A race to the bottom

The defensive patent arms race, and companies’ consequent focus on quantity rather than quality as they build their portfolios, causes them and others a great many problems

By Colleen Chien

Among the reasons that high-tech companies obtain patents, perhaps the most common is to build a defensive arsenal. To guard against the risk of patent litigation, companies acquire patents so they can retaliate against or neutralise threats of suits brought by others. A large patent portfolio is thought likely to discourage such threats in the first place.

In theory, that is how things are supposed to work. Reality has proved to be more complicated. Most obviously, mountains of patents have shown themselves to be useless against the US patent system’s stateless actors — patent assertion entities (PAEs) which are invulnerable to patent infringement counterclaims because they make nothing. PAE lawsuits (including declaratory judgments involving their patents) have risen in recent years, representing approximately 19% of suits in the 2000 to 2008 period (Figure 1) and an approximate doubling over that time, from about 13% to 25%.

In addition, as the current smartphone wars make plain, the patent arms race has failed to bring about patent peace between competing companies — at least in the short term. Although unprecedented in number, such suits between practising companies are not rare in kind. According to a study 1 published in 2009, suits between practising companies making over US$100 million in revenue per year represent 28% of all high-tech patent litigations and are the most common type (Figure 1). They also last longer than other suits — on average, around 14 months, while patent assertion entity suits resolved in 9.1 months. Though perhaps fewer suits than otherwise would have been brought, the number of large company suits suggests that defensive patenting has not accomplished anything close to resembling patent peace among practising companies.

Despite these limitations, the patent arms race is alive and well, as this year’s purchases of the Motorola Mobility and related patent portfolios remind us. Having a large patent portfolio makes companies that have been threatened feel safer. Unlike weapons, patents are not inherently dangerous and can be quite useful. They disclose information about inventions, including how to make and use them, for others to learn from and improve upon. Patents provide a proxy of innovative activity, signalling to investors a company’s pipeline or promise. They also facilitate specialisation — innovative small companies can concentrate on inventing, before passing along their technologies to others to develop, manufacture and distribute in product form.

The practice of mass cross-licensing (or perhaps more commonly, mass ignoring) of patent portfolios is cheaper and more efficient than trying to determine — in negotiations, by a judge or before a jury — which products might infringe what patents, in what countries and to what degree. To the extent that patents enable the exchange of information or the trading of product features, they benefit consumers. An armed society is a polite society.

Deeply lawed
This conventional wisdom motivates
Armed and dangerous

patenting in high-tech industries. But in light of the resources devoted to defensive patenting, and defensive patent acquisition, it is worth considering its history, practice and impact on the patent system. When this is done it is hard not to conclude that the arms race logic of “more patents, less lawsuits” is deeply flawed.

Though defensive patenting probably does ward off some lawsuits, it works less well when there are asymmetric stakes, whether among practising companies or between practising and non-practising companies. This incomplete protection has come at a significant, and thus far overlooked, social cost. Mass patenting means that patent quality suffers, and that the line in which companies must wait to have their patents examined grows longer – making for a greater backlog. Patents acquired to shield their owners have ironically ended up being used as swords in the hands of others.

How a dilemma was created
To the casual observer, it would appear that technology companies file for large numbers of patents as a matter of course. But it was not always thus. In the late 1980s and early 1990s, many innovative high-tech companies did not file for patents. By the turn of the millennium, many had reversed stance and were filing for hundreds and even thousands of patents per year as part of the patent arms race.

The origins of the patent arms race can be traced to the corporatisation of US R&D and development of case law around the turn of the 20th century. The demise of a doctrine disfavouring unworked patents, as well as the rise of strategic uses of patents, contributed to a shift away from the individual patent and towards the patent portfolio. With it, the romantic notion of an individual US inventor toiling in solitude before obtaining a patent and introducing his revolutionary lightbulb to the market gave way to large-scale R&D and patent acquisition. Large companies grew to view patents — often over technologies they ultimately did not commercialise — as an important strategic weapon in the battle against their equally large, patent-fortified rivals.

Figure 1. Distribution of high-tech patent lawsuits (2000-2008)

Line divides companies with US$100 million annual revenue. An additional 7% of litigations are either initiated by universities or otherwise do not fit into one of the categories shown.

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Henry Ford was an early defensive patenter. According to accounts, he accumulated car patents to reduce the risk of being sued and gain the ability to operate freely, without ever having to enforce the company’s patents. Filing for patents gave Ford the ability to trade rights with his competitors and to prevent the technology from being patented by others.

The patent arms race in the software and hardware industries has developed more recently. In the case of software, for example, patents have become more readily available. In 1994 the Federal Circuit ruled that software running on a general purpose computer could be patented (in Re Alappat); in 1998 it concluded in State Street that processes that produced a useful, concrete and tangible result could too. Three other developments spurred the adoption of defensive patenting: the licensing campaigns of Texas Instruments (TI) and IBM, the patent disputes between Kodak and Polaroid, and cross-licensing practices.

The catalysts
While eventually practised industry-wide, modern-day defensive patenting was catalysed by the actions of single companies – TI and IBM. In the mid-1980s, TI began an intensive licensing and litigation campaign to save the company from bankruptcy. A decade and a half and an estimated US$4 billion later, it had achieved its corporate objective. Along the way, it fundamentally changed how hardware companies approached patenting. In the mid-1990s, finally free of an obligation to license its patents imposed by a 1956 consent decree, IBM began its own campaign to monetise the considerable patent portfolio it had built up over the years. While doing so, it set off a chain reaction in the industry and ushered in a new era of software patenting and licensing.

TI’s domestic US patent licensing campaign was inspired by the company’s success in suing foreign competitors for patent infringement. At first, the company’s stance was adversarial, characterised by a willingness to pursue litigation. Over time, however, the company moved towards a licensing model, signing non-exclusive licences with major players in the industry. TI supported these efforts with an expanding patent portfolio, around that time more than doubling the number of applications it had filed in the previous decade. In the early 1990s, most software companies also had few patents. IBM was an exception; as a hardware company, it had always applied for patents. When software patents became available, IBM captured many of them, taking one-quarter of the software patents issued between 1978 and 1988. The company also pushed for development of the case law. Its appeal of a key USPTO decision led to a new form of claim, the Beauregard claim, and the development of guidelines in the mid-1990s for the examination of computer-related inventions.

As part of a broader strategy within the company to patent aggressively, IBM achieved its goal of top position in the patenting charts by 1993 and has remained there since. The company put these patents to use – expanding its patent licensing efforts in response to the introduction of a large number of PC clones. In subsequent years IBM launched an aggressive and successful licensing campaign across technology areas that brought in over US$1 billion in revenue annually by 2003.

By the late 1990s, many high-tech companies had been stung by patent suits and assertions. As they grew tired of paying royalties for access to the patent portfolios of IBM and TI, they developed their own. The rate of semiconductor patenting per research and development dollar doubled

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Table 1: List of top recipients of US patents, 2003-present

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<th>Rank</th>
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<td>1</td>
<td>IBM</td>
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<td>Samsung Electronics</td>
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<td>Toshiba KK</td>
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<td>9</td>
<td>Micron Tech Inc</td>
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<td>10</td>
<td>Matsushita Electric Ind Co Ltd</td>
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Source: Gazelle Technologies ©

Table 2: List of public companies that have offered patents at public auction

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<tr>
<td>Sun Microsystems</td>
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<td>IBM</td>
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<td>Dow Chemical</td>
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Source: Ocean Tomo 2006-2009 auction catalogues

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between 1985 and 1995. More dramatically, software patents, as a share of overall patents, increased more than sevenfold, from 2% in the early 1980s to 15% of patents by 2002. Economic studies have found that this change cannot be explained by changes in R&D and related factors, but instead by the strategic behaviour of firms.

Demonstration effects
As interviews with companies done by Rosemarie Ziedonis and Bronwyn Hall famously documented, demonstration effects also caused firms to adopt portfolio patenting strategies. A lawsuit initiated by Polaroid against Kodak in 1976 and finally settled in 1990 had a particularly profound impact. As semiconductor companies watched Kodak pay Polaroid nearly US$1 billion in damages, give its customers and lawyers another US$600 million and shut down its instant camera business, including a manufacturing plant, at a cost of US$1.5 billion and 700 employees, they took fright. This case illustrated the substantial business risks — including the threat of injunction — associated with patent infringement.

This particular lawsuit, as well as the patent licensing campaigns of TI, had a profound impact on shaping firm strategies. They inspired not only fear, but awe within the IP community. The company, led by the genius of Richard Donaldson, demonstrated the considerable rewards that mining a corporate patent portfolio could yield. Royalty payments were rumoured to have kept TI profitable for five straight quarters despite fierce foreign competition.

Patent portfolios for cross-licensing
As companies grew their patent portfolios, many followed a variant of the “patent everything” approach. In negotiations over complex technologies, parties focused on the quantity as much as the quality of patents in a portfolio. While a few patents representative of each portfolio are considered during negotiation, for portfolios larger than a certain size each patent is rarely scrutinised individually. The number of patents is a key input into the calculation.

For large patent portfolios, the high cost of evaluating which patents might apply to each product, the likelihood of the patents’ validity, the appropriate royalty rate and the appropriate base from which to calculate the royalty have led patent licences to be negotiated en masse. Portfolio cross-licensing, based on patent quantity and other proxies of coverage, has simply proved to be more efficient than the alternative. Companies with relatively fewer patents are disadvantaged in this calculus, unable to effectively evaluate the large number of patents on the other side, but with their own smaller portfolios subject to greater scrutiny.

This licensing dynamic has spurred the growth of defensive patenting. Companies file patents to gain freedom to operate, obtain access to the technology of others and neutralise patent lawsuits. Large portfolios have spawned the development of

Figure 2. Small companies and individual inventors remain the primary source of NPE/PAE patents

Note: NPE litigations for relevant market sectors including: consumer electronics and PCs, e-commerce and software, financial services, media content and distribution, mobile communications and devices networking and semiconductors. NPE, NCE, INV and university suits included

Source: RPX Corporation (c) 2011. Data based on NPE transactions from Jan 2010 to March 2011
other large portfolios. The resulting feedback loop, according to its detractors, creates a cycle whereby low-quality patents beget additional low-quality patents. To improve their bargaining position in cross-licensing, companies engage in what Polk Wagner and Gideon Parchomovsky have called “portfolio maximisation” — the practice of growing their patent portfolios in number and breadth. In pursuit of the patent arms race, companies have devoted considerable financial and technical resources to patenting — in some cases even acting in opposition to their own corporate philosophies and, arguably, their self-interest. Of course, no one thinks their own patents are low-quality — it’s the patents of others that are. However, the pursuit of numbers means that less billable time per patent is devoted to ensuring that the claims are precise, supported and non-obvious over past advances.

An uneasy truce
The hope, of course, is that patent stockpiles will bring about patent peace. But have they really done so? There is an easy answer to this question: no. Piles of patents, no matter how high, provide no deterrent to patent assertion entities that are invulnerable to counterclaims.

To provide a more nuanced answer, however, the effectiveness of the arms race at preventing competitor fights must be considered. While it is hard to isolate the chilling effect attributable to the threat of retaliatory patent suits, as opposed to other deterrents to lawsuits such as company reputation, relationships, resources and culture, the possibility of a countersuit factors into the decision calculus. Thus, although ineffective against PAEs, defensive patenting has dampened the filing of competitor suits over the past two decades. Despite what has probably been the widespread cross-infringement of patents by companies in high-tech industries, no company with a large patent portfolio has been driven out of business by patent litigation thus far, though some have come close or had to change their business model.

However, while reducing the risk of competitor suits, defensive patenting clearly has not eliminated it, as any smartphone handset maker can confirm. It is naïve to expect companies that are enemies in the marketplace to refrain completely from fighting in the courtroom. There are a few reasons why whatever truces defensive patenting have achieved are uneasy ones at best.

The fallacy of defensive patenting
Companies file for or acquire patents defensively in order to gain freedom to operate. However, the grant of a patent does not confer a positive right to practise one’s own inventions; rather, it gives patentees the right to exclude others from making, using or selling their inventions. Defensive patenting theory glosses over this distinction and equates patents with the positive right to practise instead of a negative right to exclude.

In a cold war environment in which players patent and practise related inventions, however, this association approximates reality: a company’s patent portfolio allows it to innovate freely.

Today’s complex patent ecosystem exposes the logical fallacy behind defensive
Defensive patenting works best when the parties are equally matched, with portfolios that cover each other’s products. But that is rarely the case anymore. In the case of the smartphone patent ecosystem, some companies make hardware; others make operating systems; some make both; others make neither— they develop applications; still others don’t develop or make anything at all—they just make or buy patents. Each company has a unique business model, exposure to patent suits and tolerance for patent litigation. PAE lawsuits are not the only kind to take advantage of the asymmetries between actors in the patent arms race. In an analysis I did, nearly one-third of large company lawsuits involved companies without any overlapping lines of business. In these assertions, public companies are suing on the patents they do not practise, borrowing back a strategy that PAEs—arguably originally got from practising companies. Collaborations between practising companies and PAEs such as Round Rock’s assertion of the Micron portfolio, and the recent spate of WiFi suits based on a Broadcom patent seem to be becoming more common. Many technology companies are investors in Intellectual Ventures.

The literature on patent pools—voluntary organisations whose purpose is to put a number of patents into a single licensing package—also sheds light on why patent peace is elusive. Though they come in many varieties, pools that feature vertically integrated firms essentially act as large industry cross-licences. In such pools, contributors to the pool both own the patent and manufacture the technology and therefore pay into and receive royalties from the pool. This increases the incentive to acquire patents, to increase member shares. Patent pools often fall over arguments about how to split the pool. Companies tend to think their patents are more valuable than the patents of others. Rather than opting into a patent pool, a non-joiner may choose to press for licences on its own terms or reserve the right to litigate. Thus, even when company portfolios are comparable, they will rarely be equally matched, either in reality or in the opinion of the parties. Sometimes, for competitive reasons, companies will want injunctions, not royalties. Such factors will lead companies to initiate litigation, even against defendants with large portfolios.

The legacy of the patent arms race
The promise of the patent arms race is more patents and fewer lawsuits. While defensive patenting has probably led to fewer of certain types of lawsuits, it has unequivocally led to more patents. The acquisition of these patents has significant implications for the patent system.

High-volume, low-cost and quality patenting
If a patentee plans to hold the majority of its patents defensively, rather than to assert or enforce them offensively, the patents need not be high quality or litigation-proof. As the patents are unlikely ever to be tested in court—or even in a licensing negotiation—the quantity of patents, rather than the quality of any individual patent, is important. Accordingly, defensive patenters tend to apply a high-volume, low-cost approach to building their portfolios. They invest a limited amount of company time in each patent and are unlikely to conduct pre-patentability searches. Fixed-fee, fee cap and volume pricing arrangements may be used to reduce costs. According to Carina Tan and Craig Opperman’s 2008 article in this magazine, a typical high-volume, low-cost patent filing programme was priced at around US$7,500 per application and US$1,800 per US office action response, about 25% less than the average (IAM issue 27, pages 8-11).

When companies make it their objective to file for a certain number of patents—whether set by investor expectations, competitive benchmarking or another process—the focus tends to be on the question, “What can I patent?” instead of “What is this patent’s strategic objective?” The limited investment made in each individual patent also contributes to lower-quality examination, making it less likely that patentees will take the time to provide meaningful information to the USPTO.

When a company begins to patent, its first priority is to protect its platform or pioneering technologies. Along with patents on new innovations, a company will defensively acquire non-core, portfolio builder patents that cover smaller, more incremental inventions, which are further removed from its core operations and represent inventions with limited commercialisation potential. The net effect is that patents acquired primarily for defensive reasons are likely not only to have received less time and attention, but also to cover less important, more marginal inventions. By creating demand for patents that are never intended to be enforced, the patent arms race has contributed to the problem of low-quality patents.

Patent backlog
Defensive patenting has also been blamed...
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for exacerbating backlog at the USPTO. Although average pendencies have grown across the board, applications examined in the computer software, architecture and communications technology centres have had to wait longer to receive examination. In 2010, for example, the USPTO took four to six months longer to begin examination of applications in these technology areas and they spent eight months longer in examination, on average.

Unsurprisingly, in the technology areas where the backlog has been longest, there has been exceptionally strong growth in new applications. The percentage of overall applications in each of the aforementioned areas doubled or tripled in recent years. The growth of these new applications has apparently outpaced the USPTO’s ability to scale up its examination resources. A lack of focus on the applicant side slows the examination process. The backlog affects all users of the system, as important patent applications languish alongside the less important ones in the line at the USPTO.

Patent stockpiles
Another consequence of the patent arms race is that it has left practising companies with large numbers of unused patents. As the cultural barriers that have historically prevented practising companies from selling their patents have disintegrated, more companies have made their patents available for sale (Table 2, Figure 2). The patent marketplace now provides a way for companies to dispose of their patents.

The result is that defensively acquired patents may end up being asserted offensively against other practising companies. Intellectual Ventures has used the patents of a former Baby Bell telecommunications company to sue others. The patent portfolio of licensing company MOSAID will soon feature patents that originated at Nokia. RPX Corp has reported that while the bulk of non-practising entity (NPE) patents are still sourced from small companies and individual inventors, NPEs are increasingly buying large company patent portfolios (Figure 2), which are often higher quality than patents from other sources.

In sum, then, the patent arms race has had an impact on the patent system that extends beyond the simple formula of more patents, fewer lawsuits. While deterring some suits, patent arsenals have left companies defenceless against PAEs, which do not create anything, as well as against practising companies, which sue in areas where they do not operate. Defensive patenting has also taken its toll on the patent system – driving demand for low-quality patents and creating a large number of unused patents. While these developments do not justify the wholesale abandonment of defensive patenting, which has had some deterrent effect, they do reveal an overlooked contributor to the current state of patent quality and patent litigation: the patent arms race.

It’s society’s dilemma, too
As public scrutiny of the US patent system has intensified, a larger range of reform proposals have become viable. A problem with some of them is that they tend to focus on the patent landscape in tech, where words such as broken are used to describe what is found, and fail to take into account industries such as drugs and chemicals, where the system – while not completely problem free – apparently works better. Another problem is that they focus on the 1% to 2% of patents that are litigated, rather than the 99% that are not.

Some of these proposals, and their potential impact on the patent arms and the patent system in general, are described below. They can be grouped into three broad categories: abolish software patents, make patenting more expensive or difficult, and make patents less nuclear. Despite the passage of the America Invents Act (AIA), the technology community continues to press for change of the patent system to reduce the risks associated with selling innovative products.

Banning software patents
Software engineers and others have called for software and business method patents to be abolished. The thinking is that by eliminating the most troublesome patents, the genie could be put back into the bottle. Although radical sounding, the outlawing of certain patents is preceded. According to Gerard Magliocca, in the 19th century Congress eliminated opportunistic patent lawsuits brought by non-practising patent sharks against farmers by wiping out the patents on which the suits were based. The America Invents Act (AIA) has attempted to eliminate tax method patents. However, such a proposal is not without its problems. The definitional problem is a real one, what is a software patent? Even if it could be addressed, hardware and other high-tech component industries would remain unaffected and any issues existing there unaddressed. Small companies also rely on their patents to a greater degree than do large companies. Would Google have been
## Action plan

The arms race logic of more patents, less lawsuits faces significant challenges in today's high-tech patent ecosystem:

- The patent arms race is most effective at deterring litigation when the parties have symmetric stakes to the lawsuit.
- Patent deterrence does not apply to one of the fastest-growing kinds of high-tech patent litigation – litigation brought by patent assertion entities (PAEs). It also applies with less force to cases in which practising companies are suing in areas in which they don’t operate.
- The patent arms race can be credited with discouraging suits between practising companies – far fewer cases than could have been brought have actually been brought. However, litigation between companies of greater than US$100 million in revenue is the most common kind, counting by number of cases.
- The diversity of technology company business models means that even practising companies often have diverse and asymmetric stakes, exposure and tolerance for litigation, creating uneasy truces between companies.

Even if it has solved one problem, the patent arms race has arguably contributed to others:

- Patent stockpiles - some patents acquired initially for defensive reasons have found their way back into the hands of PAEs that are using them for offensive, rather than defensive reasons. Corporate-origin patent assets have been used by Intellectual Ventures to sue others, have been acquired by Round Rock to be asserted and in general are increasingly being acquired by PAEs.
- Patent quality - by creating a demand for patents that are not ever intended to be enforced, and emphasising the quantity over the quality of patents, the patent arms race contributes to the limited investment by patentees in individual high-tech patents.
- Patent backlog - the patent backlog is exacerbated by the large numbers of high-tech patent filings which the USPTO has not been able to keep pace with.

### Make patents less nuclear

Much attention is being focused on rationalising patent remedies. Currently, a single infringed patent out of the 250,000 that reportedly cover smartphone technologies could result in a large damages award and a nearly automatic injunction at the International Trade Commission (ITC). This does not seem appropriate, given the totality of interests at stake. However, determining the right remedy is hard to do, and even harder to predict ex ante. While district court judges have the power to include or exclude evidence, and set case timing, they cannot control the parties’ lawyers, or the juries whose presence is guaranteed by the US Constitution. In addition, each one is only the master of her courtroom so, at best, any changes across the system are likely to be implemented slowly and in a piecemeal fashion; and will not include the ITC. Re-examination or post-grant challenges can also deal a surgical strike to the patents or patent holders that are most likely to be involved in patent battles, but they are not without their risks. Re-examination is time-consuming and a patent that survives the fire of re-examination, it has been argued, may come out Teflon-coated.

A cleaner approach would be to modify liability for infringement. An independent invention defence, which would excuse certain independently derived uses of the technology, seems like a promising option. Such a defence, while facially technologically neutral, would potentially be technology specific in application, applying only to inadvertently infringed ideas and having more force, potentially, in tech and component industries, where copying is rarely alleged in litigation. Although some may argue that the defence would add another source of uncertainty to patent holders prior to assertion, it is potentially easier to agree upon whether there is independent invention than whether a jury will find an invention obvious in light of the prior art. As the stakes grow, further consideration of these ideas may be warranted.

### Make patents more expensive or difficult to acquire or hold onto

If the problem is that patents are too cheap and plentiful, one solution is to make them more expensive and scarce. Increasing the filing fee to US$300,000, for example, would force companies to be more selective about the patent applications that they file. A gold-plated patent system of the sort promoted by Mark Lemley and others would also do this in part – creating a tier of patents that are expensive to obtain while disarming others by not granting them the presumption of validity. Brian Love and others have also noticed that most PAE patents are asserted late in their term, so increasing the price and frequency of US maintenance fees could make a difference. With any adjustment, the devil would really be in the detail and care would need to be taken to ensure that price-sensitive entrepreneurs and small entities aren’t hurt disproportionately, and that industry impacts are considered and taken into account. However, the AIA gives the USPTO expanded fee-setting authority, and many fees changes would not require congressional authority, making testing and refinement more possible — at least in theory.

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