

Does “Strategic Patenting” Threaten Innovation and What Could Happen If It Did?

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Recent buyouts of Nortel’s patent portfolio (6,000 patents) by Microsoft, Apple, and Sony for US\$4.5 billion and of Motorola Mobility’s (14,600 patents accepted, 6,700 in tutorial) by Google for \$12.5 billion have focused attention on the role of these portfolios in the business world and on their high value. These developments raise several questions: is the number of patents still a good indicator of technological progress? Was it a good idea to extend the scope of patentability? Is the strategic use of patent portfolios an opportunity or a threat to science and technological progress?

In the first section, we document the main evolutions of this market: the wild growth of patenting and licensing, the degradation of patent quality, the continuous rise of their prices, and the spreading of strategic patenting and of portfolio management. In the second section, we examine the impact of these evolutions on innovation and invention.

1 Patents, Licensing, and Litigation: A Wild Growth

The world of industrial property has been marked, these last few years, by the sizable expansion of filed patents. Today, more than 350,000 patents are filed each year in the United States, and nearly 200,000 are accepted.¹ The same is true in Europe and Asia. This phenomenon is related to a few major events: the

¹The data used in this chapter are all of US origin. This choice is justified because the changes described here took their source in the United States. It is in this country that emerged a market for patents, and it is there that most of its specialists work: 72 % of brokers are installed in the USA (Monk 2009). This is due to the size of the US market and to the specifics of its legal environment.

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globalization of the economy, the extension of the scope of patentable inventions, the multiplication of licenses, and finally, the development of strategic patenting.

Due to globalization, international firms look for patent's protection in all major markets. That was not always true. In the early 1990s, Apple filed in Europe only a selection of its patents. Today, it files all of them in all major European countries, despite the very high costs of translation. All major international companies do the same. According to the USPTO (US Patent and Trademark Office), only four of the top ten recipients of US patents in 2010 are based in the United States, and 51% of all patents granted in the USA are of foreign origin. In the 1990s, foreigners were usually granted around 45% of all US patents.

In recent years, the scope of patentable inventions spread to new areas: biotechnology, software, and business methods.² USPTO started patenting living products (bacteria), software (that had long escaped the patentability), production, and management methods of doing business. Nothing being previously patented in these areas, early entrants sought property rights for almost everything, including obvious “innovations” like the “one-click” that allows a customer to make a purchase on Amazon. Presumably, the idea would have come to anyone interested in this business.

This explosion in patenting coincided with a more systematic use of licenses that became a significant source of revenue for companies with a strong patent portfolio (Kamiyama and alii, McGrath. . .). Far from being just a tool to protect technology, patents give property rights that one can market, rent, or sell. Nationwide, an estimated \$120 billion is each year generated from patent licenses, up from \$15 billion in 1990. Income from licenses contributes to a large extent to the profits of numerous companies (Zunica 2009). According to Levine, IBM's fees from licensing and custom-developing intellectual property for other companies were on track to top \$1.1 billion in 2009. Qualcomm collects almost all its revenue—\$10.4 billion in 2009—from selling licenses and making the chips containing its patented 3 G mobile phone technology, known as CDMA (Levine 2010).

Some companies have long identified this source of income. Roger Smith, head of industrial property of IBM in the early 1990s said: “You get value from patents in two ways, through fees, and through licensing negotiations that give IBM access to other patents. The IBM patent portfolio gains us the freedom to do what we need to do through cross-licensing—it gives us access to the inventions of others that are the key to rapid innovation.”

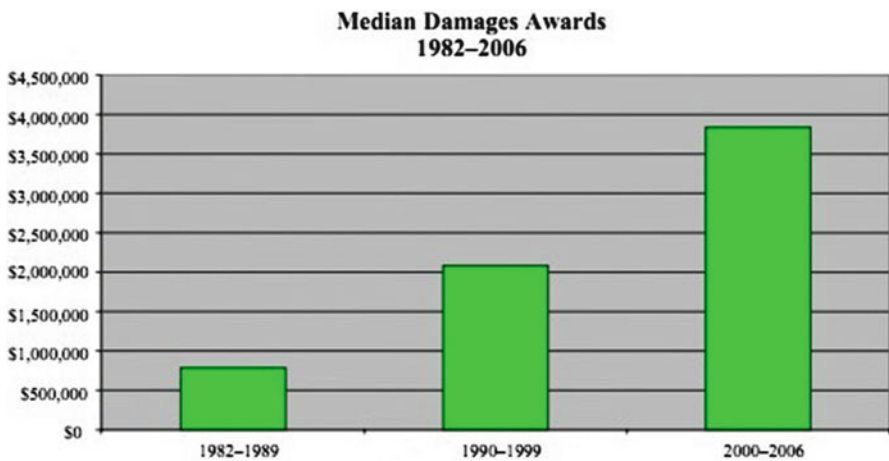
This proliferation of licenses is, in part, due to changes in technology that makes an increasing use of standards and interoperability: products of different companies cooperate and must, thus, use the same technologies. But it also comes from changes in regulations. In 1996, the Supreme Court issued a patent for business methods “making it increasingly impossible to manufacture an electronic device without receiving a cease and desist letter or other notice from a patentee demanding a large royalty or threatening an injunction” (Nielsen and Samardzija 2007).

² And may continue to do so as US courts opened the door to the patentability of diagnoses as in *Mayo v. Prometheus Labs*.

Many companies took advantage of the need to operate patents they own to develop practices which border on predatory. Monk cites the case of a company whose patents portfolio tripled following the intervention of its lawyers that wanted to build a shield against possible prosecution by competitors (Monk 2009). Recently, Microsoft accused the manufacturers of Android smartphones and tablets of infringing 25 of its patents. What could they do? Challenge the patentability of some of these inventions? It is the promise of a long legal battle. Buy licenses? This is what Amazon and HTC chose to do (Gutierrez 2011), but it can only encourage attacks by predators of all kinds, including NPE (non-practicing entities) or patent trolls (Layne-Farrard 2010), companies who make their living out of lawsuits for patent infringement.³

With so much at stake, patent disputes are increasingly ending up in court at the expense of the patent holders. In the 1980s, US courts dealt 1,000 patent litigations. These disputes have multiplied as US courts are quite severe with the trespassers. They generally ask the licensee to pay a royalty rate of 25% of its expected profits for the product that incorporates the infringed patents. And they continue to do so despite the ruling *Uniloc Inc. vs. Microsoft Corp.* “that held that the 25% rule of thumb is a fundamentally flawed tool for determining a baseline rate in a hypothetical negotiation” (Dallman 2011). In fact, this level of royalties is so high that a company may have to stop the manufacture of its product even if it is innovative.

These cases are always very expensive. It was calculated that each party in a trial spends an average \$4.5 million. Even when patents are very similar, one must sue each patent separately, which greatly increases costs that are generally included in R&D budgets. Instead of financing research, companies pay lawyers.



(Source: McGraph)

³ These companies are more numerous than one can imagine, and not just American. They have grown since one of them got, through transaction, \$162 million from RIM, the Blackberry producer. A specialist in these issues identified 51 NPEs in the US (Shestra 2010).

2 A Notable Degradation of the Average Quality of Patents

These developments went with a significant diminution (at least reported by all professionals) of the average quality of patents. IBM's former Director of Licensing, Emmett Murtha, estimates that 97% of all US patents have no economic value: "I think the majority of patents are not licensed because the technology they embody is not really useful, not feasible to commercialize, or simply not marketable for a variety of reasons" (M-CAM 2003). A figure that a specialist quoted by the New York Times confirms: "Good companies use only 20% of their patents," said Sam Khoury, the president of Inavis International, a consulting firm that appraises patents, trademarks, and related corporate assets. "Badly run companies use only 10%" (Feder 2002). And an expert calculated that approximately 50% of patents are not considered valid after a legal dispute (Reback 2006). This decline in quality does not prevent companies from exploiting their portfolio. Apple was able to prohibit the marketing of Samsung's tablets in Germany, thanks to patents that described its own tablets in a way that could apply to any similar product: a rectangle with icons that can be activated by passing the finger on it.

Several reasons can be cited for this decline. The most common is the increased workload of the patent office that leads to less rigorous controls.

Professionals regularly complain, as evidenced by this letter that examiners from several offices have sent their leaders in 2007: "Unfortunately, in many patent offices, the pressures on examiners to produce and methods of allocating work have reduced the capacity of examiners to provide the quality of examination the peoples of the world deserve" (The 271 Patent Blog, 2007).

3 Prices: A Very High Inflation

Because they are so often of a poor quality, patents that give a competitive advantage to their owner are not so frequent. Yet their value is increasing. Assuming, as all commentators explained when the deal was done, that Google acquired Motorola Mobility for its patent portfolio and only for this, each patent was valued at just over \$510,000, which is the exact price at which Novell sold, according to Frost & Sullivan's Craig Carter, 882 patents a few months earlier. Microsoft, Apple, and Sony have paid more (in the range of \$750,000) for the patents they bought from Nortel, and RIM is said to have paid \$173 million for 65 patents from Philips (Monk 2009). It is as if a particularly high market price was being created through these various transactions.

This inflation of prices has objective reasons. The most obvious is the desire of companies to protect themselves in all major markets. The cost of filing a patent in two countries is about \$17,000; the filing in fifteen countries is about \$120,000 (WIPO 2008).

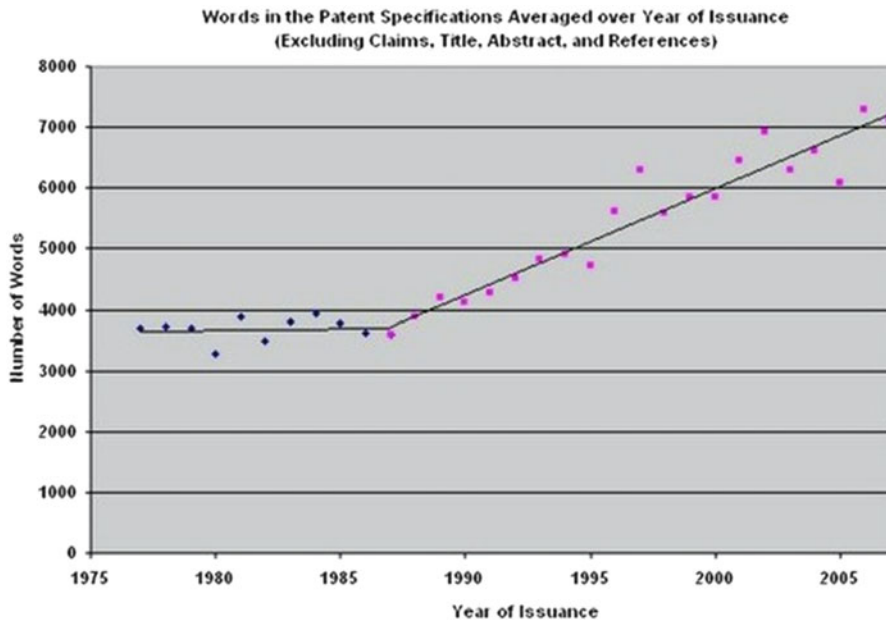
Other factors contribute to this increase of prices, such as the required translation into several languages for European patents.⁴ More significant are endogenous factors such as an increasing complexity that can be measured in several ways. Education is one: patent’s authors are increasingly PhDs. This appears in the US statistics but even more in the European surveys.

	% of female inventors	Average age of inventors*	% of inventors with tertiary education	% of inventors with PhD degree	% of inventors who changed employer after innovation
Electrical Engineering	2.0%	43.3	82.3%	19.1%	27.04%
Instruments	2.7%	44.6	82.0%	33.4%	25.42%
Chemicals & Pharm	7.4%	44.5	91.8%	59.1%	19.99%
Process Engineering	2.1%	46.6	72.7%	22.4%	21.20%
Mechanical Engineering	1.1%	46.2	66.3%	9.3%	21.54%
Total	2.8%	45.4	76.9%	26.0%	22.47%

Number of observations differs across columns, between 8,861 (age) and 8,963 (gender).

Based on a survey of 27,531 European inventors, Giuri et al. (2006)

This complexity of patents can also be measured by the increasing size of patents measured by the number of words.

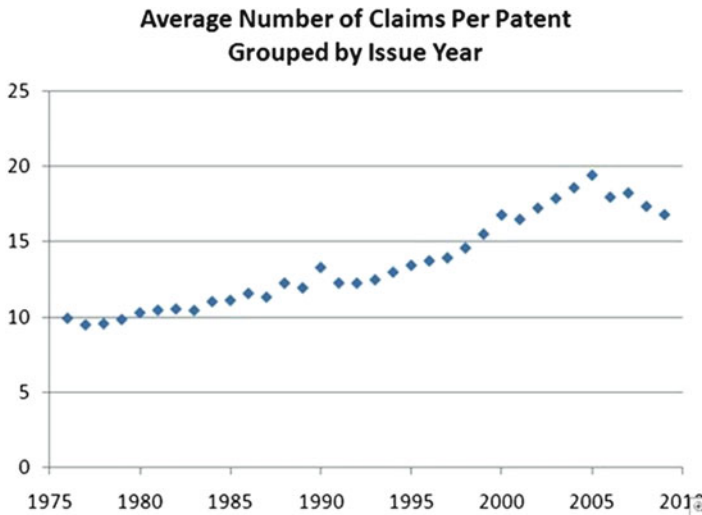


Patents are longer, more complex, as suggested by this graph done on a sample of 10,000 patents up by Patentlyo. The inflection of the curve in the 1980s coincides with the opening of new patentable domains and the creation (in 1982) of the

⁴Once a patent is granted by the European Patent Office, it must be validated in each country in which the applicant seeks protection. It usually means translation in the national language.

US Court of Appeals, which has streamlined and secured intellectual property. Its creation was followed by a sharp increase in the number of patents.

The number of claims has also increased. Each claim being subjected to billing the cost of a patent grew. It can reach extravagant sums: the 13,000 claims the owner of the US2005/0182468 patent requested cost him 1\$.3 million. The more a company has paid to get a patent, the more it will be tempted to value it highly even if it does not use it.



This increasing number of claims is related to the growing complexity of patents, to the nature of inventions, but also to changes in the legal context in the mid-1990s: US Supreme Court ruled in 1996 (*Markman vs. Westview*) that the interpretation of a patent was a matter of law and not a question of fact, which leads to a more restrictive interpretation of the scope covered by each claim, therefore the temptation to multiply them to keep the patents as inclusive as possible. In fact, the drafting of patents being entrusted to lawyers (the drafting of a patent is a round trip between the inventor, often an engineer, and lawyers) is very sensitive to the developments of case law.

The proliferation of litigations also plays a role: a patent which has stood the test of the court acquires value as the risk of a dispute disappears.

Exogenous factors also contributed to patent's increased value. In the USA, companies that give patents to nonprofit organizations, universities, or hospitals can benefit from tax cuts. This practice is widespread. Companies that engage in this practice are naturally interested in getting the maximum value from their portfolio. When General Motors faced with serious financial difficulties envisaged to give its patent portfolio to nongovernmental organizations (NGO), its CEO did not hesitate to assign it a very high value (\$3–5 million for each patent) to increase its tax exemptions (M-CAM 2003).

Other factors played a role like the purchases of patents to protect oneself from litigation or the creation of a market for high-tech companies. When a start-up is sold to a large company, most of its capital is intangible: skills, patents, and designs (Haeussler et al. 2009).

A lucrative market was created with companies whose interests are purely financial (Watanabe 2009). The case of Ampex is significant. This company that manufactured the first audiotape owns a patent portfolio that could generate significant revenues. In 2005, a hedge fund, Valuevest, wanted to buy it to exploit what its managers thought was fair value (The 271 Patent Blog, 08/09/2007).

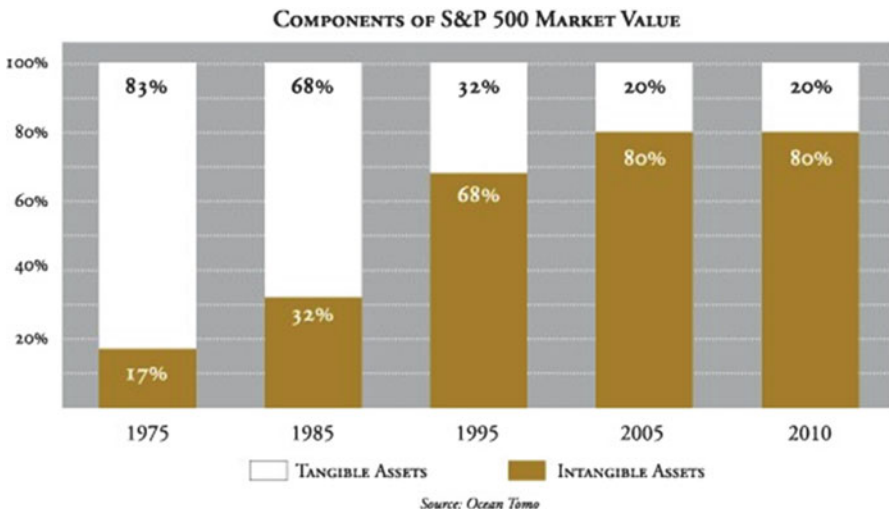
4 Portfolio Management or Predation

There is in this price inflation something of a speculative bubble. All components of a bubble are there: imitation, mimetic contagion, anticipation of future behaviors based on beliefs, and, of course, difficulty to properly value assets.

The techniques used to calculate the value of a patent or a portfolio pose almost insoluble problems. Several methods exist, but they do not necessarily give the same results. But there is more.

Behind this inflation lies a significant change in the behavior of tech companies, especially the big ones: they have chosen to manage their patent portfolios as a real asset. At all times, firms have filed patents to lure their competitors (Langinier 2005); General Electric was famous in the twenties for practicing “defensive patenting” (Nicholas 2005); DuPont used its patents to prevent the arrival of new entrants to its markets (Hounsell 1988), but firms that engage today in these practices want to value their intangible assets.

These portfolios represent a growing part of business assets. A research company, Ocean Tomo, has assessed the rise of these intangible assets as follows: “In 1975 more than 80% of corporate value reflected in the S&P 500 was tangible assets, while intangible assets comprised less than 20% of market capitalization. Today, the ratio of tangible to intangible assets has inverted—nearly 80% of corporate value resided in intangible assets (Ocean Tomo 2011).” By intangible assets, one must understand patents, brands, and reputation.



These results can be challenged, but they are corroborated by numerous studies (King 2003). The OECD explains that “in the United Kingdom investment in intangibles is estimated to have more than doubled as a share of market sector gross value added between 1970 and 2004.” They are symptomatic of a new phenomenon: inflation of intangible assets. As explained by RPX, players on this market, “patent litigation used to be a form of legal redress. Today it is a business model.”

5 Intellectual Property Rights: A Questionable Theory

It is, in fact, the whole governance of innovation that has changed. These changes were made on behalf of the theory that industrial protection is an incentive to innovate. A theory that can be summarized in a few lines: not enough inventions will be made unless incentives are provided; patents are the most effective means of providing these incentives.

This thesis is old. It is found in the texts of the first patent lawyers, but is it true?

We reported at the beginning of this article the explosion in the number of patents. This growth is generally seen as a sign of the acceleration of technical progress (Kirankabeş 2010), but these figures make their best sense when broken down by technology. More than 29,000 patents have been filed in the United States around USB (Universal Serial Bus), more than 27,000 on JPEG images, and more than 3,300 on 3G cellular modems. And this is not unique to computer science. The inhibition of angiogenesis, a recent strategy to fight cancer, has led to 28,000 patents, and sunitinib, a drug for the treatment of kidney cancer, to 3,000. Is not that in any case too much? Are these techniques so complex that they require so many inventions? This is unlikely. As we have seen, so many other factors contribute to the expansion of the number of patents that it has ceased to be a reliable indicator of technological progress.

The critique of industrial protection is not new. In an article published in 1950, Fritz Machlup and Edith Penrose showed that it has accompanied the beginnings of the patent law (Machup 1950). It is only when the protectionists have prevailed over the free traders in the aftermath of the crisis of 1873 that patent proponents won out after a vigorous propaganda campaign.⁵ This shows that intellectual property protection was not obvious to most classical economists even if Adam Smith, John Stuart Mill, and Jeremy Bentham “viewed patents as a justifiable exception to free trade principles.”

Contemporary criticism rarely mentions these ancient texts as it rather seeks to analyze the current situation. It has several origins. It comes, in part, from industrial

⁵ Hostility to protectionism was particularly strong in Britain, where it gave birth to an abolitionist movement and in Germany. Defenders of patents saw it a protection of the industry similar to customs duties.

property specialists concerned about some of its deviations (USPTO 2003) and who highlight the various weaknesses of current arrangements.

It also comes from economists. The Austrian School (Murray Rothbard, among others) has long criticized intellectual property, accusing it, among other shortcomings, of diverting investment in basic research. If this risk has long seemed low, it has gained consistency since universities have the opportunity to apply for patents (1980 in the USA): a university like Yale, which had five patent applications filed in 1981, had 246 in 2011 (97 United States and 149 abroad). How can one exclude that this has been done at the expense of basic research?

It was only recently that orthodox economists have questioned the link between patents and innovations. Josh Lerner showed that the smaller a company, the more it tends to favor trade secrets over patenting (Lerner 2000). Carl Shapiro expressed concern about the risk of holdup (Shapiro et al. 2007); others have developed models showing that a patent could reduce the potential for innovation (Tuomas and Kanninen 2000) and highlighted the disappointing results of the extension of property law (Dey 2007). Based on an historical review, Bessen and Hunt have questioned the impact of patent systems on innovation: “In some industries such as pharmaceuticals, patents provide strong positive incentives to invest in innovation. But in many other industries, perhaps most, patents fail to perform like property and they may actually discourage innovation” (Bessen and Hunt 2007).

Historians of British industry have also shown that the sectors in which there was more innovations were not those in which more patents have been filed, which is reminiscent of the contemporary situation: IT is probably the sector in which innovations were in recent years the most numerous; it is also one of in which it was for long very difficult to file patents (MacLeod 1986).

These interrogations about the impact of patents on innovation finally come from practitioners. In its 2003 survey, USPTO cites a programmer who says: “The ease with which the US patent office has given patents in the last few years has already dampened my plans to write software as a primary business.” Patents are not or are no longer the engine of innovation that their advocates present. This is confirmed by the Berkeley patent survey of 700 US start-up in 2008 (Graham et al. 2009). It shows:

- That they do not consider patent as an incentive to innovate.
- That the use of patents by start-up varies by industry: low in the software world, and it is more important in companies involved in healthcare (biotechnology, medical devices). The main reason is probably related to the time to market.
- That the start-ups that file patents do it primarily at the request of shareholders.

Confirming these results, Bessen and Hunt indicate that large European companies do file patents for only 36% of their innovations (Bessen and Hunt 2009). Only the pharmaceutical industry proceeds otherwise. In most sectors, firms innovate without worrying about patents. The industrial sectors that could not until recently patent their inventions, such as IT, were no less inventive.

Does it mean that patents do not contribute to the development of innovation? Not necessarily. Some authors have suggested, like Pigou, that patents were not

conducive to innovation, but oriented it: “By offering the prospect of reward for certain types of invention, they (the patent laws) do not indeed appreciably stimulate inventive activity, which is, for the most part, spontaneous, but they do direct it into channels of general usefulness” (Pigou 1920). In the same vein, Petra Moser has shown “that patent systems influenced the distribution of innovative activity across industries. Inventors in countries without patent laws concentrated in industries where secrecy was effective relative to patents, e.g., food processing and scientific instruments” (Moser 2003).

One can advance other arguments in their favor. To defend their institution, the rapporteur of the project of creating patents in France, Stanislas de Boufflers, advanced in 1790 an interesting argument: patents contribute to innovation because they promote the circulation of inventions and they give those who so wish the ability to access and possibly negotiate (*Procès-verbal 1789–1791*). They foster the dissemination of information which can be regarded as a positive externality.

Contemporary experience tends to confirm this thesis. It is a weak protection that favored the emergence of Silicon Valley as the center of IT innovation in the 1980s. Ronald Gilson showed that it was the impossibility to enforce “not to compete” contracts that explains the development of this cluster: an employee with an idea his company did not wish to develop could bring it to a competitor or create his own company (Gilson 1998).⁶ Thus, ideas and inventions could move freely and be tested. The same argument could be applied to China. A poor protection of inventions, a high mobility of engineers willing to share the secrets of their employer did not hinder the development of its economy. On the contrary, it seems to have favored its expansion (Barboza 2011).

If patents are not an incentive to invention, the recent developments that attempt to manage patent portfolios as an asset like any other may stifle innovation and remove this positive externality. Several factors can contribute to the receding of innovation. The first, stressed by several authors, is the diversion of R&D funds toward legal expenses, whether to file patents and to defend them in litigation. Then come the high costs of litigation and the use of patents as a threat that creates a new uncertainty (Graham 2006).

This uncertainty is worsened by the proliferation of patents. The firm that would like to develop a new drug to inhibit angiogenesis in the fight against cancer should ensure that it does not infringe any of the 28,000 patents already filed on this very recent and promising technique. The risk that it could be the case is obviously very high. No doubt the laboratory can buy licenses, but as suggested by Carl Shapiro, if the firm has to give just 1% of its revenues to each holder of patents it infringed, it may soon give up (Heller and Eisenberg 1998).

All these developments may stifle innovation. They may also profoundly alter the direction of research. This is especially true in academia: universities that file patents may focus on applied research at the expense of basic research. Disciplines

⁶ This thesis is supported by recent studies that establish a correlation between the productivity and mobility of researchers (Hoisl 2007).

that cannot be patented, mathematics, physics, and social sciences, could suffer. This is not the only danger: patenting imposes secrecy and therefore inhibits the flow of information which is at the heart of scientific activity. Patents make it more difficult for other researchers to use new ideas. They can create conflicts within the academic community: who is going to reap the most benefits? Who will get the most funding: those that do basic research or those that file patents? This trend is particularly worrisome in China as it encourages its academics to file patents (Ward 2011).

In the area of business, these developments could be no less significant. R&D could no longer be guided by the laboratories or marketing departments but by financiers whose main aim is to maximize the rent from the patent portfolio. They could try to get the best valuation of the portfolio, but they could also push defensive strategies at the expense of more interesting work.

In short, these recent developments are likely to hamper innovation. Unless, of course, governments decide otherwise. It’s the legislature that created property rights, changes in regulations are responsible for the changes we documented. But all governments do not approve of these changes. Some might rebel, especially among the BRICS (India, Brazil, etc.), and want a more liberal regime (Bird and Cahoy 2007). We could see the emergence of a “digital divide” between overprotective countries and those that want to protect inventors from all over the world from excessive IP litigation.

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