



PATENT ASSERTION AND U.S. INNOVATION

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Executive Summary

- ❖ Some firms that own patents but do not make products with them play an important role in U.S. innovation ecosystem, for example by connecting manufacturers with inventors, thereby allowing inventors to focus on what they do best.
- ❖ However, Patent Assertion Entities (PAEs, also known as “patent trolls”) do not play such roles. Instead they focus on aggressive litigation, pursuing such practices as: threatening to sue thousands of companies at once, without specific evidence of infringement against any of them; creating shell companies that make it difficult for defendants to know who is suing them; and asserting that their patents cover inventions not imagined at the time they were granted.
- ❖ Suits brought by PAEs have jumped by nearly 250 percent in just the last two years, rising from 29 percent of all infringement suits to 62 percent of all infringement suits. Estimates suggest that PAEs may have threatened over 100,000 companies with patent infringement last year alone.
- ❖ While aggressive litigation tactics are a hallmark of PAEs, some practicing firms are beginning to use them as well.
- ❖ PAE activities hurt firms of all sizes. Although many significant settlements are from large companies, the majority of PAE suits target small and inventor-driven companies. In addition, PAEs are increasingly targeting end users of products, including many small businesses.
- ❖ PAEs take advantage of uncertainty about the scope or validity of patent claims, especially in software-related patents because of the relative novelty of the technology and because it has been difficult to separate the “function” of the software (e.g. to produce a medical image) from the “means” by which that function is accomplished.
- ❖ A range of studies have documented the cost of PAE activity to innovation and economic growth. For example:
 - One study found that during the years they were being sued for patent infringement by a PAE, health information technology companies ceased all innovation in that technology, causing sales to fall by one-third compared to the same firm’s sales of similar products not subject to the PAE-owned patent.
 - Another study found that the financial reward received by winning PAEs amounted to less than 10% of the share value lost by defendant firms, suggesting that the suits result in considerable lost value to society from forgone technology transfer and commercialization of patented technology.
- ❖ History suggests that it should be possible to address these challenges. Similar cases occurred with patents for agricultural equipment and for railroad equipment in the late 19th century, in which there was great uncertainty about whether a valid patent had been infringed. Once these underlying conditions were changed, this business model was no longer profitable and litigation of this type fell dramatically.
- ❖ Specific policies should focus on fostering clearer patents with a high standard of novelty and non-obviousness, reducing disparity in the costs of litigation for patent owners and technology users, and increasing the adaptability of the innovation system to challenges posed by new technologies and new business models, would likely have a similar effect today.

I. Introduction

The folks that you're talking about [PAEs] are a classic example; they don't actually produce anything themselves. They're just trying to essentially leverage and hijack somebody else's idea and see if they can extort some money out of them... [O]ur efforts at patent reform only went about halfway to where we need to go and what we need to do is pull together additional stakeholders and see if we can build some additional consensus on smarter patent laws.

- President Obama, February 14, 2013

The purpose of the U.S. patent system, according to the Constitution, is “to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries” (U.S. Const., art. 1, sec. 8, cl. 8). Giving inventors this right provides a powerful incentive for innovation.

Patent policy must navigate a fine line however, as excessive enforcement of that exclusivity—such as through abusive litigation or overly broad patent claims—may dampen incentives for future innovation. Innovators who fear inadvertently infringing existing patents may reduce innovative activity or take costly steps to defend against lawsuits claiming infringement, leading to fewer resources available for wages, job creation, and innovation of new products and services.

Firms that own patents but do not practice¹ them can play a useful role in the innovation ecosystem. Firms that aggregate and manage patents can play an important intermediary role, bringing value to society by more efficiently matching inventors to patent users in an otherwise illiquid market, and by developing expertise in legitimately protecting patents from infringement. However, some litigation strategies may reduce incentives to transfer or commercialize technology by unwarrantedly raising potential innovators' fears that they will be accused of patent infringement if they do so.

This report looks particularly at firms who do not practice the patents they own and instead engage in aggressive litigation to collect license and other fees from alleged infringers. A review of the evidence suggests that on balance, such patent assertion entities (PAEs) (also known as “patent trolls”) have had a negative impact on innovation and economic growth.

The success of the PAE business model in part reflects patent policy challenges created by the rapid growth of complex software products. Because of rapid technological change and the special characteristics of software, it has been hard to define clear boundaries for patents, and hard to set an appropriate bar for non-obviousness, leading to many opportunities that PAEs (and in some cases, non-PAEs) have exploited.

II. The Role of Intermediaries in the Patent System

¹ Firms that “practice” their patents use them to design or manufacture products or processes.

Patent intermediaries can play a useful social role. Inventors and buyers of patents (such as a manufacturer who can commercialize patented inventions) may have a difficult time finding each other because the potential usefulness of a patented technology is often not obvious, and often depends on the complementarity between the protected technology and the buyer's own portfolio of technology.

In principle, illiquid markets such as the one for patents may benefit from specialized intermediaries. These intermediaries bring value to society by more efficiently matching patent holders to patent buyers, thereby fostering transfer of technology from inventors to those who can use the technology to make products that are valuable to consumers. For example, an individual inventor might sell a patented battery technology to an intermediary, who then sells or licenses the patent to a cell-phone manufacturer who has both the equipment to make the battery in large scale and the ability to market the advantages of the new battery when combined with that phone.

This arrangement allows inventors to specialize in innovation and benefit from the specialized commercial knowledge and connections of an intermediary. Similarly, it can be

THE LEAHY-SMITH AMERICA INVENTS ACT (AIA)

In September, 2011, President Obama signed into law the Leahy-Smith America Invents Act, historic patent reform legislation designed to help American entrepreneurs and businesses bring their inventions to market sooner, creating new businesses and new jobs.

The key provisions of the AIA, which went into full effect in 2012, are helping to improve the patent system for innovators in all fields by offering a fast-track option for patent processing; taking important steps to reduce the current patent backlog; and increasing the ability of American to protect their intellectual property abroad.

Several provisions of AIA may help address some of the problematic behavior of PAEs by creating new programs at the Patent and Trademark Office to create alternatives to litigation regarding patent validity, new methods for post-grant review of issued patents, and major steps to increase patent quality through clarifying and tightening standards. Nonetheless, the impact of aggressive litigation tactics by PAEs and others was not widely known during the seven years the AIA was under negotiation, and as President Obama said, AIA "only went about halfway to where we need to go."

costly for technology users to find all potentially-relevant patents. Effective brokering of patents by intermediaries can therefore increase the value of patents, fostering greater incentives to innovate. And finally, potential inventors may not have the resources to protect their patents from infringement; their incentives to invent may be increased if they can sell their patents to firms that specialize in litigation and other means to collect license fees from those who are using the patented technology.

On the other hand, patent intermediaries may also act in ways that reduce innovation. Recent years have seen the rapid emergence of PAEs, or "patent trolls." These firms "use patents primarily to obtain license fees rather than to support the development or transfer of technology" (Chien 2012). Obtaining these license fees in practice often means aggressive litigation practices, in which PAEs tie up (or threaten to tie up) legitimate

innovators in court by charging them with patent infringement. The PAE business model is generally seen as combining characteristics such as the following (Chien 2012; Bessen, Meurer and Ford 2011; Hagiu and Yoffie 2013):

1. They do not “practice” their patents; that is, they do not do research or develop any technology or products related to their patents;
2. They do not help with “technology transfer” (the process of translating the patent language into a usable product or process);
3. They often wait until after industry participants have made irreversible investments before asserting their claims,
4. They acquire patents solely for the purpose of extracting payments from alleged infringers;
5. Their strategies for litigation take advantage of their non-practicing status, which makes them invulnerable to counter-claims of patent infringement.
6. They acquire patents whose claim boundaries are unclear, and then (with little specific evidence of infringement) ask many companies at once for moderate license fees, assuming that some will settle instead of risking a costly and uncertain trial.
7. They may hide their identity by creating numerous shell companies and requiring those who settle to sign non-disclosure agreements, making it difficult for defendants to form common defensive strategies (for example, by sharing legal fees rather than settling individually).

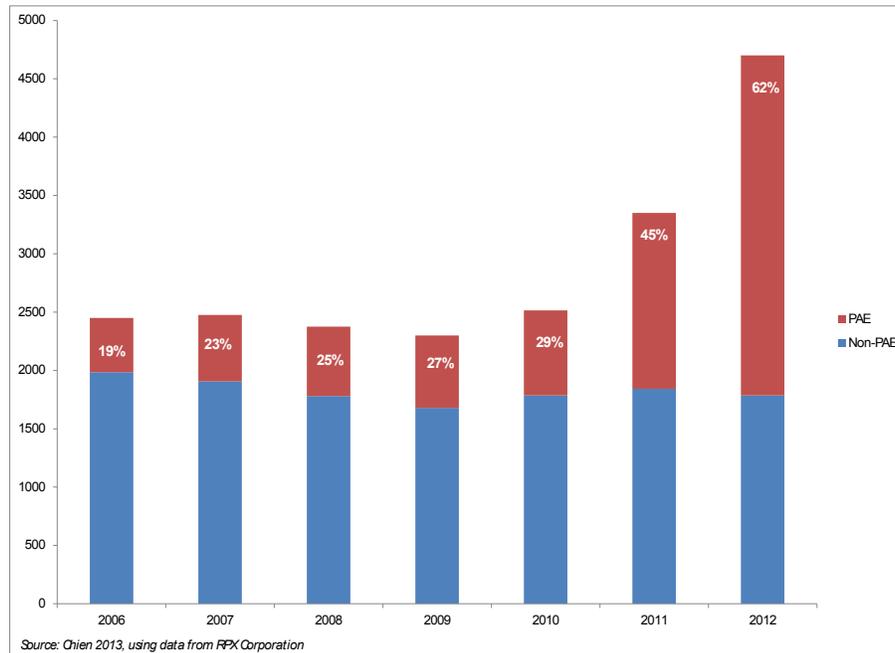
While intermediaries in general may be non-practicing entities, and generate revenues through licensing fees, PAEs go further by masking their identity, and acquiring and asserting broad patents, some of questionable validity, in order to extract settlement fees.

For example, one company sued dozens of online retailers, claiming that its patents covered nearly any use of online shopping cart technology, leading several retailers to pay settlements worth millions of dollars each. Ultimately, one online technology retailer won an appeal that invalidated each of the three key patents that were the basis for the original suits. The court found that the claims of the patents were obvious in light of products that already existed at the time the patent was filed.² The victory in this case, however, required spending millions of dollars and years in court – a risk that other online retailers had been unwilling to take (Mullin 2013a; Mackie, Payne, and Stewart 1994). See below for additional examples of PAE tactics.

² The appeals court held that once the technology existed to do purchasing on a closed network (CompuServe), extending this capability to allow purchasing on the Internet, while novel, required only steps that would be obvious to anyone skilled in the relevant prior art.

PAE activity has increased dramatically in recent years (Figure 1). Last year, PAEs brought over 2,500 lawsuits — 60% of all patent suits. That compares to 1,500 in 2011 (45% of all cases,) and 731 in 2010 (accounting for 29%) (Chien 2013). Other studies find a similar rise in PAE activity. An updated version of a study done for the US Government Accountability Office (Jeruss, Feldman and Walker, 2012) finds that PAEs filed 59% of the patent lawsuits in the US in 2012 (Feldman, Ewing, and Jeruss (2013)).

Figure 1: Total number of Patent Cases Commenced, 2006-2012



The increased prevalence of PAE suits, and patent suits in general, in recent years stands in contrast to the 20th century, when suits for patent infringement were relatively rare. This increase is likely due to two factors. First, there are an increasing number of computer and communications patents, whose wider breadth makes them more easily abused, as we discuss below. PAE suits are concentrated in the IT sphere; according to one estimate, 82% of PAE defendants were sued on the basis of a software patent (in contrast to only 30% of those sued by non-PAEs) (Chien and Karkhanis, 2013). Software patents are nearly five times as likely to be in a lawsuit as chemical patents; business method patents are nearly fourteen times as likely (Bessen 2011).

Second, during the 20th century, patents were primarily held by manufacturers (FTC 2011). Rival makers of complex products are likely to be infringing each other's patents, so they have an incentive to settle competing infringement cases by cross-licensing, rather than engaging in expensive legal battles that do not add to society's stock of scientific knowledge. In contrast, a PAE has no rival product, so it can't be counter-sued. PAEs also have few of the reputational concerns that might deter a well-known company from appearing to victimize other innovators. Furthermore, PAEs can develop economies of scale in suing many firms at once on a contingency-fee basis; once the initial legal preparation work has been done, a PAE can send demands asserting infringement to

numerous companies at low cost, paying legal fees only in the event that its assertion is successful.

PAEs often threaten to sue with the intention of extracting license fees or settlement payments. The increase in the number of suits filed for patent infringement has been accompanied by an increasingly large number of suits threatened. PAEs assert broad patent claims against an unusually large set of potential defendants; these assertions are often not based on any evidence of infringement by an individual defendant, but are instead an attempt to find companies that will seek to settle the PAE's claims rather than risk a trial. Conservative estimates place the number of threats in the last year alone at a minimum of 60,000 and more likely at over 100,000 (Chien 2012).³

The uncertainty and expense of litigation suggests that many patents might be best viewed as “probabilistic property rights” or “lottery tickets” (Lemley and Shapiro 2005). Given this situation, many patent owners and users prefer to settle out of court for amounts that have not so much to do with the economic value of their patents or the probability that they have infringed. Instead, settlements are affected more by the parties' relative opportunity costs of going to trial and attitudes towards risk—factors that favor PAEs, whose legal fees are low (since they do not have to provide much evidence to assert that there has been patent infringement), and who do not have to pay the fixed costs of a manufacturing operation. Therefore, PAEs have an incentive to drag out litigation, to increase pressure on defendants to settle the case (Tucker 2012).

Examples of Abusive Practices in Litigation by Patent Assertion Entities

Above we have argued that Patent Assertion Entities (PAEs) have “over-asserted” their patents, pursuing legal action in a way that does not increase incentives for innovation, and in fact reduces these incentives and complicates normal business operation. Below are two examples:

Large company example

SAS is the world's largest privately held software company, providing business and organizational customers with advanced analytics. SAS has been a defendant in several suits filed by PAEs. In Congressional testimony in March, John Boswell, SAS's General Counsel, described the PAE business model and its impacts on his company:

Here are the basic parameters of what is happening with these suits. A patent troll sets up shop in a jurisdiction known to be supportive of patent plaintiffs... It buys patents from defunct companies or patents that companies no longer want to keep. It does not hire employees; it does not engage in research; it does not even practice the invention—nor does it ever intend to practice it. The patent troll then either serves a demand letter on the victims, or effects legal service of a complaint. The

³ For example, Innovatio IP Ventures, LLC sent 8,000 notice letters to coffee chains, hotels, and retailers seeking compensation for use of Wi-Fi equipment made by Cisco Systems, Inc., Netgear, Inc., and Motorola Solutions, Inc. that they allege to infringe on Innovatio's patents. In February, a Federal judge dismissed a suit by Cisco Systems to prevent Innovatio from seeking royalties from Cisco customers. See Jones (2013).

troll then pursues settlement by threatening massive and costly discovery,... of every electronic document that might touch upon the alleged claims, by any person inside the defendant's operations. ...[In one recent case], the number of electronic documents that we had to collect exceeded 10 million.... SAS won summary judgment in this case and it is now on appeal to the Federal Circuit. So far this case has cost us in excess of \$8 million [in legal fees alone].

If SAS ultimately wins this case it will be a Pyrrhic victory at best. We spent \$8 million and huge amounts of developer time and executive time etc., for what? This victory does not resolve the other patent troll cases that we face, or will face in the future. This \$8 million and the millions more we are spending on other cases is money SAS no longer has to invest in people, facilities, research, or product development; and we are a relatively small player in this world. .. It does not cost much to be a troll and to make broad, vague demands. On the other hand, the risk to the company receiving a troll threat is enormous.(Boswell 2013)

Small company example

A PAE sent letters to hundreds of small businesses alleging infringements of patents if the businesses have document scanners integrated into their computer networks, and demanding a “good faith payment” of \$900-1,200 per employee for a license. The letter provides no specific evidence against the recipient; it argues instead that general research “has led us to the conclusion that an overwhelming majority of companies like yours utilize systems that are set up to practice at least one of scenarios” covered by the patents. In May, the State of Vermont sued the PAE for unfair and deceptive practices, alleging that the letters were targeted to businesses and non-profits unlikely to be familiar with patent law, that they “shifted the entire burden of the pre-suit investigation onto the small business that received the letters”, and that despite repeated threats to sue if the payment is not made, no such suits had been filed (see Fisher, 2013).

III. “Functional Claiming” and Uncertain Infringement

To be awarded a patent, an inventor must disclose the invention in sufficient detail to enable skilled practitioners in the relevant field to understand it and potentially build upon it. Patent applicants must also articulate the specific claims as to the scope of the patent. Understanding which products and processes are, in fact, protected by the patent is essential to avoiding infringement upon that patent. Moreover, such clarity enables patents to serve the socially beneficial purpose of promoting technology transfer. The Patent and Trademark Office grants patents only if the claims are novel (have not been made before) and are not obvious to a person skilled in the relevant art.

Setting an appropriate bar for novelty and non-obviousness is particularly important in a new field; if the bar is not set high (something difficult to do in a new field), firms may well find themselves inadvertently infringing patents, both because of the sheer number of patents and because commercial need is driving many inventors to create similar inventions near-simultaneously (Lemley and Melamed 2013). Many practitioners of such technologies (such as railroads in the 19th century and software today) find it more profitable to focus on expanding the overall market for their products by technological

cooperation with rivals, rather than working to clearly delineate property rights (Boldrin and Levine 2013).

An additional reason that the issue of overbroad patents is particularly salient in software is due to the prevalence of “functional claiming” in these patent classes (Lemley 2012). A claim term is “functional” when it recites a feature by “what it does rather than by what it is” (In re Swinehart 1971).⁴ Functional claiming involves claiming exclusive rights over any device that performs a given function, regardless of how that function is performed.

Functional language can therefore lead to very broad and/or vague claims. These problems are especially acute for software patents. For these patents, it has been argued that the code *is* the function, with the implication that a software patent arguably excludes any other code that performs that same function. In contrast, in pharmaceuticals, the distinction between a function and the means used to perform that function is generally clear. For example, several patents have been awarded for the function of reducing cholesterol; each patent covers a different chemical compound—a different means of providing that function.

Compounding the problem is the fast-moving, interdependent nature of technical change in the software industry. Functional claims can be used to ‘over-assert’ a patent by attempting to cover products and processes that were never contemplated by the inventor or the examiner as being within the claim scope at the time of the invention. For example, a patent claim about a programmed processor could be asserted broadly to cover any and all devices that achieve the claimed result, rather than being limited to a device programmed with the specific software used by the inventor.

In addition, single piece of software or website might have several thousand “functions” that could be claimed in as many patents. It is also difficult for an outsider to judge what an inventor meant by a claim and to know what sort of invention would be “obvious” to a skilled practitioner and thus unworthy of a patent. For example, in the case discussed earlier, the appeals court had to consider detailed features of twenty-year-old technologies to determine whether the shopping basket patents in fact made novel claims.

Thus, it can be very difficult to know if one is infringing patents. These broad, functionally-defined, and intertwined patents are therefore a key part of the PAE business model. These intermediaries acquire broad patents and threaten suit, in hopes of extracting settlements. If even one patent in a complex product is held to be infringed, the product cannot be legally sold (Lemley and Shapiro, 2005). This situation can lead to problems for practicing firms both large (note that a single smartphone may read on over 100,000 patents) and small (the basis of the demand letters discussed in the examples above is the alleged interaction between components of a computer network found in most offices). The stakes are particularly high when the venue for an infringement dispute is the U.S. International Trade Commission (ITC), given the ITC’s inability to award damages and

⁴ For example, functional language is often used to add further description to a structure or step, e.g., a claim may recite a conical spout (*a structure*) that allows several kernels of popped popcorn to pass through at the same time (*a function*). *In re Schreiber*, 128 F.3d 1473, 1478(Fed. Cir. 1997).

reliance instead on exclusion orders barring import of a given product deemed infringing into the United States.

IV. The Economic Cost of PAE Activity

While most patents are not litigated and are properly practiced and enforced, the harassing litigation tactics of some PAEs, combined with substantial litigation costs (ranging from a median of \$650,000 for smaller cases, to a median of over \$5 million per case where the amount in controversy exceeds \$25 million) (AIPLA 2013), have added significant costs to the innovation ecosystem and sapped investments in research and development, causing great harm to society. These costs are of several types.

Direct costs to firms that practice patents. James Bessen and Michael Meurer (2012) find that defendants and licensees paid PAE's \$29 billion in 2011, a 400% increase from 2005; they estimate that less than 25% of this money flowed back to innovation.⁵ In addition, in the majority of PAE cases, the legal cost of the defense exceeds this settlement or judgment amount (Chien 2012c).

Private costs of lost opportunities to commercialize technology. One might argue that the losses to defendants accused of infringement would be offset by gains to the owners of patents. However, very little such transfer of value appears to take place. For example, in the years 2000 through 2010, a set of fourteen publicly-traded PAEs followed by Bessen, Meurer, and Ford (2011) had total revenues of \$7.6 billion.⁶ Patent suits initiated by those fourteen entities were associated with a decline of \$87.6 billion in defendant company share value over the same period, implying that the financial award experienced by winning PAEs amounts to less than 10% of the lost share value in this sample.

While drops in the share value of a defendant companies may reflect other economic factors (e.g. the now-raised expectation of losing future suits or making settlement payments), the 90% of lost defendant share values that simply vanishes suggests considerable lost value to society from forgone technology transfer and commercialization of patented technology. Aggregating to all suits by PAEs yields lost wealth of over \$300 billion in four years starting in 2007. That is, the stock market values the lost opportunities for technology commercialization as significantly greater than the direct payments from defendants and licensees to PAEs.

Even if patent assertion entities do not prevail in the courtroom, their actions can significantly reduce incremental innovation while litigation is ongoing, a situation that can persist for years. The reason is that such action could be viewed by courts as an evidence

⁵ In their papers, Bessen and Meurer define PAEs as firms with each of the following characteristics: they "do not produce goods, rather they acquire patents in order to license them to others," they "seek to derive the majority of their income from the enforcement of patent rights," and they file lawsuits.

⁶ These revenues may include revenues from sources other than litigation, and therefore may overstate the value of transfers from defendants to these PAEs. Note that the \$7.6 billion does not include payment streams received after 2010 related to settlements won during the study period. Future payment streams are unlikely to be large given that settlements tend to be paid in lump sums.

of “willful infringement” if the plaintiff’s patent is upheld, making the firm liable for treble damages. For example, one study found that during the years they were being sued for patent infringement by a PAE, health information technology companies ceased all innovation in that technology, causing sales to fall by one-third compared to the same firm’s sales of similar products not subject to the PAE demand (Tucker 2013).

Social costs of reduced innovation. A great deal of economic literature shows that firms do not capture all the value created by the research and development they do (Mansfield 1968). Thus, the losses caused by excessive litigation exceed even the large stock market losses described above, including lost value to consumers who are not able to buy innovative products, and reduced income for workers whose pay is lower because they are unable to work with more productive new processes.

Range of Victims

Although PAEs often target major, household-name and deep-pocketed technology companies, they also target start-ups and small companies. In fact, though the most substantial settlements are often extracted from large entities, the majority of PAE suits target small and inventor-driven companies (Bessen and Meurer 2012).

Recent surveys provide evidence for the negative impact of PAE litigation on innovative companies. The impact on smaller startups is particularly acute. In a recent survey of 223 technology company startups, 40 percent of PAE-targeted companies reported a “significant” operational impact (e.g. change in business, exit from the market, delay in milestone, change in product, etc.) due to the suit or threat thereof (Figure 2).⁷ In another recent survey of 116 in-house counsels, primarily from firms with over \$100 million in annual revenue, nearly all firms reported that PAE demands had affected them financially or distracted them from their core business, with nearly 40 percent stating that PAE activity had led them to make changes to an underlying product (McBride 2013).

PAEs have also sent infringement notices to “downstream users” of technologies, who are often small companies, as in the scanner and Wi-Fi cases discussed above. Although the amount of money extracted from each company is small, the number of potential defendants makes this strategy potentially profitable overall.

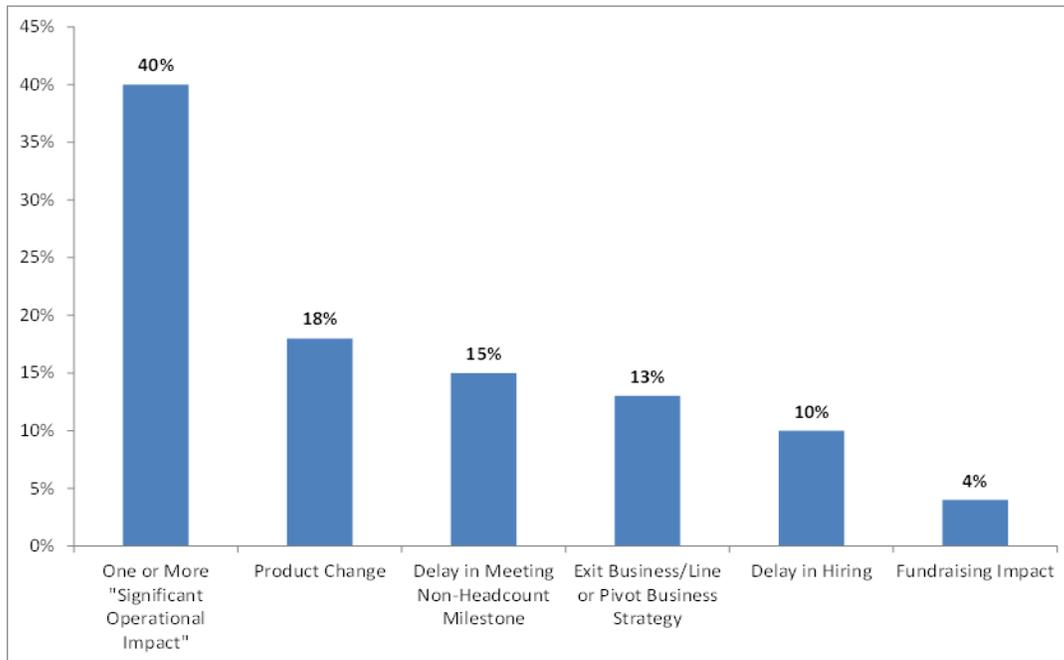
Aggressive litigation tactics have also been adopted by some firms that practice their patents. The recent spate of patent litigation among large technology companies—termed the “smartphone patent wars” by the press—typifies this behavior, which also involves companies purchasing massive numbers of patents as a defense against of litigation, or as leverage in negotiating licenses with competitors.

Between \$15-20 billion was spent on patent litigation and patent purchases in the smartphone industry from 2010- 2012 (Lemley 2012). And in 2011, spending by Apple and Google on patent litigation and patent acquisitions exceeded spending on research and

⁷ “PAE” was defined as “an entity that does not offer products/services” and makes a “demand” regarding patents (Chien 2012).

development of new products, according to public filings (Duhigg and Lohr 2012).⁸ Indeed, Google’s \$12.5 billion purchase of Motorola, according to its own statements, was undertaken in large part to prevent patent suits from competitors (Womack and Tracer 2011).

Figure 2: Impacts of a PAE Demand on Technology Startups⁹



“Defensive” purchase of patents has come under scrutiny by the Federal Trade Commission and the Department of Justice for potentially anti-competitive behavior.¹⁰ In one illustrative case, Apple and Motorola engaged in protracted legal wrangling over whether Motorola’s royalty requests were reasonable given that the technology was “standard essential,” i.e. required for a standardized technology to function. In some technical standards-setting situations in which a patented technology is being considered for inclusion in a standard (such as Wi-Fi), a patent-holder may agree to offer licenses for the technology on “fair, reasonable, and non-discriminatory” (FRAND) terms, in return for gaining access to the broad market that having a standard potentially creates.

When standards incorporate patented technologies, owners of those patents benefit from expanded marketing and licensing opportunities, while the public benefits from products

⁸ In 2012, Google spent \$12.5 billion to buy Motorola Mobility and its patents and \$5.2 billion in 2011 on research and development (R&D) Google, Inc., Annual Report (Form 10-K) 6 (Jan. 26, 2012), available at <http://www.sec.gov/Archives/edgar/data/1288776/000119312512025336/d260164d10k.htm>. In 2011, Apple spent \$2.4 billion on R&D but contributed more, approximately \$2.6 billion, to a single transaction to buy patents from Nortel. Apple, Inc., Annual Report (Form 10-K) 7 (Oct. 26, 2011), available at <http://www.sec.gov/Archives/edgar/data/320193/000119312511282113/d220209d10k.htm>

⁹ Source: (Chien 2012)

¹⁰ http://www.justice.gov/atr/public/press_releases/2012/280190.htm

embodying the best technical solutions. However, a product that complies with such a standard will necessarily read on these patents, creating a potential incentive for patent owners to raise the price of a license after the standard is set. In early 2013, the Department of Justice and Patent and Trademark Office issued a joint policy statement on the implications of this phenomenon for enforcement at the International Trade Commission (ITC).¹¹ Also in 2013, the FTC settled with Google, issuing a consent decree in which Google agreed to honor Motorola's prior commitments to license standard-essential technologies on FRAND terms (Federal Trade Commission 2013).

V. Conclusion

[A]mong a host of dormant patents, some will be found which contain some new principle . . . which the inventor, however, had failed to render of any use in his own invention. And some other inventor, ignorant that such a principle had been discovered... had the genius to render it of great practical value . . . when, lo! the patent-sharks among the legal profession, always on the watch for such cases, go to the first patentee and, for a song, procure an assignment of his useless patent, and at once proceed to levy black-mail upon the inventor of the valuable patent.

- Senator Issac Christiancy, (R – Michigan) 1878¹²

“Patent Assertion Entities” (PAEs) often abuse the U.S. intellectual property system's strong protections by using tactics that create outsize costs to defendants and innovators at little risk to themselves. The PAE business model is based on the presumption that in many cases, targeted firms will settle out of court rather than take the risky, time-consuming course of allowing a court to decide if infringement has occurred.

The practices of this group of firms, which has come to file 60% of all patent lawsuits in the US, act to significantly retard innovation in the United States and result in economic “dead weight loss” in the form of reduced innovation, income, and jobs for the American economy.

Improving policy in this area is challenging because maintaining the incentives for innovation provided by patents requires allowing litigation when patents are infringed, and because practicing firms sometimes act badly as well.

As the quote above suggests, this problem has occurred before in US history. These abusive suits occur when it is costly or risky for practicing firms to defend themselves against unwarranted claims of infringement. Similar cases occurred with patents for agricultural equipment and for railroad equipment in the late 19th century.

In the case of agriculture, “shark” activity was unleashed in the late 1860s when the Commissioner of Patents (with the support of Congress) issued rulings that had the effect of reducing the bar for non-obviousness. In the 1880s, the Patent Office (again supported by Congress) changed the standard back to what it had been, and suits by non-practicing patent owners fell dramatically.¹³

¹¹ <http://www.justice.gov/atr/public/guidelines/290994.pdf>

¹² 45 CONG. REC. 307 (1878) Quoted in Magliocca, 2007

¹³ Lamoreaux, et al 2013; Magliocca 2007

In the case of railroad equipment, the late 19th century was a period of fast-moving, complex technical change, making it difficult to determine whether claims were novel and non-obvious to a skilled practitioner. In addition, practitioners of railroad technologies (not unlike software innovators today) preferred to focus on expanding the overall market for their products by technological cooperation with rivals, rather than working to clearly delineate property rights (Boldrin and Levine 2013). In this case, “shark” activity fell away as a) railroad firms banded together to fight all claims of infringement (rather than settling) and b) patent claims became narrower and clearer, as railroad technology became more codified.¹⁴

A key factor in the rise of patent assertion by non-practicing entities in each of these cases was a change in law or technology that led to uncertainty about whether a patent had been infringed (for example, the granting of large numbers of patents that were broadly written or that met only a low standard of non-obviousness). History suggests that it should be possible to address these challenges. There have been two periods when conditions arose for the PAE or “shark” business model to be profitable (Lamoreaux *et al* 2013). In both instances, once the underlying conditions were changed, this business model was no longer profitable and litigation of this type fell dramatically.

Thus, the best approach to resolving today’s patent troll problem is not to ban firms specialized in patent assertion, but rather to reduce the extent to which legal rules allow patent owners to capture a disproportionate share of returns to investment (Lemley 2008). We see three main areas for improvement: clearer patents with a high standard of novelty and non-obviousness, reduced disparity of litigation costs between patent owners and technology users, and greater adaptability of the innovation system to challenges posed by new technologies and new business models.

¹⁴ Chien 2012; Usselman and John, 2006

Works Cited

- AIPLA (American Intellectual Property Law Association). "Re: Comments on the FTC/DOJ Patent Assertion Entity Activities Workshop, December 10, 2012." April 5, 2013. <http://www.justice.gov/atr/public/workshops/pae/comments/paew-0046.pdf>.
- Allison, John R., Emerson H. Tiller, Samantha Zyontz, and Tristan Bligh. "Patent Litigation and the Internet." *Stanford Technology Law Review* 3 (2012).
- Ballardini, Rosa M. "The Software Patent Thicket: A Matter Of Disclosure." *SCRIPTed* 6, no. 2 (2009), 207-33. <http://www.law.ed.ac.uk/ahrc/script-ed/vol6-2/ballardini.asp>
- Bessen, James E. "A Generation of Software Patents." *Boston University School of Law Working Paper No. 11-31*, June 21, 2011.
- Bessen, James E., and Michael J. Meurer. "The Direct Costs from NPE Disputes." *Boston University School of Law, Law and Economics Research Paper No. 12-34*, June 28, 2012.
- Bessen, James E., Michael J. Meurer, and Jennifer Laurissa Ford. "The Private and Social Costs of Patent Trolls." *Boston University School of Law, Law and Economics Research Paper No. 11-45*, September 19, 2011.
- Boldrin, Michele, and David K. Levine. "The Case Against Patents." *Journal of Economic Perspectives* 27, no. 1 (2013): 3-22.
- Boswell, John. *Abusive Patent Litigation: The Impact on American Innovation & Jobs, And Potential Solutions*, United States House of Representatives Judiciary Subcommittee on Courts, Intellectual Property and the Internet 113th Cong. 2013.
- Chien, Colleen V. *Patent Assertion Entities, Presentation to the DOJ/FTC hearing on PAEs*. Washington, DC, December 10, 2012.
- . "Patent Assertion Entities, Presentation to the DOJ/FTC hearing on PAEs." *Social Science Research Network*. December 10, 2012. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2187314 (accessed May 15, 2013).
- . "Startups and Patent Trolls." *Santa Clara University Legal Studies Research Paper No. 09-12 Working Paper Series*, 2012.
- Consumer Protection Complaint. State of Vermont v. MPHJ Technology Investments LLC, 282-5-13, State of Vermont, Superior Court, Washington Unit. May 8, 2013. <http://www.atg.state.vt.us/assets/files/Vermont%20v%20MPHJ%20Technologies%20Complaint.pdf>
- Duhigg, Charles, and Steve Lohr. "The Patent, Used as a Sword." *The New York Times*, October 7, 2012.
- Federal Trade Commission (FTC). "The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition." March 2011.
- Federal Trade Commission (FTC). *Google Agrees to Change Its Business Practices to Resolve FTC Competition Concerns In the Markets for Devices Like Smart Phones, Games and Tablets, and in Online Search*. January 3, 2013. <http://www.ftc.gov/opa/2013/01/google.shtm>.
- Feldman, Robin, Thomas Ewing and Sara Jeruss. "The AIA 500 Expanded: Effects of Patent Monetization Entities" April 9, 2013. <http://ssrn.com/abstract=2247195>
- Fisher, Daniel. "Hard Time for Trolls as Vermont Sues Patent Mill Over Demand Letters." *Forbes*. May 24, 2013.

- Hagi, Andrei, and Yoffie, David "The New Patent Intermediaries: Platforms, Defensive Aggregators, and Super-Aggregators," *Journal of Economic Perspectives* 27, no. 1 (Winter 2013): 45-66.
- Halliburton Energy Services, Inc. v. M-I LLC*. 514 F.3d 1244 (United States Court of Appeals, Federal Circuit, January 25, 2008).
- In Re Schreiber*. 128 F.3d 1473 (United States Court of Appeals, Federal Circuit, October 23, 1997).
- In Re Swinehart*. 439 F.2d 210 (United States Court of Customs and Patent Appeals, 1971).
- Jeruss, Sara, Robin Feldman and Joshua Walker. "The America Invents Act 500: Effects of Patent Monetization Entities on US Litigation." 11 *Duke Law and Technology Review* pp. 357-389 (2012).
- Jones, Ashby. "Cisco's Patent Counterattack Fails." *The Wall Street Journal*, February 6, 2013.
- Lamoreaux, Naomi R., Kenneth L. Sokoloff and Dhanoos Sutthiphisal. Patent Alchemy: The Market for Technology in US History. *Business History Review*, 87, no.1 (2013): 3-38.
- Lemley, Mark A. "Are Universities Patent Trolls?" *Fordham Intellectual Property, Media & Entertainment Law Journal* 63, no. 1 (2008): 611-631.
- Lemley, Mark A. "Software Patents and the Return of Functional Claiming." *Stanford Public Law Working Paper No. 2117302 Working Paper Series, 2012*.
- Lemley, Mark A. and Douglas Melamed. "Missing the Forest for the Trolls" *Stanford Law and Economics Olin Working Paper No. 443, 2013*.
- Lemley, Mark A., and Carl Shapiro. "Probabilistic Patents." *Journal of Economic Perspectives* 19 (2005): 75.
- Mackie, David J., Andrew C. Payne, and Lawrence C. Stewart. US Patent 5715314. 1994.
- Mansfield, Edwin. *Industrial research and technological innovation: An econometric analysis*. New York: Norton, 1968.
- Magliocca, Gerard N., "Blackberries and Barnyards: Patent Trolls and the Perils of Innovation." *Notre Dame Law Review* 82 (2007). Mullin, Joe. "How Newegg crushed the "shopping cart" patent and saved online retail." *Ars Technica*, January 27, 2013a.
- Mullin, Joe. *Patent Trolls Want \$1,000 - For Using Scanners*. Arstechnica.com January 2, 2013b.
- Tucker, Catherine. "Patent Trolls and Technology Diffusion." *TILEC Discussion Paper No. 2012-030 Law and Economic Research Paper Series, 2013*.
- Usselman, Steven W., and Richard R. John. "Patent Politics: Intellectual Property, the Railroad Industry, and the Problem of Monopoly." *The Journal of Political History* 18, no. 1 (2006): 96-125.
- Womack, Brian, and Zachary Tracer. "Google to Buy Motorola Mobility for \$12.5 Billion to Gain Wireless Patents." *Bloomberg*. August 15, 2011. Yeh, Brian T., "An Overview of the 'Patent Trolls' Debate." *Congressional Research Service*. April 16, 2013.