries deciding complex technological questions of fact. *See, e.g.*, Paul R. Michel, *Improving Patent Jury Trials*, in PLI’S FOURTH ANNUAL INSTITUTE FOR INTELLECTUAL PROPERTY LAW 1998, at 81 (PLI Patents, Copyrights, Trademarks & Literary Prop. Course Handbook Series No. 532, 1998) (“The very unpredictability of jury verdicts not only undermines opinion letters, but discourages license agreements and design-arounds, and multiplies litigation – with attendant costs in money, disruption and delay.”).

⁴⁷ *See* Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CALIF. L. REV. 805, 869-71 (1988) (describing that firms commonly license to peripheral competitors, new firms, and foreign companies rather than to direct competitors).

⁴⁸ *See* KEVIN G. RIVETTE & DAVID KLINE, REMBRANDTS IN THE ATTIC: UNLOCKING THE HIDDEN VALUE OF PATENTS 58 (2000) (noting IBM’s rise in patent licensing revenues from \$30 million to \$1 billion annually); Parchomovsky & Wagner, *supra* note 7, at 8 (pegging the value at \$1.5 billion annually); Bill Seubert, IBM Software Group, ThinkBIG! A peek at the zSeries/z9 platform (June 6, 2006), *available at* <http://www.cs.ipfw.edu/advisory/meetings/mtg12/IBM%20CS%20PAB%20Jun06.ppt> (slide show presentation).

revenue, perhaps it is not surprising that IBM has been issued the greatest number of U.S. patents annually since 1993.⁴⁹

Another category of licensor is the so-called “patent troll,” which roughly is a company that sells no products and performs no R & D, instead generating its revenue through licensing or damages earned in infringement suits.⁵⁰ In essence, these licensors are “patent holding companies”—a landlord of sorts that buys patents and leases them out to companies that practice them.⁵¹ In addition to buying patents, some so-called “trolls” hire engineers to sit in conference rooms and brainstorm patent applications.⁵² Over the past five years or so, these entities have significantly increased their licensing and litigation activity, in what many observers believe is an abusive fashion.⁵³

3. Developing an Arsenal for Cross-Licensing

On the other hand, patentees that have a well-stocked arsenal of patents to assert against would-be licensors are often in a strong bargaining position. The genesis of Microsoft’s march to becoming a top patenter is telling. As one practitioner recounts:

[I]n 1993 Microsoft only held 24 patents and was struggling with IBM over software licensing. When the two companies could not come to terms, IBM wielded a portfolio of over 1,000 patents as a strong-arm tactic to get Microsoft to the table. Analysts said Microsoft eventually had to ante up an estimated \$20–30 million in patent licensing fees. In the wake of this, Bill Gates told financial analysts “Our goal is to have enough patents to be able to take and exchange intellectual property with other companies.” As of October 2000, Microsoft held 1,391 patents.⁵⁴

⁴⁹ Press Release, IBM, IBM Sets Record for Most U.S. Patents Earned in One Year, Jan. 11, 2007, available at <http://www-03.ibm.com/press/us/en/pressrelease/20868.wss>.

⁵⁰ See e.g., Robert P. Merges, *Introductory Note to Brief of Amicus Curiae in eBay v. MercExchange*, 21 BERKELEY TECH. L.J. 997, 997 (2006) (noting “non-producing, non-research and development performing patent holders” are often referred to as “patent trolls”).

⁵¹ Charles Tait Graves, *The Law of Negative Knowledge: A Critique*, 15 TEX. INTELL. PROP. L.J. 387, 405 (2007); see also Peter Lattman, *Innovative Invention Company Or Giant Patent Troll?*, WALL ST. J., (Law Blog), Nov. 12, 2007, <http://blogs.wsj.com/law/2007/11/12/innovative-invention-company-or-giant-patent-troll/>.

⁵² Intellectual Ventures, *Frequently Asked Questions*, <http://www.intellectualventures.com/faq.aspx> (last visited April 15, 2008) (“How do you come up with your invention ideas? IV’s invention efforts center on “invention sessions” which are multidisciplinary brainstorming events focused on a particular set of issues and possible solutions. IV typically hosts several 1-2 day invention sessions per month.”); see also Malcolm Gladwell, *In the Air: Who Says Big Ideas are Rare?*, THE NEW YORKER, May 12, 2008, available at http://www.newyorker.com/reporting/2008/05/12/080512fa_fact_gladwell?currentPage=all (recounting in detail one of Intellectual Ventures’ invention sessions).

⁵³ See, e.g., *supra* note 3.

⁵⁴ See ANTHONY L. MIELE, *PATENT STRATEGY: THE MANAGERS GUIDE TO PROFITING FROM PATENT PORTFOLIOS* 40 (2000) (recounting the 1993 IBM-Microsoft licensing negotiations).

As of April 2008, Microsoft held 8,499 patents,⁵⁵ and has inked numerous cross-license deals⁵⁶—apparently achieving Bill Gates’s goal “to take and exchange intellectual property with other companies.”

Yet, Microsoft’s weak stance vis-à-vis IBM in 1993 is probably indicative of most start-up companies’ positions in cross-licensing negotiations. Because a start-up typically does not have the funds to build an arsenal of patents like some large incumbents, it will be at a relative disadvantage in cross-licensing deals. Thus, if a patentee spots a start-up using its patented technology and desires a license to the start-up’s patents—except in the very unlikely event that the start-up has a significant portfolio to cross-license—the start-up would presumably provide a payment (either up-front, as an on-going royalty, or both) to the patentee as part of the cross-licensing agreement. The ability of the incumbent to gain access to the start-up company’s innovative technology as part of the cross-licensing deal will add to the already strong incentives for the incumbent to build its patent arsenal and thereby keep cross-licensing costs with fellow incumbent competitors down.⁵⁷

4. Securing Investment and Financing

Maintaining supra-competitive prices, one-way licensing, and cross-licensing all generate revenue or reduce costs. Of course, another way to increase cash flow is to raise capital through financing or borrowing, and patents can play an important role here as well. First, some scholars have demonstrated that intensive patenting by acquisition targets produces upward adjustments in purchase prices.⁵⁸ Additional research suggests that similar effects push up initial public offering (IPO) share prices.⁵⁹ Second, other scholars have found that increased patenting by venture-backed companies in the software and biotech industries is significantly correlated with total investment, total

⁵⁵ This number resulted from a search for “Microsoft” as assignee on the U.S. Patent & Trademark Office’s website. See Patent Full-Text and Image Database, <http://www.uspto.gov/patft/index.html> (last visited April 7, 2008).

⁵⁶ Cross-licensing Deals: Google Search, <http://www.google.com/search?source=ig&hl=en&rlz=&=&q=cross-licensing+deals&btnG=Google+Search> (current through March 29, 2008).

⁵⁷ As we described in Part I, most of the companies that are the top patent holders in the United States are large incumbents that are highly active in cross-licensing deals. See *supra* note 10.

⁵⁸ See David Hsu & Rosemarie Ziedonis, Patents as Quality Signals for Entrepreneurial Ventures (Apr. 2007) (unpublished manuscript, on file with Mack Ctr. for Technological Innovation working paper series), available at http://elsa.berkeley.edu/~bhhall/e222spring07_files/HsuZiedonis07_PatentSignaling_abstables.pdf (finding that a doubling in the patent stock of venture-backed semiconductor companies leads to a 24% premium in market valuation).

⁵⁹ Iain M. Cockburn & Megan J. MacGarvie, *Patents, Thickets, and the Financing of Early-Stage Firms: Evidence from the Software Industry* (Nat’l Bureau of Econ. Res., Working Paper No. W13644, 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1037168.

number of financing rounds, and firm longevity, though it is unclear whether increased patenting caused, or is merely correlated with, these results.⁶⁰ Third, patents often serve as valuable hard assets, either in securing loans or by increasing a company's value upon liquidation.

One reason why patents may be valuable to securing investment and financing is that they are indicators of a company's ability to maintain supernormal profits or to reduce licensing costs. Yet, some company managers, and many in software start-ups, maintain that patents provide no specific value for their company other than merely an "optical" one for investors and other financing entities.⁶¹ On this account, although patents may have no intrinsic value for the company that owns them, they can still have an extrinsic value to outsiders estimating the company's assets or worth.

There are several explanations for this seeming paradox. Probably the most likely one is that investors, banks, lawyers, and other outsiders performing due diligence on companies have only a limited amount of time and resources to perform a valuation of assets or overall worth. Because patents can increase profitability for many companies, the outsiders incorrectly attribute some value to otherwise worthless patents held by the company. Alternatively, even if the patents cannot increase a company's profitability, they may signal to outsiders that the company is engaging in the sorts of practices that successful companies generally conduct or may serve as a proxy for internal firm resources that are otherwise difficult to quantify. For instance, the fact that a company has the wherewithal to file for patents might signal to investors that it has the "discipline and technical expertise" to "codify [otherwise] tacit knowledge," which could be viewed as a safeguard against a "brain drain" of the company's valuable know-how if key engineers were to leave.⁶² It could also be the case that managers may simply be wrong in their assessments, not realizing the value of patents that investors can objectively determine. In any event, given that the costs of eliminating information asymmetry between investors and a company are typically high, even companies for which patents are "valueless" to profitability will still retain an incentive to file.⁶³

Another possibility is that patents, even if not valuable in the hands of the current owner, might be extremely valuable in the hands of a different owner. This implicates the notion that a patent may offer residual value to investors, even if the start-up fails in its current business model. If a patent can be sold to others who are well-positioned to demand royalties or file infringement suits, it may have value quite apart from its utility to the business model of the start-up venture. So, while the patent may offer little in terms of the company's strategy for earning revenue, it may nevertheless be a valuable asset on the balance sheet in the eyes of investors and lenders.

⁶⁰ See Mann & Sager, *supra* note 11.

⁶¹ See Mann, *supra* note 38, at 995 n.172.

⁶² See *id.* at 992; see also Long, *supra* note 12.

⁶³ See Long, *supra* note 12, at 644.

5. “The Best Defense is a Good Offense”: Patents as Shields

It is a cliché of war, boxing, and football strategists that “the best defense is a good offense.”⁶⁴ Suffice it to say, this cliché is—at least in one of the authors’ experience as a litigator—bandied about almost as much in the patent arena.⁶⁵ An alleged infringer that can assert a patent as a counterclaim against a plaintiff enjoys multiple benefits. This is so even if the counter-claimant’s patent is not as strong as the plaintiff’s. First, the plaintiff will typically become subject to the threat of an injunction on its infringing products.⁶⁶ If the revenue stream of the plaintiff’s potentially infringing products is significantly greater than the revenue stream of the defendant’s, this differential in at-risk assets may compensate for the plaintiff’s threat value, even for a weak patent. Second, the counterclaim will tend to neutralize the plaintiff’s attack. For instance, legal arguments that the plaintiff might make to further its case (e.g., on the proper standard of obviousness) will typically also improve the defendant’s counterclaim case. And, the defendant will be able to use in its defensive case any legal argument the plaintiff makes in its defensive case. Third, counterclaiming imposes significant additional costs on the plaintiff. Taken together, such a “defensive” strategy of affirmatively using patents can substantially decrease the defendant’s risks and costs of litigation, leading to a more favorable outcome. Because of these benefits, patentees may file for patents to generate such a “defensive shield.”

6. Patent Bullying

Of course, in some instances, arch competitors will engage in two-way patent battles. A good example is the ongoing spat between the two wireless technology companies, Broadcom and Qualcomm.⁶⁷ When the asserted patents are strong, and the parties are battling to maintain supra-competitive prices, it seems plausible that the patent system is effectively fulfilling its role in providing appropriate *ex post* incentives to spur *ex ante* invention. However, when the patents are weak—that is, when it is very likely the defendant would be able to show on summary judgment, at trial, or by the final appeal that it does not infringe or that the asserted patents are invalid or unenforceable—the patent system may not function optimally because of the high costs and uncertainty of patent litigation.

Thus, even knowing that their patents may be weak, large companies can often exploit them in strategic fashion to prevent competition from upstarts. The story of

⁶⁴ See, e.g., Anthony H. Cordesman, *The Best Defense Is a Good Offense*, N.Y. TIMES, Dec. 27, 2004, at A17.

⁶⁵ See, e.g., Posting of Rand Bateman to IP Thoughts, *The Best Defense Is A Good Offense - Even In Patents*, Jan. 29, 2008, <http://ipthoughts.com/2008/01/29/the-best-defense-is-a-good-offense--even-in-patents.aspx>.

⁶⁶ DONALD S. CHISUM, CHISUM ON PATENTS § 20.04 (2008).

⁶⁷ See, e.g., Jonathan Sidener, *Qualcomm Says Competitors Conspiring in Patent Dispute*, SAN DIEGO UNION-TRIBUNE, Mar. 21, 2008, at C1.

Vonage is illustrative. Vonage, an early-stage company founded in 2000,⁶⁸ was one of the first providers to offer telephone services over the Internet through traditional telephones.⁶⁹ After its initial marketing blitz, Vonage had two million subscriber lines by 2006, many of which had been switched from the incumbent local and long-distance carriers, such as Verizon, AT & T, and Sprint.⁷⁰ The incumbent carriers responded by suing Vonage for patent infringement in three separate cases.⁷¹ Despite a widespread belief among industry observers that the carriers' patents were invalid or not infringed,⁷² Vonage ultimately settled all three cases for around \$200 million,⁷³ about a quarter of its annual revenue.⁷⁴ Since settling the lawsuits, Vonage's marketing expenditures have decreased and its subscriber growth has slowed, though the company has "staved off bankruptcy for the time being."⁷⁵

7. "Blocking" and "Preemptive" Patenting

To avoid fates like Vonage's, companies that otherwise see little benefit to patenting may nevertheless file for a patent merely to preempt a competitor from patenting the company's invention at a later time. Indeed, as we noted in Part I, because earlier invention is not prior art if it is "abandoned, suppressed, or concealed,"⁷⁶ the later-inventor that obtains a patent can actually claim infringement against the earlier inventor that kept the invention as a trade secret.⁷⁷

⁶⁸ See Yahoo! Finance, Profile for Vonage Holdings Corporation, <http://finance.yahoo.com/q/pr?s=VG> (last visited Aug. 15, 2008).

⁶⁹ Lev Grossman, *On the Internet, Talk Is Cheap*, TIME, Apr. 15, 2002, at 77.

⁷⁰ See Chris Williams, *Vonage: Patent Smackdown Won't Bring Shutters Down*, REGISTER, Feb. 26, 2007, http://www.theregister.co.uk/2007/02/26/vonage_defends_against_verizon. One of the authors performed legal work for Vonage in the AT&T case. All of the information provided on Vonage herein is publicly available.

⁷¹ See *id.*

⁷² See, e.g., Mike Masnick, *AT&T Joins The Party Of Jealous Telcos: Sues Vonage For Patent Infringement*, TECH DIRT, Oct. 22, 2007, <http://techdirt.com/articles/20071019/184443.shtml>.

⁷³ See Nathan Eddy, *Vonage, AT & T Agree on Patent Lawsuit Settlement*, CHANNEL WEB, Dec. 26, 2007, <http://www.crn.com/networking/205203144>.

⁷⁴ See Yahoo! Finance, Income Statement for Vonage Holdings Corporation, <http://finance.yahoo.com/q/is?s=VG&annual> (last visited Apr. 15, 2008) (Dec. 31, 2007 data).

⁷⁵ David Shabelman, *Some Hope for Vonage*, THEDEAL.COM, Nov. 9, 2007, available at Lexis-Nexis, News-All file; see also Seth Wallis-Jones, *Growth Slows But Vonage Trims Losses on Path to Profits*, GLOBAL INSIGHT, Feb. 14, 2008.

⁷⁶ 35 U.S.C. § 102(g)(2) (2000).

⁷⁷ As we noted earlier, there is a narrow exception in certain situations of "prior use" involving business methods. See *supra* note 17.

In a closely related strategy, some patentees will file follow-on “blocking” patents to prevent a competitor from benefiting from the competitor’s *own patents*.⁷⁸ A common misconception is that a patent provides an affirmative right to its holder to practice it—for instance, to sell products that fall within the scope of the patent’s claims.⁷⁹ However, patents are only “negative” rights—that is, they provide their holders with a right to exclude so as to prevent the “infringing” behavior of others. In Part I, we offered an example of Comm Co., which held a patent on a communications protocol, effectively blocking Chip Co. from selling its innovative (and patented) microprocessor. Comm Co. would hold this right to exclude regardless of whether Chip Co.’s patent covered its microprocessor *coupled with* the communications protocol claimed in Comm Co.’s patent, resulting in leverage for Comm Co. to extract a payment from Chip Co.

8. Patents as Substitutes for Non-Disclosure Agreements

Perhaps the most subtle reason for filing for patents is to acquire a non-negotiable form of non-disclosure agreement (NDA) with broad injunctive relief. NDAs are contracts used to restrict the disclosure or use of confidential information by employees or third parties. For instance, when a technology company hires an engineer, the employment agreement will usually contain non-disclosure provisions that prevent the employee from disclosing or using knowledge gained during employment that is not in the public domain. Another common instance when NDAs are signed is when two companies collaborate in development. Finally, when an individual inventor seeks to have her invention commercialized, often NDAs are signed before any disclosure or negotiation.

Patents may offer a stronger “fix” to information disclosure than merely using NDAs. First, although NDAs typically provide for injunctive relief, that relief frequently relates to the disclosure of the confidential information, not the sale of a product incorporating the confidential information, because of powerful exemptions available to the non-disclosing party.⁸⁰ Second, it is often difficult to prove that an NDA has been breached.⁸¹ For instance, if a former employee privy to confidential information is at all duplicitous, she may disclose the information orally—and in very broad terms—to

⁷⁸ STEPHEN C. GLAZIER, *PATENT STRATEGIES FOR BUSINESS* 34 (2008) (describing this “picket fence” strategy).

⁷⁹ See, e.g., Robert P. Merges, Symposium, *Law in the Twentieth Century: One Hundred Years of Solicitude: Intellectual Property Law, 1900-2000*, 88 CALIF. L. REV. 2187, 2222 (2000).

⁸⁰ See, e.g., Robert Merges, *A Transactional View of Property Rights*, 20 BERKELEY TECH. L.J. 1477, 1498 (2005) [hereinafter Merges, *A Transactional View*].

⁸¹ See, e.g., M. Scott McDonald, Symposium, *The Role of Contract in the Modern Employment Relationship: Noncompete Contracts: Understanding the Cost of Unpredictability*, 10 TEX. WESLEYAN L. REV. 137, 149-50 (2003); cf. *Greenberg v. Croydon Plastics Co.*, 378 F. Supp. 806, 814 (E.D. Pa.1974) (“Plaintiffs in trade secret cases . . . are confronted with an extraordinarily difficult task. Misappropriation and misuse can rarely be proved by convincing direct evidence. . . . Against this often delicate construct of circumstantial evidence there frequently must be balanced defendants and defendants’ witnesses who directly deny everything.”).

another employee who actually incorporates it into an end product, without an evidentiary trail. Third, in some commercial situations, a third party will refuse to sign an NDA.⁸² A patent will usually overcome these problems, because it binds the world—not just the parties to the NDA—not to make, use, or sell a product embodying the confidential information, regardless of whether the information was stolen, and it typically does so with an injunctive remedy.

9. “Image is Everything” Patenting

A final explanation for patenting may find its basis in the vagaries of human psychology. Some inventors appear to apply for patents to validate their ideas: the patent may offer credibility by certifying that the technology met the government’s (supposedly) stringent utility, novelty, and non-obviousness standards. According to a popular book for independent inventors, *Patent It Yourself*, “[s]ome inventors file for and obtain patents mainly for vanity, or the prestige a patent brings.”⁸³

Whatever the tarnish of late on the U.S. Patent Office among some engineers, for the general public, a patent still seems to have an aura of importance in signifying the novelty of a product. As we recounted in Part I, many companies tag their advertisements with the hackneyed “patent-pending” moniker (oddly, even if the patent has issued).⁸⁴ Although it appears no one has yet to perform an empirical study of the effectiveness of adding “patent-pending” to advertisements, no one seems to doubt as much,⁸⁵ and the examples are numerous.⁸⁶

⁸² See, e.g., Merges, *A Transactional View*, *supra* note 80, at 1498 n.61.

⁸³ DAVID PRESSMAN, *PATENT IT YOURSELF* 8 (2006). Of course, for those software engineers adamantly opposed to patents, being listed on one would presumably be considered a pock. Interestingly, in a recent study examining the relationship between the patenting activity of engineers and those aspects of their job most important to them, “intellectual challenge” was much more strongly correlated to patenting rates than other factors, most notably economic rewards. Henry Sauermann & Wes Cohen, “I Don’t Work for Money”: The Motives of Scientists and Engineers 8 (Mar. 7, 2008), www.law.berkeley.edu/institutes/bclt/entrepreneurship/presentations/Friday/830am/sauermann.pdf (slide show presentation).

⁸⁴ Peter Menell suggested to one of the authors that perhaps the “patent-pending” phrase is more effective than a mere “patented” tagline, because the former portrays a product so “cutting edge” that not enough time has passed for even the patent to issue.

⁸⁵ See, e.g., ROBERT C. DORR & CHRISTOPHER H. MUNCH, *PROTECTING TRADE SECRETS, PATENTS, COPYRIGHTS, AND TRADEMARKS* 216 (1995) (“[T]he words patent pending may have substantial psychological or marketing value.”).

⁸⁶ See, e.g., Constant Light (Patent Pending) Technology, http://www.extremecctv.com/tech_ConstantLight.php (last visited Apr. 17, 2008); Learn how to get the patent pending InstantBuzz now, http://www.squidoo.com/Levi_Holman (last visited Apr. 17, 2008); Scorpion EXO-400 Sting Full Face Street Motorcycle Helmets, <http://www.extremesupply.com/scorpionhelmets/scorpionexo400sting.htm> (last visited Apr. 11, 2008).

B. Reasons for Not Patenting

Given the explanations above, it may not be surprising that the number of patent applications filed at the U.S. Patent Office has grown dramatically in the past 25 years.⁸⁷ Researchers have found different explanations for the upsurge in patenting over this period⁸⁸—including important changes over the last few decades that have strengthened patent rights—but reasons remain *not to patent* inventions that are otherwise objectively patentable.

1. Technology is Seemingly Not Patentable

Some inventors think that their invention is not patentable, because they believe the invention either is outside the scope of the subject matter allowed by patent law or is obvious in view of the prior art.⁸⁹ Given the wide scope of subject matter allowed to be patented, it is very likely that some inventors mistakenly do not file. Among the oft-repeated examples of subject matter that might seem unpatentable to the uninitiated, but for which patents have issued, are many business methods, including schemes to avoid paying taxes,⁹⁰ and so-called “mental steps” patents, such as a physician’s determination of whether an amount of a naturally occurring chemical in the body indicates illness.⁹¹

Moreover, even when discrete ideas have been previously patented, savvy inventors (and their attorneys) know that there are many ways to re-package old inventions. Many ideas that are seemingly obvious, even to lay observers, have passed muster in the Patent Office.⁹² Favorite examples are Amazon.com’s “one-click” patent,

⁸⁷ See James Bessen & Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* 63 (2008).

⁸⁸ See, e.g., Bronwyn H. Hall, *Exploring the Patent Explosion* (Nat’l Bureau of Econ. Res., Working Paper No. 10605, 2004), available at <http://www.nber.org/papers/w10605> (demonstrating that a significant change occurred in the rate of patenting shortly after the creation of the Federal Circuit); Samuel Kortum & Josh Lerner, *Stronger Protection or Technological Revolution: What is Behind the Recent Surge in Patenting?* (Nat’l Bureau of Econ. Res., Working Paper No. 6204, 1997), available at <http://www.nber.org/papers/w6204> (suggesting that the rise in patenting during the 1990s was primarily due to increased innovation, and not the pro-patent regime created by legal changes).

⁸⁹ See, e.g., Kenneth M. Bush, *Advising Clients: How to Recognize and Protect Intellectual Property*, 62 ALA. LAW. 380, 380 (2001) (claiming that from large companies down to individual inventors, potential clients often do not understand what is protectable as intellectual property).

⁹⁰ See generally William A. Drennan, *The Patented Loophole: How Should Congress Respond to this Judicial Invention?*, 59 FLA. L. REV. 229 (2007).

⁹¹ See *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 127-35 (2006) (Breyer, J., dissenting) (dissenting from the Court’s dismissal of the case as improvidently granted and reasoning that the claim-at-issue merely “instructs the user to (1) obtain test results and (2) think about them”).

⁹² See, e.g., FTC, *supra* note 37, ch. 4, at 8-19 (citing patent and economic scholars that criticize the lenient nature of the non-obvious requirement); Robert P. Merges, Symposium, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 598 (1999) (noting that standards at the USPTO would be raised if the requirements were tightened).

which claims in essential part, “a single-action ordering component . . . in response to performance of only a single action,”⁹³ Smucker’s crustless peanut butter-and-jelly sandwich (which has since been invalidated),⁹⁴ and a method of swinging on a swing (invented by a 5-year old).⁹⁵ So, while novelty and non-obviousness are certainly bars to patenting, they are perhaps less important than at first glance. But it may be the case that the least experienced—i.e., first-time entrepreneurs—are the most at risk of misperceiving the broad scope of patentability and, thus, of wrongly failing to file.

2. The High Costs of Patenting and Patent Litigation

Simple economics suggest that the high cost of patenting will deter some inventors from filing. And the costs are not merely pecuniary—opportunity costs associated with the time that managers and engineers spend patenting instead of attending to their key functions may be significant.⁹⁶ Assuming that roughly 50% of patents are ever practiced,⁹⁷ and that only about 10% of patents confer some ability to increase prices or gain licensing or litigation revenue,⁹⁸ the expected value of additional profits flowing from patent protection must be on the order of \$500,000 to justify the filing of a patent application.⁹⁹ Furthermore, unless a company can credibly threaten litigation, the value of a patent significantly diminishes.¹⁰⁰ The rational would-be infringer, when confronted

⁹³ Claim 6, U.S. Pat. No. 5,960,411 (filed Sept. 12, 1997); *see generally* Stephen Dirksen et al., *Who’s Afraid of Amazon.com v. Barnesandnoble.com?*, 2001 DUKE L. & TECH. REV. 3 (2001).

⁹⁴ *See* Bill Haltom, *But Seriously, Folks! No patent for PBJ!*, 41 TENN. BAR J. 34 (2005).

⁹⁵ U.S. Pat. No. 6,368,227 (filed Nov. 17, 2000); *see* Jeff Hecht, *Boy Takes Swing at U.S. Patents*, NEW SCIENTIST, Apr. 17, 2002, <http://www.newscientist.com/article.ns?id=dn2178>.

⁹⁶ *See, e.g.*, Mann, *supra* note 38, at 983.

⁹⁷ *See, e.g.*, Roger L. Beck, *Competition for Patent Monopolies*, 3 RES. L. & ECON. 91, 98 (1981).

⁹⁸ Mark A. Lemley estimates that about 1.5% all patents are ever litigated and only 5% are ever licensed for royalty. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1501-07 (2001). One would expect that a large share of patents that confer any significant market power would be licensed or litigated. Assuming this value is about 50%, about 10% of all patents confer significant market power.

⁹⁹ In particular, if the average out-of-pocket cost of filing a patent is \$20,000, *see supra* note 33 and accompanying text, and a conservative \$5,000 of internal costs is pegged to lost engineering time, then the expected net benefits must be greater than \$25,000 to justify filing. If all patents are treated as equal, and the chance of the patent being practiced (about 50%) and the chance of conferring market power (about 10%) are independent, then the likelihood that a practiced patent will confer market power is 5%. Thus, the additional profits added by a patent with market power must be about \$500,000 on average to justify filing. Of course, the probability of a patent is practiced and the probability it confers market power are likely to be highly correlated. But the intent here is to provide a rough estimate of the long-term value a patent must confer to justify filing. In reality, this figure will vary widely depending on the exact costs of filing, the amount of engineering distraction time, and the likelihood that the patent will be practiced, licensed, or litigated. Additionally, in some situations, the defensive, marketing, or vanity value of a potential patent should be taken into account. *See supra* Part II.A.9.

¹⁰⁰ This credible threat includes the ability to detect infringement in the first instance, which may be very costly itself, especially for patents on internal processes that are not discernable from commercial products.

with a patent held by an individual inventor or small company with limited resources, would likely be more willing to engage in infringing behavior, calculating that the risk of enforcement is lower. Even if the patentee files suit, the would-be infringer would likely be able to settle the case for much less than it would against a well-funded opponent. Following this argument, entrepreneurs and small companies will likely have an even higher disincentive to file for patents.

3. Perceptions that Patents Provide Weak Protection: “Design Arounds”

Some view patents, especially in the software industry, as a “gigantic waste of time and money.”¹⁰¹ The belief that certain kinds of patents are easy to “design around” often leads companies to think that patents are worthless.¹⁰² That is, if the claims of the patent are narrow enough, a third party can escape infringement by making simple changes to its products to achieve the same functionality. There are a few reasons to doubt, however, that *in any field*, it is usually easy to design around patents. First, although the disclosure in a patent must provide sufficient written description so as to enable the claims that are drafted,¹⁰³ the Federal Circuit in recent years has not applied the enablement or written description doctrines very strictly.¹⁰⁴ This trend has generally allowed patentees to claim their inventions much more broadly than the embodiments disclosed in the patent specification. Second, courts have tended to construe claims more broadly than their language indicates.¹⁰⁵ And finally, claims need not be literally infringed—the doctrine of equivalents provides that if the accused product is “insubstantially different” from that claimed or performs “substantially the same function in substantially the same way to achieve substantially the same result” as that claimed, there is infringement nonetheless.¹⁰⁶ Accordingly, claims that patents are easy to design

See, e.g., Rebecca S. Eisenberg, Symposium, *Genetics and the Law: Patenting the Human Genome*, 39 EMORY L.J. 721, 739 (1990).

¹⁰¹ Bruce Byfield, *End Software Patents Project Comes Out Swinging*, LINUX.COM, Feb. 29, 2008, <http://www.linux.com/feature/128110> (quoting Brad Feld, founder and chair of Mobius Venture Capital).

¹⁰² For instance, one start-up company CFO asserts that “[t]here are a lot of ways to work around [software] patents.” Mann, *supra* note 38, at 978 n.5.

¹⁰³ *See* 35 U.S.C. § 112 (2000).

¹⁰⁴ *See, e.g.,* BESSEN & MEURER, *supra* note 87, at 65-67; Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 24 (2001).

¹⁰⁵ *See generally* Michael Risch, *The Failure of Public Notice in Patent Prosecution*, 21 HARV. J.L. & TECH. 179, 210-12 (2007).

¹⁰⁶ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002) (“Unimportant and insubstantial substitutes for certain elements could defeat the patent, and its value to inventors could be destroyed by simple acts of copying.”); *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950) (“‘To temper unsparing logic and prevent an infringer from stealing the benefit of the invention’ a patentee may invoke this doctrine to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result.’”) (quoting *Royal Typewriter Co. v. Remington Rand, Inc.*, 168 F.2d 691, 692 (2d Cir. 1948) (Hand, J.) and *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)).

around should be eyed skeptically. Based on the available data, at least some software patents appear very broad in scope.¹⁰⁷ But like most of the issues we address in this article, more empirical study is needed to make a conclusive determination.

4. Other Legal Protection

The last major reason why companies may not patent is that other forms of legal protection are perceived as adequate, or even superior, given their business strategies. Patents are typically complements to most other forms of legal protection over innovations, including copyright, trademark, and most contractual protections—that is, patents may co-exist with these legal forms of protection to provide supplementary rights.¹⁰⁸ Thus, a company choosing to protect its invention with a patent, copyright, trademark, or contractual provisions need only determine whether the marginal benefit of adding any one of these forms of IP protection outweighs the marginal costs. Although, as we noted earlier, these calculations can be tricky, a rational company should not forgo patenting simply because it believes that trademarks, copyrights, or contractual protections are sufficient in themselves.

On the other hand, patents and trade secrets, at least by design, cannot simultaneously protect an invention.¹⁰⁹ In theory, patent publication will destroy any trade secret the patentee has in the invention. In practice, however, because the enablement and written description requirements are weak, and the related “best mode” requirement is vague and hard to prove violation of in court, a patentee may often be able to patent an invention and keep its “secret sauce” a trade secret.¹¹⁰ Thus, the stark contrast that some scholars present between these two options is often much fuzzier.¹¹¹ Of course, if a company strongly desires to keep all aspects of its invention secret, and believes it can do so, it will not patent.

¹⁰⁷ See Cohen & Lemley, *supra* note 104, at 13, 39.

¹⁰⁸ See Stuart J.H. Graham & Deepak Somaya, Vermeers and Rembrandts in the Same Attic: Complementarity between Copyright and Trademark Leveraging Strategies in Software (Feb. 2006) (unpublished manuscript on file with Ga. Inst. of Tech. TI:GER working paper series), available at http://tiger.gatech.edu/files/gt_tiger_complementary.pdf.

¹⁰⁹ See, e.g., LANDES & POSNER, *supra* note 25, at 294-95; Dan L. Burk, *Misappropriation of Trade Secrets in Biotechnology Licensing*, 4 ALB. L.J. SCI. & TECH. 121, 130 (1994) (“For those inventions that are patentable subject matter, concurrent patent protection and trade secret protection are incompatible because the disclosure required by the patent destroys trade secrecy.”).

¹¹⁰ For instance, both patents and trade secrets were used by Pilkington Glass to protect codified and tacit elements of the firm’s “float glass” invention, a radical improvement in creating smooth glass. See *United States v. Pilkington, PLC*, No. CV 94-345, 1994 WL 750645 (D. Ariz. Dec. 22, 1994). Moreover, applicants may enjoy trade secrecy while a patent application is pending, providing the applicant both priority advantages and the protection of trade secrecy before publication. See Graham & Somaya, *supra* note 108.

¹¹¹ See Graham & Somaya, *supra* note 108.

C. The Decision to Patent (or Not): The Inconclusive Data

Despite the extensive theoretical literature, apart from scattered anecdotes, there is relatively little empirical evidence about patenting by start-up companies.¹¹² One line of studies has surveyed large, usually publicly traded companies.¹¹³ Not only did these studies fail to target start-up companies,¹¹⁴ but they also left unanswered questions that are of particular interest for start-ups. For instance, these studies did not ask why firms decide to forgo patenting, how companies react to competitors that hold patents, or how patents relate to other types of legal protection for innovations.¹¹⁵

Additionally, significant shifts have occurred in industry and innovation dynamics since these surveys were completed, including the rise of the software and biotechnology industries. These sectors have evolved significantly following important legal decisions in the early 1980s.¹¹⁶ Finally, there have been major changes in the patent law landscape, including the emergence of so-called “patent trolls,”¹¹⁷ shifting case law from

¹¹² For instance, Mann, *supra* note 38, provides a much-needed look at the use of patents by venture-backed software companies, but his study relies solely on in-person interviews with a relatively small sample set. *See id.* at 961 n.* (listing interviewees).

¹¹³ C.T. TAYLOR & Z. A. SILBERSTON, *THE ECONOMIC IMPACT OF THE PATENT SYSTEM: A STUDY OF THE BRITISH EXPERIENCE* (1973); Edwin Mansfield, *Patents and Innovation: An Empirical Study*, 32 *MGMT. SCI.* 173 (1986); Edwin Mansfield, Mark Schwartz, & Samuel Wagner, *Imitation Costs and Patents: An Empirical Study*, 91 *ECON. J.* 907 (1981); Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development*, 3 *BROOKINGS PAPERS ON ECON. ACTIVITY* 783 (1987); Wesley M. Cohen, Richard R. Nelson, & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Condition and Why U.S. Manufacturing Firms Patent (or Not)* (Nat'l Bureau of Econ. Res., Working Paper No. 7552, 2000), available at <http://www.nber.org/papers/w7552>.

The Yale Survey, Levin et al. *supra*, and the Carnegie-Mellon Survey, Cohen et al. *supra*, targeted managers at large industrial companies to determine why and how patents were being used by their companies. These surveys, and the research that they spawned, helped uncover the motivations for large-company patenting, and the relative importance of different methods of profiting from innovation (such as “patenting,” “secrecy,” and “lead time”).

¹¹⁴ The Yale Survey used a ranking of all publicly-traded companies with R&D expenses greater than 1% of sales or \$35 million in 1981. Levin et al., *supra* note 113, at 819. Similarly, the Carnegie-Mellon Survey surveyed eligible labs in the Directory of American Research and Technology as well as other publicly traded firms, oversampling on Fortune 500 companies. Cohen et al., *supra* note 113, at 4.

¹¹⁵ Although the surveys asked respondents about the importance of patenting and trade secrecy, neither investigated the role of other specific legal protections, such as trademark and copyright. Levin et al., *supra* note 113, at 785; Cohen et al., *supra* note 113, at 3-4.

¹¹⁶ *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175 (1981), (holding that the execution of a process, controlled by running a computer program, is patentable); *Diamond v. Chakrabarty*, 447 U.S. 303 (1980) (holding that genetically-modified microorganisms are patentable). The software industry is especially different today from the early 1980s or 1990s. *See, e.g.*, Stuart J.H. Graham & David C. Mowery, *Intellectual Property Protection in the U.S. Software Industry*, in *PATENTS IN THE KNOWLEDGE-BASED ECONOMY* 219-227 (Wesley Cohen and Steven Merrill, eds., 2003).

¹¹⁷ *See supra* note 3.

the Federal Circuit and the Supreme Court,¹¹⁸ as well as a significant upward trend in overall patenting and in the hazards of litigation.¹¹⁹ In sum, although these surveys may provide instructive background on what may be the patenting behavior of new, embryonic firms, they certainly are far from conclusive.

More recently, several studies have mined publicly available, archival data to elucidate the role of patenting in the evolution of small companies. Lerner, for instance, examined the patenting behavior of young biotechnology firms, and showed that companies' decisions to patent are influenced by patent litigation costs.¹²⁰ Hsu and Ziedonis used existing data to demonstrate that, for early-stage semiconductor companies, holding patents is associated with higher valuations by investors.¹²¹ Cockburn and MacGarvie found that the growth in software patenting has prolonged the funding cycle for some companies, and determined that companies' initial public offerings may be delayed in technologies characterized by dense patenting.¹²² Mann and Sager recognized that increased patenting by a given software company is significantly correlated with total investment, the number of financing rounds, and firm longevity.¹²³

In sum, while these studies are illustrative, they do not systematically address the drivers of patenting by start-ups.¹²⁴ Unfortunately, other than data on issued patents and pending applications available from the U.S. Patent Office, there is no comprehensive data available on the dynamics of U.S. firm patenting, licensing, and litigation among start-up companies. Thus, many important questions relating broadly to the use of patents by small companies, particularly technology start-ups—including the one of our title, “Why do start-ups patent?”—have yet to be answered by researchers.

¹¹⁸ See, e.g., Rebecca S. Eisenberg, Commentary, *The Supreme Court and the Federal Circuit: Visitation and Custody of Patent Law*, 106 MICH. L. REV. FIRST IMPRESSIONS 28 (2007); Harold C. Wegner, Commentary, *Making Sense of KSR and Other Patent Cases*, 106 MICH. L. REV. FIRST IMPRESSIONS 39 (2007).

¹¹⁹ James Bessen & Michael J. Meurer, *The Patent Litigation Explosion* (Boston U. Sch. of L., Working Paper No. 05-18, 2005), available at <http://ssrn.com/abstract=831685> (claiming that the hazard of litigation rises for companies that spend more on R&D, file more patents, and are publicly traded).

¹²⁰ Josh Lerner, *Patenting in the Shadow of Competitors*, 38 J.L. & ECON. 463 (1995).

¹²¹ See *supra* note 58.

¹²² See Cockburn & MacGarvie, *supra* note 59.

¹²³ Mann & Sager, *supra* note 11.

¹²⁴ Moreover, because these studies relied upon archival data, they are at best a proxy for firm strategy and behavior.

III. UNCOVERING THE DATA: THE KAUFFMAN FOUNDATION SURVEY OF PATENTS & ENTREPRENEURSHIP

A. Addressing the Lacuna in Prior Research

Prompted by the lack of adequate data and the changing patent environment, the authors and other investigators developed—and are now administering—the first targeted survey in the United States of start-up and early-stage companies’ patent prosecution, licensing, and litigation strategies and experience.¹²⁵ Formally titled the “The 2008 Berkeley Patent Survey: Entrepreneurial Companies and the Patent System,” it includes a variety of questions centered on how patenting, patent licensing, and patent litigation relate to company innovation, capital formation, business strategies, competition, and other forms of intellectual property protection.

One of our principal aims is to determine what motivates invention and innovation for entrepreneurs and startup companies. In this regard, the survey seeks to inform a number of unresolved questions in the scholarly literature: Do patents offer a meaningful incentive for start-up companies to conceive of patentable inventions and to develop these inventions into marketable products? What role do patents play in effectively bringing these products to market and in keeping competitors at bay? Or are patents mainly a tool for raising capital and improving the chances of being acquired or going public?¹²⁶

These questions have important implications for the overall structure of the economy. As Joseph Schumpeter pointed out in the 1910s, small company innovation plays a crucial role in the success and dynamism of capitalist economies.¹²⁷ For instance, if the survey shows that patents play a previously misunderstood role in facilitating the formation and success of startup companies, such a finding would have enormous implications for law and policy. Thus, the survey data may be critical to evaluating whether the patent system is too complex and costly for entrepreneurial companies to manage, and ultimately, how patent reform proposals might affect entrepreneurial companies. These questions have particular relevance to the topics at issue in this article: What are the factors that drive entrepreneurs in early-stage

¹²⁵ In 2000, a number of European scholars conducted a survey of small firms owning patents. WILLIAM KINGSTON, ENFORCING SMALL FIRMS’ PATENT RIGHTS (2000), *available at* www.pedz.uni-mannheim.de/daten/edz-h/gdb/00/studies_enforcing_firms_patent_rights.pdf (last visited July 9, 2008). However, this study mainly focused on the ability of small firms to enforce their patents and protect their investment, and did not investigate *why* small firms patent (or not). *See id.*

¹²⁶ In this regard, the survey also aims to determine the role of patenting in achieving successful business models. For instance, are startups applying for patents to protect their commercial products? If so, is that strategy a successful one? Or are these companies patenting to accomplish other business goals—for instance, as cross-licensing bargaining chips to obtain the right to use another company’s patents? *Cf. supra* notes 6-10 and accompanying text (discussing cross-licensing deals among major patent holders).

¹²⁷ Joseph A. Schumpeter, *The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle* 74-94 (1934) (pointing to the role that entrepreneurial innovation plays in driving competition).

technology companies to seek patent protection on their innovations? And, what factors influence their decision to forgo patenting?

B. *Why do Start-ups Patent (and Why Not)?: Our Survey Questions*

The survey questions are designed to tackle these important issues head on. Importantly, we engaged in both an extensive literature review and a series of in-depth interviews. While the literature review alerted us to theory and to the lack of complete information in the scholarly record,¹²⁸ our in-depth interviews provided us with new perspectives, from entrepreneurs, technology inventors, venture capitalists, lawyers, and university technology-transfer officers.¹²⁹ These discussions allowed us to understand in greater depth the ways in which entrepreneurs are actually using and responding to patents in their competitive environments.

Because our study is aimed primarily at high-technology companies, our research focuses on three important sectors: biotechnology and medical devices, software and allied information technologies (IT), and clean/green technologies.¹³⁰ We are administering our questionnaire to top managers at nearly 12,000 U.S. “entrepreneurial companies”—i.e., firms that were founded in the United States during the last ten years—in these sectors.¹³¹ We are conducting additional testing by oversampling venture-backed companies.

From a research perspective, one of the most exciting aspects of collecting survey responses from entrepreneurial companies is the ability to link the data with public information about the companies.¹³² By aggregating the responses with data about

¹²⁸ We began by studying literature from the 1970s and 1980s examining the relationship between companies’ product innovation, research and development spending, and patenting. See Mansfield, *supra* note 113; Mansfield, Schwartz, & Wagner, *supra* note 113. We also examined research emanating from surveys launched in the 1980s and 1990s that helped the field understand how patents affect companies’ structure and strategy. See Cohen, Nelson & Walsh, *supra* note 113; Levin, Klevorick, Nelson & Winter *supra* note 113; Jerry G. Thursby & Marie C. Thursby, *Who is Selling the Ivory Tower?: Sources of Growth in University Licensing* (Nat’l Bureau of Econ. Res., Working Paper No. W7718, 2000), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=232103 (relying on survey evidence from businesses that license in university inventions).

¹²⁹ A complete list of those persons who provided us invaluable comments in forming the survey is available in the introductory note of this article.

¹³⁰ Our analysis of companies that received venture funding during the last 10 years shows that over 75% are classified into the primary industries “information” (61%), “health” (15%), and energy (<1%). These data for our analysis are derived from VentureXpert (Thomson), <http://vx.thomsonib.com/NASApp/VxComponent/VXMain.jsp>.

¹³¹ Our sample frame is drawn from Dun & Bradstreet and VentureXpert (Thomson) data, using both the Standard Industry Classification (SIC) and North American Industry Classification System (NAICS) to classify companies into relevant sectors.

¹³² To maintain the privacy of companies’ responses, investigators and any co-authors will only publish aggregate data and survey responses from multiple companies in a given sector, and not any individualized company data and responses.

patent prosecution and litigation, revenues, profits, financing, headcount, location, business strategy, industry, and competitors, we will be able to present a much more robust account of start-up companies’ interactions with the patent system. Most importantly, we expect this aggregation of data will allow us to answer questions that historically have been outside the reach of scholars.

In this regard, while formulating the survey questions we realized that start-up companies presented unique issues that not only required us to significantly redraft questions from previous studies, but also to create entirely new sets of questions. Our questionnaire inquires about each respondent company’s background, business profile, business model and innovation focus. Questions also explore the company’s patenting characteristics, its motivation for patenting, its responses to patents in its competitive environment, and its use of other forms of intellectual property and related strategies, including copyrights, trademarks, and “open source” models. While many of the survey questions are pertinent to the topic of this paper—Why do start-up companies patent, and why do they choose to forgo patenting their inventions?—two of the survey questions directly address the issue.

The first of these questions (see below) seeks answers to why start-up companies decide not to patent. Having engaged in preliminary analysis using U.S. Patent Office data, we know that many of our sample companies have never filed for a patent. Accordingly, determining why technology start-ups do not patent may be just as important as ascertaining why they do file for patents.

Q1: Thinking about the last major technology innovation that your company did not patent, which if any of the following influenced your company’s decision not to patent? (Please check ALL that apply)

a. Did not want to disclose information	<input type="checkbox"/>
b. Cost of getting the patent, including attorneys’ fees	<input type="checkbox"/>
c. Competitors could have easily invented around the patent	<input type="checkbox"/>
d. Believed that trade secret was adequate protection	<input type="checkbox"/>
e. Cost of enforcing the patent, including actions in court	<input type="checkbox"/>
f. Did not believe the technology was patentable	<input type="checkbox"/>
g. No need for legal protection	<input type="checkbox"/>

Given the length constraints we set for our survey instrument,¹³³ we included only the most salient reasons.¹³⁴ We also decided to limit the question to the company’s last “major” technology innovation, since many minor innovations are not patented

¹³³ Based on feedback from numerous individuals, including entrepreneurs, the investigators decided to limit the survey to about 40 questions taking no more than 15 minutes to answer.

¹³⁴ We discovered these reasons through research and interviews.

merely because of the high costs of patenting.¹³⁵ Finally, to make the question easier for our respondents, we chose a more constrained “yes/no” answer option instead of allowing answers with large variation (e.g., Likert-like scaling: “not important,” “somewhat important,” etc.).¹³⁶

Based on our review of the literature and discussions with experts, we hypothesize that the major reasons for start-up companies not patenting a major innovation are the cost of getting the patent and the distraction of managers and engineers from their regular work. It will be interesting to compare our responses on the cost questions with the results of the Carnegie-Mellon Survey, in which the costs of patent prosecution and enforcement were relatively unimportant reasons (37% and 25% of respondents, respectively) for large companies to forgo patenting.¹³⁷ Moreover, for some industries, such as software, we expect a higher rate of “no need for legal protection” and “ease of design around” responses.

Our second question asks of those companies that have filed for at least one patent since their founding the relative importance of various reasons for patenting (see below).

Q2: How important or unimportant have the following been to your company in seeking patent protection in the United States:

	Very Important	Moderately Important	Slightly Important	Not at all Important
Preventing others from copying our products or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving our chances of securing investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Obtaining licensing revenues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving chances/quality of liquidity (e.g., acquisition/IPO)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing patent infringement actions against us	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving negotiating position with other companies (for example, cross-licensing)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹³⁵ Additionally, by limiting the question to the company’s most recent innovation, we avoid responses based on a “general feelings,” thereby generating a more accurate account of companies’ decisions not to patent.

¹³⁶ Because we did not expect our respondents to have highly nuanced views on their decision not to file and to reduce the length of the survey, we did follow up this question by asking “Which of these reasons were the most important reason not to patent?”

¹³⁷ See Cohen, Nelson & Walsh, *supra* note 113, at 45 fig. 5. Responses in the Carnegie Mellon survey were limited to respondents stating that “preventing copying” was a factor in driving the product-patenting decision. See *id.* at 47 fig. 7.

Enhancing company's reputation/product image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Again, space constraints limited us from listing all of the possible reasons for patenting that we have discussed in this article. Because the literature indicates that patents are often important to the financing activities and exit strategies of start-up companies, we included these explanations. Furthermore, with so little data available on the licensing characteristics of start-up firms, we incorporated two options on licensing activity: earning royalties and cross-licensing. We also included several other responses that the scholars and experts we interviewed believed were important, such as preventing copying, preventing suits, and improving product image. Finally, because we could not be sure of capturing every possibility, we allowed our respondents to alert us to additional reasons through an open-ended “Other (specify)” option.

Based upon our interviews, and our review of the literature presented earlier, we hypothesize that “securing investment” will rank highly on the list, along with “preventing others from copying.” Again, it will be interesting to compare our responses on the latter question with the results of the Carnegie-Mellon Survey, in which virtually all (96%) of the large-firm respondents stated that “preventing copying” was a factor in driving the patenting decision.¹³⁸ For later-stage start-ups, we expect that “improving chances/quality of liquidity” and “obtaining licensing revenues” will play a greater role than for early-stage companies. We would be somewhat surprised if many start-ups are filing for patents to improve their position in cross-licensing negotiations, but it will be interesting to determine which technology sub-sectors include companies that mark this reason as an important one.

In sum, while the “average response” among all of our respondents will be a noteworthy result of the survey, the rich supplemental data we have collected will allow us to generate our most interesting results. Specifically, by segmenting our dataset, we expect to be able to offer detailed insights on the drivers of patenting behavior. For instance, we will test whether there are industry, sector, or product characteristics that make certain patenting explanations more salient. By partitioning our sample companies by age and size, we will comment on how the evolution and growth of companies bears upon the development of patenting strategies. By parceling our companies by their expressed innovation strategies and technology focus, we will be able to determine whether certain explanations for patenting are technology-specific. These are but some of the ways that we will be able to parse our data to answer many questions about start-up company patenting.¹³⁹

¹³⁸ See Cohen, Nelson & Walsh, *supra* note 113, at 47 fig. 7.

¹³⁹ For example, our data will also permit us to partition our companies by their expected liquidity event, enabling us to differentiate the explanations for patenting based on the desired “exit strategy” of the company. Other categories include a segmentation of the companies by their success and failure at securing investment. Parceling our data according to investment characteristics will permit us to test

By gathering targeted responses from numerous companies, and then incorporating detailed supplemental information into the data, the Berkeley Patent Survey offers the promise of instructing scholars, practitioners, and policymakers in areas that have been hidden from view or populated with anecdote. For an important class of economic agents, we are optimistic that we will finally be able to systematically answer the questions: What are the determinants of patenting by start-up technology companies? And, why don't these companies patent their technologies?

hypotheses about the salience of different explanations based on the investment success of the firm. Dividing these companies by the type of technology they practice—which we will find by collecting patent portfolios of each respondent firm—will allow us to determine whether some explanations are more important to innovators practicing in different technology arts. Furthermore, because we have data on the competitors of many of our respondents, we will be able to map the competitive and market structure of the environment in which our respondents are operating, thus enabling us to test hypotheses about the role of competition in patenting behavior. Such analysis can also be extended to patenting concentration. By collecting patent portfolios not only for our respondent companies, but also for their competitors, we will be able to comment meaningfully on the role of “patent concentration” (i.e., patent thickets) upon the drivers of start-up company patenting.