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The transformations of conventions for patent use and the role of legal intermediaries

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Abstract

Today, the patent system is facing a paradox. It has never been so successful, yet at the same time it has attracted severe criticism, such as the call to return to the "commons". This article argues that the success of the patent at the 'macro' level is linked to the proliferation of the ways it is used at the 'micro' level: as a tool for the protection and diffusion of innovations, as an instrument of market power and technological valorisation, as a signal and instrument of negotiation, as a valuable corporate asset. These uses would somehow be superimposed since the genesis of the patent system, without cancelling the previous ones. This article proposes an analysis of the contemporary evolution of this legal institution by distinguishing different conventions for patent use as well as legal intermediaries which contribute to their definition, diffusion, and transformation, in particular patent attorneys. Although this explanatory outline draws mainly on the case of France, it can be extended to other countries.

Keywords JEL: O31 – Innovation and invention: processes and incentives, O34 – Intellectual property rights, L15- Information and product quality, K49 – Legal procedure (other)

1. Introduction

We find ourselves today in a paradoxical situation with respect to patents. The patent system has never been so successful – if we measure this success in terms of the number of patents filed annually worldwide, which continues to increase – while at the same time this system has attracted severe criticism both in civil society, with the rejection of the so-called “proprietary” model and return to the “commons”, and in academia.

This has recently led to fierce controversies among economists on the merits and social utility of intellectual property rights (IPRs), and in particular on the role of the patent system in stimulating innovation.¹ These controversies among economists have a long history, starting with libertarians detractors who criticized the allocation of any economic monopoly

¹ In recent years some economists have advocated the idea of purely and simply eliminating IPRs, after a transitional period. The study by M. Boldrin and D. Levine (2008) provides a good illustration of this argument and has been the subject of much discussion. By contrast, a recent book by R. Merges (2011) seeks to justify IPRs on grounds going beyond economic considerations alone.

by the state. They died down during the second industrial revolution at the end of the nineteenth century, when a consensus on the subject emerged (Machlup and Penrose, 1950).

Despite the criticism and deep uncertainty about the economic value of patents,² a patent market has developed in recent years, at least in the United States (Monk, 2009), with as a side-effect an increase in the number of intermediaries needed in this sector, in particular patent brokers and financial analysts.³

It should be noted that an embryonic form of a “market for patented technologies” developed very early on in the United States (Lamoureaux and Sokoloff, 2002). After this market had lain dormant for over a century due to the incorporation of R&D operations into large companies, it was reactivated by the expansion of the US patent system beginning in the 1980s, in the context of the US policy of tightening up IPRs internationally and the extension of patents to software and life-science inventions. This strengthening of IPRs has indeed encouraged the emergence of a new type of business, which specializes in the production of technologies that it does not necessarily exploit itself but instead cedes to other exploiters through the assignment of patents or exclusive licences (Arora and Merges, 2004).

In addition to the proliferation of high-tech start-ups, which are particularly prone to using the patent system, we may ask what other sources or explanatory factors account for this surge in patenting and for the consensus in favour of the patent as compared to other mechanisms for protecting knowledge.

In fact, the 1986 inquiry conducted by Levin *et al.* (1987) on the various methods for protecting innovations showed that at that time taking out a patent was only one of several options; others were secrecy, technological advance, the complementarity of assets, and publication. The use of patents was found to be very extensive in sectors where knowledge can easily be codified, such as the pharmaceutical and chemical industries, and was adopted more often for products (because of the risk of reverse engineering) than for production processes. Since this survey, things have changed a lot in favor of patents. During the contemporary period (1990-2007) and in the OECD countries, patent filings have grown more substantially than spending on R&D (Guellec *et al.*, 2010), even though the former has been relatively decreasing since the end of the 2000s, due to renewed business cycle and higher

² This kind of uncertainty can be analysed by focusing on the inadequacy of the patent as an instrument for the codification of knowledge and demarcation of property rights, following a neo-institutional approach (Bessy and Brousseau, 1998).

³ For the US market for intellectual property, see A. Wang (2010) which defines different kinds of patents intermediaries: brokers, defensive aggregators (of patents), and offensive aggregators often qualified by the term “patent trolls”. For the French case, see the report prepared for the *Conseil d'Analyse Economique* by D. Guellec, T. Madiès, and J.-C. Prager, *Le marché des brevets dans l'économie de la connaissance*, 2010.

patentability standards in the US and Europe. Nevertheless, there has been a growing demand for patents at the European Patent Office (EPO) over the ten last years, from 136.800 in 2008 to 165.590 in 2017 (annual growth rate of 2%).

The worldwide surge in patenting can be attributed to the greater globalization on IPRs (broader geographic protection by filing in different regional offices) (Fink et al., 2016), rather than an increase in research productivity (Danguy *et al.*, 2014). But, in a somewhat different perspective, this patent inflation can be also linked to a kind of convention about the solid worth of patent considered as an intangible but valuable asset, somewhat like the mimetic process of the convergence of beliefs (Orléan, 2011), parallel to that which exists with respect to the state of business or of the financial markets. A good illustration is given by large companies who now seek to accumulate a patent portfolio (although they have rarely had recourse to this method of protecting innovation in the past), in the hope that these portfolios will enable them to improve their market capitalization. But this should not blind us to all the IPR intermediaries who contribute to this alignment of opinions concerning the untapped value of intellectual property assets.

Beyond the US and Europe policy of tightening up and harmonizing IPRs (and TRIPS agreements also which came into force in 1994), one might, of course, raise questions about the role of political factors, which have encouraged patent filing (Lerner, 2002), and about the various lobbying activities which have recently contributed to make filing patents an indicator of success in innovation, including in publicly funded research, thus helping to exacerbate this spiral. Or one could point to the increasing juridicization of the processes of technological co-operation, including cases where these resemble “knowledge commons” based on very sophisticated free licensing systems devised by IPR intermediaries.

In this article, I demonstrate that the contemporary surge in patenting observed at the macro level is linked to the proliferation of the ways it is used and collectively valued at the micro level. These conventions for patent use have so to speak been accumulating since the genesis of the patent system, and earlier uses have never been superseded by later ones.

After presenting the framework for my analysis (section 2), I go on to describe the various conventions for patent use and the roles played by legal patent practitioners in defining and diffusing these conventions and in constructing the markets in which patents are exchanged, including licensing agreements. The traditional uses of patent are presented (section 3), then the use of patent considered as a signal and instrument of negotiation (section 4), and finally patent as a valuable corporate asset (section 5). We conclude with some policy implications that emerge from the insights of our analysis (section 4).

Among legal patent practitioners, I will focus on the role of patent attorneys, whose business has recently grown significantly through a diversification of their activities, in the same way that IP law firms have done.⁴ Although initially the main task of these agents was to assist inventors in the writing and filing of patent, in litigation in the courts, they gradually developed their advisory activity and participated in the construction of a market for patented technologies, there including the drafting of the contracts for the transfer of patent or licence sales (Bessy, 2006). They can therefore also be regarded as "patent brokers" to reduce transaction costs in this market by linking the parties and ensuring the accuracy of trade (Lamoureaux and Sokoloff, 2002).

Another source of explanation for the recent surge of patenting, which will not be pursued in this text, is the greater willingness of the courts to enforce patent rights, as testified by the increasing proportion of cases won by patent holders in the US in the 1980s with the emergence of specialized patent court (Kortum and Lerner, 1998).⁵ Whether we are going to witness the same evolution at the European level with the planned creation of a patent specialized court is an open question.

By focusing on the different activities of patent attorneys we also avoid putting the blame for abuses of the patent system purely on businesses or on the dysfunction of patent offices, which seem to be collapsing under the weight of increasingly lengthy and complex requests for patent filings (longer texts, a greater number of claims), resulting in a reduction in the quality of the patents granted (Jaffe and Lerner, 2004; Burt and Lemley, 2009; Le Bas and Pénin, 2014). But we will mention the role of examiners in the functioning of the patent system. This role is limited to examination of the filing for patent but which also includes acts of judgment in opposition proceedings. They are required to have relationships with patent agents when they are not themselves then agent or lawyer, taking advantage of their good knowledge of the functioning of the office (Swanson, 2009).

Finally, focusing on the patent agents will make other practitioners appear in the analysis, showing how a division of labour is established within the patent eco-system but also how the struggles of borders between these professionals arise at the national and international level.

⁴ In France, the profession was regulated in 1992 by the Intellectual Property Code, which imposed obligations on its practitioners comparable to those for lawyers (qualifications, ethical rules, company insurance and governance structures). In 2017, there were over 1000 registered practitioners (compared to 900 in 2012); 52 per cent used the mention "patent", 35 per cent "brands, designs, and models", 13 per cent both. Like lawyers, almost half of them operate in Paris.

⁵ B. Hall (2007) advances the idea that a specialized patent court is more likely to be captured by the patent bar and those whose interest is served by strong patents.

Drawing on this analysis, we propose an explanatory outline of the recent transformation of the patent system. Although this explanatory outline draws mainly on the case of France,⁶ it can be extended to other countries such as Britain, Germany, and the United States, especially since in our own period the American and European systems are converging.

2. An analytical framework: Law and conventions

My main hypothesis is that the parties involved in the procedure of patent filing, in the granting of the patent title, and in its various applications, especially industrial exploitation, seek to co-ordinate their activity by retaining a certain use of patents (economic valorisation). It is from this viewpoint that we introduce the concept of the “patent use convention”, in order to highlight co-ordination and the reduction of uncertainty throughout all phases of patent-related activities.

The notion of « convention » is understood here in the sense of an informal and self-emergent inter subjective agreement (Bessy and Favereau, 2003) close to that of used by D. North (1990) who also emphasises interactions between legal rules and conventions. This characterization is different from the definition given by Lewis (1969) according to whom the distinctive feature of a convention is that, among a set of possible choices, only one is implemented. As a result, in our analysis several conventions can coexist at the same time.

The patent use conventions are different from economic values or prices conventions in matter of patent. The emphasis is more on the use value of the patent than on its exchange value. These conventions are also different from those which permit the interpretation of criteria of patentability.

From a dynamic point of view, the adoption of a new convention requires that a minimum of actors adhere collectively and spontaneously to a new use of patents. It is the continuing intention of the practitioners to engage in this patent use which perpetuates the convention, whatever their motives (economic interest, belief, etc.), and thereby the institution of the patent (Searle, 1995). Another hypothesis of this evolutionary perspective is that patent attorneys because of their expertise play a crucial role in the dissemination of the convention.

Over time, various conventions for the use of patents have emerged, which function to institutionalize them; these reinforce each other, although they can sometimes be in conflict.

⁶ Some arguments developed here are from a first series of interviews of French patent attorneys in order to study the transformation of their profession. This brief qualitative survey has been supplemented by the statistical analysis of changes in the demography and the structure of the profession.

This hypothesis of a process of mutual reinforcement of the different uses of the patent is based on institutional complementarities (Aoki, 2001).⁷ It has gradually made this type of intangible asset into an increasingly important element of the (stock) market valuation of those companies which hold large quantities of them.⁸ Biotechnology companies are a typical example of this today. New businesses are evaluated financially according to the patents they own which assure their potential for future earnings (Malki, 1997).

Just when this turning point occurred still needs to be identified precisely, but it seems to us that it dates to the 1980s, in conjunction with changes in the financial institutions.⁹ With the contemporary expansion of the US patent market, appeared new intermediaries that acquire patents and who are not bound by rules of ethics, as are legal intermediaries (Wang, 2010). But, in this text, we will look at these new intermediaries only for characterizing the recent movement of financialization of the patent. According to our evolutionary perspective, we will study the progressive evolution of the profession of patent attorneys to account for the transformation of the system as a whole.

To understand this transformation, it is important to situate it briefly in a longer history. In the eighteenth century the first convention for patent use was founded on the privileged status of the inventor (Enlightenment thinkers conceived of the creator as owner, but also as exploiter of an invention whose industrial value was acknowledged), and at the same time on the establishment of a public domain of technical knowledge (which in turn presupposes that descriptions of patents can be accurate), useful especially for the progress of industry.

Later, during the nineteenth century, when the inventor and the patentee were no longer the same people, patents agents and businesses developed the shared representation of the patent as a source of market power. In this use convention, patents gave manufacturers a competitive advantage over their potential competitors and provided a substantial source of

⁷ In the same way, recent work on the *privilèges d'invention* (the rights to exploit an invention) shows that these rights were exploited for a variety of purposes, far from the usual image of favouritism and arbitrary political intervention, and that while they had some features in common with the patents granted to inventors, the essential character of the *privilèges* survived the Revolution, as an individual right adapted to the particular needs of economic activity (Conchon *et al.*, 2015).

⁸ McClure (2015) considers patents as a new class of assets and expects the developments of robust marketplaces for patent rights exchange.

⁹ The work of B. Coriat and F. Orsi (2002) on the malfunctions of the US patent system has shown how the parallel, complementary development of IPR and of financial regulation has opened up new possibilities for those involved in innovation. In the case of IPRs, this began with the Bayh-Dole Act of 1980, which permitted academics to patent the results of their federally funded research, and continued on to the present abuses of the US patent system, which has reinforced IPRs and expanded the definition of what can be patented. In the case of financial regulation, new NASDAQ rules permit initial public offerings (on the stock market) by unprofitable businesses whose assets may consist purely of IPRs; this has made it possible for companies of a very unusual type, following new business models, to be launched.

revenue through carefully calibrated licensing policies which encouraged technology transfers, with the patent functioning as a guarantee of these transfers (Bessy and Brousseau, 1998). A defensive approach, emphasizing protection, gave way to a much more aggressive economic strategy, directed especially at the penetration of national and later international markets; the Paris Convention of 1883 which harmonized the regulations governing patents was an outgrowth of this.

These conventions gradually came to be used for strategic purposes. J. Baudry (2014) has demonstrated the rapid spread of the notion that a patent is a sign of inventiveness in general, or of the high quality of an invention.¹⁰ Another strategic behaviour engaged in by patent applicants was to make sure that the description of the patent could not be used to reproduce the product or process in question, a gambit highlighted by counterfeiters to bolster their defence.

The appeal of the patent during the twentieth century was linked to the fact that it also became an exchange currency in the course of industrial negotiation, quite apart from its specifically technical content (and hence apart from the exchange value of the knowledge it contained). This can be seen especially in the case of the emergence of the first “patent pools” in the aeronautics and film industries in the United States and Europe at the start of the twentieth century (Merges, 1996). Generally speaking, in line with this use convention, patents became ways for a business to position itself strategically on the market.

During the current period, and in conjunction with the financialization of the economy and the toughening of IPRs since the 1980s, the increased attractiveness of patents plays a part in the valuation of the companies which hold them, contributing to their financial capitalization (and in the case of new enterprises to their initial public offering). This convention for patent use is based on the optimal construction of patent portfolios, including increasing the bargaining power of companies with their competitors. This portfolio construction relies upon a relatively fluid market for patents in order to exchange and a new kind of intermediaries. This market feeds back the monetization of patents, illustrating the complementarity between the two use conventions.

¹⁰ Baudry bases his argument on a statistical analysis of the complete database of invention patents (over 11,500, from the period 1791-1843) and hence of their formal descriptions, which he has coded for statistical purposes in a very astute way. From this original database, the author analyses the various uses of the patent (in terms of the sectors of activity, the status of the inventors, the time-period of the patents, and the technical developments). The typology on p. 50 clearly indicates two types of use of the patent: as a way to protect an investment, and as a strategy for differentiating similar products, in the context of the counterfeit economy of the period.

At the same time, the dramatic increase in the number of patents is also contributing to their relative depreciation in value and to growing criticism of the “proprietary model” – though there is no call for its outright abandonment – as large companies make use of open-source products (and hire away staff from the companies producing them) and ride the wave of “open innovation”, while their patent attorneys develop sophisticated strategies for working collaboratively, especially with regard to licensing.

In this article, the first two conventions will be grouped in a section about traditional uses of the patent in order to focus on the analysis of the contemporary period with the emergence of new functions of intermediation performed by patent attorneys. We will now deepen these different conventions for patent use and their interlocking by showing the diversification of the activities of patent attorneys that contribute to their definition and dissemination.

3. The traditional uses of patents and their actors

It is a widespread belief that a patent not only protects inventors from their competitors and encourages them to commit to the perfecting and industrial exploitation of their inventions, but also gives them a higher social status than mere imitators of whatever kind. This is in a sense a continuation of the idea of the *privilège* (a legal right granted by the King) which protected exploiters of inventions and granted them an enviable position in (court) society. But unlike the case of the *privilège*, the inventor was required to formulate a detailed description of the invention so that it could circulate beyond the restricted circle of knowledgeable people able to attest to its innovative, useful, and truly inventive nature, as well as its reproducibility.¹¹

During the nineteenth century, the institutionalization of the patent has contributed to the gradual creation of a public domain via a range of arbitration and conservation bodies, like the French *Conservatoire des Arts et Métiers*. This was one consequence of the nature of the “contract” between the inventor and society, which granted exclusive but temporary rights in return for the dissemination of the knowledge incorporated in the patent. For everyone else, the value of the patent depends essentially on its reproducibility. One example of this was the expropriation of German pharmaceutical patents by the US pharmaceutical industry (via the

¹¹ The French law of 1844 reinforced this requirement of a verbal description, with technical drawings being seen as only complementary. But as G. Galvez-Behar (2006) reminds us, this is not a matter of a simple description of a technical object; it has to ensure the maximum protection of the invention as well as anticipating possible legal objections. Technology consultants gradually acquired legal competence in order to forestall litigation and also to do prior patent research in cases where there was no preliminary patent examination.

Chemical Foundation) during the First World War. An analysis of the trial (lasting from 1923 to 1926) in which the Chemical Foundation was accused of unlawful expropriation shows that in this case the value of the patents depended mainly on their wording, which was sufficiently precise that the items patented could be reproduced (Steen, 2001).

The market power of the integrated firm

This case also shows very clearly how the German chemists' patents had locked up the market in their favour, to create a quasi-monopoly, a fact introduced by the Chemical Foundation as an argument in its defence. More generally, it perfectly illustrates how inventors very soon began to try to increase their market power by patenting the production processes which reduced their operating costs or improved the quality of their products. They also do by adding value to their patents in the form of regionally exclusive operating licences (see the examples given by J. Baudry, 2014: 154-168), and by assigning secondary patents relatively to their main technical fields, in order to finance their research work, which was viewed more and more as an investment.

This use of patents was practised more intensively after the (French) law of 1844 dissociated the inventor from the filer of the patent. Ownership of the patent itself reverted to the industrialist-employer or to other economic agents with an interest in this new kind of asset, such as venture capitalists, contrary to the original individualistic concept of the patent for an invention. This new interpretation of the patent emerged at the same time as the large-scale business, which invested in new products and processes to establish its competitive advantage in the market. It tied in with a new division of labour leading to the incorporation of R&D divisions into such businesses, a way of organizing innovation collectively in which the salaried individual inventor became an exception to the rule. It is noteworthy that mechanisms for managing appropriation and controlling employees' knowledge and skills, in particular through Taylorism, and the introduction of laws governing labour contracts at the beginning of the nineteenth century, enshrining workers' subordination, together led to the principle that employees' inventions belonged to their employer, unless otherwise specified, and that the employer could retain exclusive ownership of them.¹²

The invention of the patent by the agents

¹² This institutional complementarity is particularly well analysed by Coriat and Weinstein (2012) for the case of the United States. While this obligation to assign rights to the employer was initially included only in the contracts of employees hired and paid to produce inventions, from 1920 onwards it was extended to all contractual employees. This subject ought to be explored further in the French context. Appropriation by the employer of the inventions produced by the employees was codified in the law on *brevets d'invention* of 2 January 1968.

Although during the nineteenth century the underlying direction of the patent system depended increasingly on businesses' strategies for the protection of innovations and control of the market, the role of patent agents became crucial for the development of methods of "value analysis" as performed under the British system, in which filing a patent required making a "claim", that is to say a description of the invention and an explanation of what was new about it.

In this situation, patent agents were to play a fundamental role in the development of terminology for the description of techniques, of conventions for interpreting the general rules in each industry, and of the criteria of the development of markets proving the usefulness of an invention. In other words, they helped to establish the institution of the patent and that of the public domain to also inform the competitors of the new fields of research and limiting duplications (Kitch, 1977).

Moreover, this mastery of the terminology of technical descriptions combined with knowledge of the markets enabled them to forestall infringements. Patent agents thus learned to word their claims as carefully as possible in the first place, and to be favourably positioned later on to resolve disputes over infringements, most often by settling out of court (transactions). In the event of a lawsuit, patent agents have recourse to lawyers who are used to representing the client's interests in court. In the French case, and up to contemporary times, there has been a strong complementarity between the two professions, each professional that can develop its own expertise over a long period of learning of patent law. The patent practitioners also became agents from father to son (Galvez-Behar, 2006).

The first patent agents in France (who were also lawyers) acted as intermediaries for foreign inventors in order to familiarize them with the peculiarities of the French legal system (Baudry, 2014: 297-302). Their activity contributed to the standardization of the patent filing process, though not completely since these intermediaries also accommodated to the specific industry practices and conventions operating in each field.

By the late nineteenth century, these legal intermediaries were responsible for almost three-quarters of the patent filings (Galvez-Behar, 2006). This is a marker of their role in the absence of examiners or official publication of patents by the state. The "Office National de la Propriété Industrielle" (later to become the "Institut National de la Propriété Industrielle") was established only with the law of 1902. But far from performing a merely passive role as patent filers, these agents played an active part in encouraging new inventions and their industrial exploitation, through both the patent system and their networks of professional

relations, which brought together inventors and the exploiters of inventions – so much so that one could say that they are responsible for the “invention of the patent”.

Examiners continued to control patentability, by seeking to limit the monopolies that patent agents try to create strategically through wording the patent filing to comply with the law as it develops or through subtly circumventing it (especially in the pharmaceuticals sector).

But patent agents mainly work to achieve co-operation on the technical side, by connecting the licensor with the licensee, evaluating their competence and respectability, and bringing to bear an extensive apparatus for drawing up contracts (including pricing of licences) and anticipating the market (see the professional journals published by patent attorney firms). Because of their position of pivot, they participate in the definition of prices conventions (of licences), tariffs, which vary according to industries, and the modes of payment (fixed or variable according to the use of the licence) (Bessy *et al.*, 2008). In the same way, they develop methods for estimating the value of patents and publish articles on this issue in professional journals (Swanson, 2009).

The US market for patented technologies

Their involvement in the development of a “market for patented technologies” is probably unique to the United States, not only because of a large number of patent assignments but also because of the emergence, alongside patent exploiters, of venture capitalists who invest in a very wide range of technologies. It could be said that what interests the exploiter is basically the use-value of the patent, that is to say the profit from the exploitation of the patented product or process, whereas the “speculator” is interested in the resale value of the patent or the profit to be derived from licensing it, possibly even to counterfeiters. These possible sources of profit depend in turn on the creation of a market for such products.

As is shown by the work of N. Lamoreaux and K. Sokoloff (2002), US patent agents (as well as lawyers specializing in the subject) are contributing to increased, and increasingly specialized, innovation, especially by facilitating patent assignment.¹³ To do this they rely on their networks of colleagues in other states and on the relationships they develop during their careers with people on both sides of the market for technology.

¹³An identical development took place in Britain. According to S. Bottomley’s book, *The British Patent System During the Industrial Revolution, 1700-1852* (Cambridge University Press, 2014), about half of the patents were assigned. In France, an assignment was less frequent, at least during the first half of the nineteenth century (Baudry, 2014).

The specialized press strengthens the development of this market. In fact, in addition to the availability of the texts of patents at the Patent Office in Washington (and at its branches), journals specializing in this type of information began to appear in the mid-nineteenth century. They were mostly owned by patent agencies which published the texts of new patents. Lamoreaux and Sokoloff also found that some of these journals focused on specific industries (for both US and British patents).

Globally, during the 20th century, patent agencies and IP law firms developed, sometimes working in close cooperation with those who managed patents and other aspects of intellectual property in the major companies.

4. Signal and exchange currency

As companies develop their intellectual property policies, filing a patent will not be only dictated by considerations of the protection and valorisation of the accumulated knowledge that it enshrines. It is also done strategically by businesses, and the decision to file is taken, especially by those who do this frequently, in a context of cross-expectation.

Patents as transactional goods

The repeated interactions among the parties in the patent system give rise to more or less explicit practices, agreements, and conventions which structure the system and define its operation in terms of consistent behaviours and reciprocal expectations. These conventions give rise to strategic uses of patents, involving the anticipation of competitors' reactions and of possible negotiations with them.

The patent can be used as a signal, conveying information which may influence the behaviour of potential competitors without necessarily revealing trade secrets. These signals may be intended to indicate capacities or indicate the adoption of certain technical options, in order to deter or mislead competitors in the highly competitive context of a race for a patent.

But the patent can also be viewed as an exchange currency in the context of an effective policy of industrial co-operation, including partnership agreements, alliances, or consortia for the purpose of imposing technical standards (David and Shurmer, 1996; Lemley, 2002).

The proliferation of mechanisms for standardization, linked to the globalization of the economy, is increasing the pressure on firms to participate in negotiations or in the resolution of conflicts among industrial competitors. This requires a substantial portfolio of patents. In general, more and more companies are looking for acquisitions internationally and are turning to new markets outside their borders, involving strategic positioning with respect to innovation and IP.

The extension of patents into the field of information technology - and also biotechnology - reflects the strategic importance of intellectual property for companies. For example, mobile telephony standards are based on several thousand patents that harmonise the sector's activities but also drive a never-ending war between manufacturers accusing each other of infringing their respective patents. As in all cases of technological standardisation, the different manufacturers are forced to cooperate through cross-licensing agreements. Some will lay claim to more "essential" patents to force a renegotiation of licensing fees, especially when an outsider starts to capture market share. Here lies the crux of Apple's legal challenge against Samsung: having failed to negotiate higher licence fees, the idea was to get a head start in the technological race for online mobility through the smartphone operating system.

So, the value of a patent resides in the power it confers in negotiating alliances, essential on account of technological interdependency. Innovation is increasingly being developed through co-operation between businesses, known as "co-opetition" and more recently termed "open innovation" (Chesbrough, 2003), which leads to a less or more intensive use of IPRs.

Beyond the development of technology licensing agreements over the last decades (Hagedoorn, 2002), the patent is becoming a true exchange currency, as is shown by the proliferation of patent pools since the 1990s, based on free cross-licensing arrangements within the pool and standard licensing agreements for non-pool companies.¹⁴

The concentration of patent attorney firms

R. Merges (1996) were among the first to research this form of group management of rights and technology, in which pool members manage their technical knowledge as a "commons". In his study of the history of this phenomenon in the United States, he gives the example of pools in which the patents of the "founders" are highly valued, in the aeronautics sector for instance, but this is the exception rather than the rule. He makes the interesting point that to avoid strategic behaviour and cognitive bias, pool members may ask a third party, an expert in the field, to evaluate patents and settle disputes, as patent attorneys do.

In her history of the emergence of the US professional patent practitioner, K. Swanson (2009) shows the growing role of lawyers in the constitution and management of the first patent pools at the turn of the 20th century in the United States in the areas of the sewing

¹⁴ Patent pools have been one response to the proliferation of rights-holders of different elements of the same technology, meaning that users have to pay a series of royalties to different owners. This coordination problem is related to the fact that each rights-holder can try to maximize their income, with the danger that this will increase the cost of using the technology in question. The right system of incentives must then be found to encourage firms to coordinate among themselves and set licence pricing that will support the development and sustainability of the technology.

machine and telegraphy. Legal practice began to shift in focus from advocacy to counselling and with the increasing prominence of in-house counsel-lawyers salaried by the firms they advised. These practices will then spread in European countries with the exception of France, a country in which corporate in-house counsels have not been admitted to the legal profession, despite proposals to that effect. Patent Practitioners in these companies are rather engineers.

In all cases and whatever the conditions of exercise of their profession, the activities of patent attorneys have developed a lot over the last decades with a concentration of (IP law) firms, their diversification, their internationalization, and so their segmentation. For example, the rapid growth of the French profession of ‘patent (and trademark) attorney’ (*Conseil en propriété industrielle*) is accompanied by the concentration of firms, the share of firms over 20 professionals increased from 22.3% to 52.9% between 2008 and 2017, and their geographical diversification (national and abroad).

The major international IP law and consulting firms have thus developed a whole technical and legal apparatus for the construction of patent pools, research consortia and public-private partnerships. They also elaborate tools to control the freedom-to-operate in different countries.

We should note that large companies tend to use IP attorneys when they need specialized services that they have not developed internally. Another explanation for the recourse to licensing agents is that it is difficult for large companies to issue licences because of the negative image they project, due to the fact that they may be competing with their own licensees. Gambardella *et al.* (2006) suggest that licensing agents’ independence might reassure licensees that the large licensors will not compete with them in the market for their products. They support their argument by pointing out that large companies, who find the valuation of their patent portfolio difficult, frequently make use of licensing agents.

5. The financialization of patents

This patent valuation activity will compete with that of financial analysts who specialize in the assessment of patents, working in large investment banks, venture capital firms, law firms or independently. This financialization of patents is linked to the emergence of new intermediaries seeking to build a market for patents. We will examine the conditions of emergence of this market and show the limits of new uses of patents.

More generally, patents have become a tool for evaluating the performance of R&D divisions, including those in the public sector, as well as a balance-sheet item, an “intangible asset” in the process of market capitalization. This capitalization goes along with the more

general trend towards the systematic development of intangible assets, with the introduction of financial categories in the management of the patent and its valuation methods.¹⁵ This financialization of the patent should be seen as linked to the increasing role of the financial markets in investment decisions, in particular with respect to R&D, and of financial intermediaries in the creation of a “market for patents”.

The case of the pharmaceutical industry gives another illustration of the influence of finance in respect to the question of the right of access to health and the role of patents (Cassier, 2018). The new economic structure is based on the decoupling between R&D firms, fed by venture capital companies and financial markets like the Nasdaq, and pharmaceutical firms that specialize in the purchase of therapeutic innovations that have already been developed. Indeed, they acquire start-ups or their patents when the risks related to clinical research tend to be reduced. They can then practice pricing policies ensuring a very high ROI rate, incommensurate with the capital spent on developing the drug.

The development of patent assessment tools

Despite the fact that industry participants consider the vast majority of patents as ineffective at preserving value, they are nonetheless valuable through aggregation into a portfolio. This aggregation explains the proliferation of patent portfolios and widespread use of financial management techniques of asset portfolios. Significant financial issues around patent disputes also contributed to the emergence of assessment tools of patent value (Hagiú and Yoffie, 2011).

IP managers in large companies must not only ensure good practice with respect to patent filing but also become flawless managers of their patent portfolios, including possessing the tools to assess which patents should be kept, abandoned, sold, or acquired in order to strengthen their positions. Traditional valuation procedures rely on experts in each field covered by the patent portfolio; in addition to these there now exist statistical tools for the quasi-automatic management of major patent portfolios (using software designed by rating companies who sell their products at very high prices and do not always publish their evaluation methods), as well as software which represents patents in map format.

These analytical software tools also allow optimizing the process of open innovation, helping to identify areas of research that are conducive to innovations of collaborative type.

¹⁵ We may note that this financial capitalization already existed at the beginning of the nineteenth century when companies could be established based on the income from patents, seen as equivalent to that from shares (Baudry, 2014).

They encourage companies to cooperate without systematically protecting their innovation or by granting free licences within patent pools. All of this apparatus is developed by IP attorney firms and by “rating companies” which draw on large databases of patents, with which they work more or less cooperatively. In general, this financial evaluation activity can compete with that carried out by finance professionals, in particular, patent brokers (Wang, 2010).

All of these tools for the management of patent portfolios, and for the use of IP attorneys and public research organizations, contribute to the construction of a market for patents, which the certain economists have called for (Guellec *et al.*, 2010). Among the different functions and business models of IP specialist firms, they encourage the development of IP auctions (live or online) in spite of the fact that patent and licence auctions held in the US and Germany have been failures¹⁶, as have financial products based on patents. One of the obstacles to the development of the auction places is high transaction costs and the lack of price transparency. Another one is the absence of a standard method of assessment of patent value which would guarantee the liquidity of the market for patents (Monk, 2009; Wang, 2010).

The conditions of development of a market for patents

But these portfolios are also made to negotiate with competitors in case of dispute. Their construction relies on a patent market relatively fluid to exchange with the assistance of intermediaries specialized in the assessment of patents (Monk 2009). These entrepreneurs are most often former IP lawyers or IP counsellors anticipating new sources of profit based on this complementarity and designing new business models through a mutual learning process.

The conditions of development of these markets are restrictive and suppose that a whole set of factors are combined, as evidenced by the emergence of a market for patents mainly located in Silicon Valley. Beyond institutional factors proper to the USA from the 1980s, are the offensive companies IP strategies that play a crucial role. Indeed, A. Monk (2009) shows that first are high-tech companies, like IBM, who have become aware of the profits they could make by monetising their patent, either through a licensing program or outright sales, in particular, those which do not confer a bargaining power, especially with competitors. On the other side, companies look to purchase patents in order to negotiate with their competitors in case of disputes and avoid the need for costly lawsuits. Companies tend to build daunting

¹⁶ The first auctions carried out since 2007 by the Ocean Tomo company in the United States represent an interesting experience in this regard. They were not as successful as expected, despite an important advertising. Sales planned in France in 2009 have been cancelled. Results in price showed a ratio of a little less than 2 to 1 between the value of patents provided for by the software of this company and the value of sales.

“defensive patent shields” ensuring bargaining power at the negotiating table for licensing and royalties. The constitution of patent portfolios could also help firms to work through patent thickets and overcome the problem of the anti-commons.

However, this instrumentalization of IPRs soon reached its limits. The belief in robust IPRs has contributed to the phenomenon of financial overvaluation. At the same time, it has led to raising the stakes around IPR-related lawsuits, and to over-investment in legal resources, so that instead of being a source of security, these rights, as a result of being instrumentalized, have more and more become a source of uncertainty (Hall, 2007).

Nevertheless, this uncertainty has spurred the creation of new intermediaries which acquire patent portfolio. An author like A. Wang (2010) distinguishes between “defensive patent aggregators” providing their subscribers with freedom to operate and safety from litigation, and “offensive aggregators” seeking to realize revenue by provoking infringement (the famous patent trolls¹⁷), although they can play a socially valuable role by enabling small inventors to value their inventions.¹⁸ This is to thwart this strategic use of the patent system that defensive aggregators appeared, thus increasing the potential of the market for intellectual property.

These patent aggregators have contributed to the emergence of a patent bubble in the IT sector over the 2000s.¹⁹ But this patent bubble has been also linked to an unprecedented expansion of businesses specializing in R&D (Rosenberg, 1990), in particular with the growth of academic spin-offs on the American model, in which the scientists who establish the businesses also invent the items being patented, and thus have an immediate interest in the company’s success.²⁰

So it is one thing to develop “markets for technologies” to expand technical transfers, it is another one to develop “markets for patents” directed by financial returns and the pursuit of

¹⁷ Speculator activity in the patent market has increased in recent years with the growing participation of “non-practicing entities” in lawsuits in the United States (Bessen and Meurer, 2012).

¹⁸ More generally, Geradin *et al.* (2012) offer a counterpoint to the negative view attached to non-practicing entities by showing how they can play a pro-competitive role in an industry. See also Pénin (2012).

¹⁹ See B. Kahin, « The patent bubble... still growing », Huffington Post, Sept. 26, 2008. This journalist speaks about a bubble of investment that’s far removed from the common sense underpinnings the patent system, using *Intellectual Ventures* as example. This new firm founded in 2000 by a former Microsoft employee “has reportedly amassed \$5 billion in capital and a portfolio of over 20,000 acquired patents — and it’s looking for more. From the perspective of the tech sector, Intellectual Ventures combines two questionable business models, the patent troll and the pyramid scheme, in a form that evokes Wall St.’s cleverness in designing glitzy vehicles for esoteric assets ».

²⁰ A study of the biotechnology sector by L. G. Zucker and R. Darby (1996) shows a positive correlation between the number of prominent scientists in the start-up team or on the board of directors and the financial worth of the business.

monopoly positions. As shown by Lemley (2007), a market for rights of exclusion has a lower value for society than a market for knowledge. Moreover, it is questionable if the elite of high-tech firms (with their large patent portfolio) would increase their power and barriers to entry against the small entrepreneurs.

In summary, the new market for intellectual property based on the financialization of the patent also revealed a series of intermediaries that are more oriented to the trade of the IPRs (Benassi and Angelo, 2012). They contribute thereby to the proliferation of transactions and their legal security because of the complexity of the tangle of rights (“patent thickets”). As shown by Wang (2010), these new entrepreneurs (patent aggregators) come more often from IP law and consulting firms, from the departments of R&D of large companies alike, and transfer their legal skills to develop business based on the strategic use of the law and by allying with the financial and marketing professionals. These new players lead to a problem of competition with conventional legal intermediaries and are not always in line with the objectives of the patent system.

6. Conclusion

The findings presented in this article show not only the plurality of conventions for patent use but also their interlocking over the course of history ultimately leading to the patent expansion saga in which IP law and consulting firms have played a prominent role. In the contemporary period, unexpected opportunities for profit have emerged leading to more strategic uses of patents and their systematic monetization and capitalization. This evolution has led to the construction (still at the state of an embryo) of a market for patents and the emergence of new intermediaries, or even new functions of intermediation performed by patent attorneys. While most of the texts of the current literature on patent intermediaries focus on the entry of new players, our article shows how traditional legal intermediaries were brought to diversify and how they gave the opportunity to some of their employees to develop their IP specialist firms. The emergence of new intermediaries is thus based on the existence of traditional intermediaries, as also a pure “market for patents” will be based on the existence of a “market for (licensing) technologies” and on a venture-capital market in which business law firms play a vital role, as shown in the example of the development of the Silicon Valley (Suchman, 2000; Monk, 2009).

The other interest of such an analysis in terms of ‘use convention’ is to have a better understanding of strategic behaviors by showing that they are based on well-established conventions.

The extension of the different patent uses has required traditional practitioners to diversify and increase their competences if they want to be able to advise the most prestigious companies. This type of innovation race contributes to the segmentation of IP law and consulting firms. This segmentation is strengthened through the development of the "European patent law market", with the future of the unitary patent creation and the Unified Patent Court. The growing complexity of the law leads to a form of competition-cooperation between professional representatives before the European Patent Office who work in large international firms. It may adversely affect the operation of the patent system.

Globally, our focus on the role played by legal intermediaries in the diffusion of conventions for patent use permits to enrich the evolutionary approach of institutional change, in particular legal change (Kerber, 2008). If these intermediaries play a mediating role in the institutionalization of the patent, by connecting different levels and systems and by tailoring the patent law to the needs of specific industries, they also contribute to the strategic use of the law and so to the now familiar abuses of the patent system (Le Bas and Pénin, 2014). Not only does this discourage investment in R&D, it can also be a source of inequalities. The biomedical field provides an excellent illustration of this problem, even though (European) opposition procedures and compulsory licences limit abuse of the law, bringing new players (hospitals, patient associations) into the game (Cassier, 2007). Moreover, the expansion of the legal principle that rights should be proportional to the effort put in by inventors – a principle applied judicially in order to demonstrate a substantial disparity between the intrinsic value of the right and the asking price on the market – should limit the inequalities in access to health (Merges, 2011).

This, in turn, raises the question of how to regulate lawyers and IP attorneys, whose activities have developed and diversified greatly in recent years, at the limit of their incompatibility of exercise as it is defined in France by professional orders. We also may wonder if a patent bar would not capture the functioning of the future European specialized patent Court to its advantage (Lazega, 2016). Moreover, the new intermediaries linked to the financialization of patent are pursuing private goals which do not participate in the advancement of public knowledge. If patent brokers contribute to the fluidity of the market

for patents, the 'offensive patent aggregators' are more at odds with the objective of the patent system based on the incentive to innovation (Hagiou and Yoffie, 2011; Pénin, 2012).

Finally, the interdependence between all these intermediaries contributes to the training of community of practice and the mobility of professionals between different private and public organizations: Patent offices, law firms, patent attorney firms, patent brokers, patent aggregators, independent administrative authorities, agencies of scientific expertise, which raises the question of conflicts of interest. But as in the art world and authentication operations, a balance must be found between the recourse to the best experts and the limitation of conflicts of interest.

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