(Mis-)Use of Patents in Open Source Software and Open Standards: An Evaluation of Tactics and Defences under Intellectual Property and Competition Law

Nikolaos Volanis, LLM Nikolaos Prentoulis, LLM

Ballas, Pelecanos & Associates
10 Solonos Street, Kolonaki
10673, Athens, Greece
(t)+30 210 36 25 943
(f)+30 210 36 47 925
(e) Nicholas.volanis@balpel.gr

Lawyers&Consultants
34 Didotou Street
106 80 Athens, Greece
(t)+30 210 36 17 609
(f)+30 210 36 17 606
(e) prentoulis@gdplaw.gr

March 2009

Keywords: Patent Enforcement, Intellectual Property, Competition Law, Open Source Software, Open Standards,

Abstract

This paper aims to discuss the misappropriation of patents in the context of Open Source Software (OSS) and Open Standards (OS), from a perspective of Intellectual Property and Competition law. Through the illustration of various examples in recent case law, we first contemplate on the potential threat that patent misuse may have in the OSS industry, as well as the various responses of the OSS community to this threat. Furthermore, we examine alternative legal defences against opportunistic patent enforcement. Our focus is not placed on the defences aiming against the validity of the patent, but instead, we reflect on the legal bases pursuant to which the opportunistic behaviour of the patentee may lead to the unenforceability of his patents, or be considered as an anti-competitive behaviour. In this context, we stress that the network dynamics in the software and IT-related markets should play an important role when evaluating the abuse of patent rights or of dominant behaviour. From a competition policy perspective, this tension between opportunistic rent-seeking and the industry's drive towards royalty-free software and standards requires a careful balancing, so as to not undermine the legitimate right of the patent holder to benefit from his investment in R&D.

1. Introduction – open source in the context of open standards

In February 1989, Richard Stallman released his first GNU project software for UNIX under version 1.0 of the GNU General Public License, under licensing conditions which contradicted the software licensing system of that time. Later that year, Bill Joy released a free version of UNIX software under a similarly peculiar license, the Berkeley Software Distribution License. These two relatively quiet events, questioned the essence of the established software production business model, and signalled a new era in software development and licensing, now widely referred to as the open source movement[1].

Since 1989, various arguments have been put forth *contra* the development and viability of open source software (OSS). At the beginning, the reasons advocating towards the necessity of proprietary software were technical: as it was argued, no free or open source project could develop the highly complex and robust code necessary for the demanding software applications. But when the GNU/Linux project began to produce an operating system that rivalled Microsoft's in robustness and quality, this technical argument began to fade. In its place, some offered an argument of commercial necessity: No viable business model could be based on software given on a royalty-free basis, given the high costs for quality software development. But then again, the fact that companies such as IBM[2] and HP[3] began to embrace open source software by investing millions in such projects, made this argument to loose its strength. Moreover, when the various secondary markets based on open source platforms began to take off, it became clear than open source and free

---

[1] The main online code repository for open source projects is Sourceforge.net. As of February 2009, it hosts more than 230.000 open source projects and more than 2 million registered users ("What is SourceForge.net", available at http://apps.sourceforge.net/trac/sourceforge/wiki/What%20is%20SourceForge.net?)

[2] Schadler, T., "Commentary: IBM's open-source stance", *cnet* news, 21 January 2003, available at http://news.cnet.com/Commentary-IBMs-open-source-stance/2009-1069_3-981484.html

[3] Shankland, S., "HP considers open-source services", *cnet* news, 17 January 2006, available at http://news.cnet.com/HP-considers-open-source-services/2100-7344_3-6027842.html

software were elements of different (or even hybrid[4]) business models, not opponents to business.[5]

The transparency in the development process of OSS in combination with its royalty-free licensing policy has interlaced OSS with the notion of open standards in the IT industry, particularly the software, hardware and telecommunications/internet markets. In fact, a critical fraction of open source projects are developed with the purpose of "amplifying" a standard, by increasing its acceptance in the marketplace and enhancing cross-platform compatibility.[6] This two-way interconnection between OSS and open standards is supplemented by the fact that usually the success of OSS software depends on open standards, particularly in the case of open formats and protocols, as some prominent examples of OSS may indicate.[7]

Indeed, a standard serves as a common framework of reference and it is often essential to help prevent the fragmented development of incompatible software. By satisfying the agreed specifications in its software products, each company is encouraged to seek its own way to improve upon those specifications and to distinguish its own products from those of

---

[4] West, J., "How open is open enough? Melding proprietary and open source platform strategies", *Research Policy*, Vol 32, Issue 7, 2003, pp. 1259 – 1285, available at http://www.cob.sjsu.edu/west_j/Papers/West2003a.pdf

[5] Asundi, J., Carare, O., Dogan, K., "Competitive Implications of Software Open-Sourcing", 2008, p. 5 *etseq.* (with further bibliography), available at http://ssrn.com/abstract=1185374

[6] Schwartz, J., "Open source versus open standards", *cnet news*, 10 April 2003, available at http://news.cnet.com/2010-1071-995823.html

[7] Indeed, we believe that the open source movement has largely contributed to the interoperability of applications, formats and protocols, particularly in the wake of communications-oriented systems such as the Internet, which depend on shared protocols, and define the interfaces and datatypes shared between cooperating components. Specific examples may include the success of the Apache HTTP Server (http://en.wikipedia.org/wiki/Apache_HTTP_Server) as well as the Firefox Internet browser, both of which operate in an open protocol environment.

its competitors; to phrase the aforementioned process in a more eloquent wording: "Companies cooperate on standards and compete on implementations".[8]

In this context, standards are usually developed by industry consortia and Standard Setting Organisations (SSOs) which, within the guidelines of competition legislation, cooperate to publish specifications for how software or IT products should interoperate, or adopt protocols and formats that allow cross-platform compatibility. Although the opinions on what are the essential characteristics of open standards vary considerably[9], the least common denominator of "openness" seems to be the following: While in its most absolute form open standards are IPR-free, if the standard includes technology that is covered by intellectual property (e.g. copyright or patents), this should be subject either to non-discriminatory licensing terms with reasonable royalties (so called "Fair, Reasonable and Non-Discriminatory Licensing Terms" - FRAND), or on a royalty-free basis.[10] However, such "openness" increases the opposition of interests between owners of IPRs and SSOs or OSS projects aspiring to become market standards: This happens because the coordination of the industry towards a wider adoption of a royalty-free standard (and hence its total value) or a royalty free OSS platform, will increase the intensity of competition within the market. Moreover, as the open standard gradually increases its share in the relevant market, it becomes more difficult for a company owing significant Intellectual Property Rights (IPRs) in this market (which are not essential to the standard) to benefit from licensing them to other market players.

---

[8] Peterson, Sc. "Consideration of Patents during the Setting of Standards", FTC and DOJ Roundtable on 6-11-2002: *Standard Setting Organisations: Evaluating the Anticompetitive Risks of Negotiating IP Licensing Terms and Conditions Before a Standard is Set,* available at http://www.ftc.gov/opp/intellect/021106peterson.pdf

[9] A quick search indicates that a precise meaning of "open" in the context of compatibility standards is highly contested, and depends on the nature of the defining entity (be it a governmental body, a Standard Setting Organisation, a software company specialized in proprietary software, or a non-profit organisation established for the promotion of open source software). More information regarding said definitions can be found at http://en.wikipedia.org/wiki/Open_standards

[10] West, J., "What are Open Standards? Implications for Adoption, Competition and Policy", presented at Standards and Public Policy Conference, Chicago, USA, 11 May 2004, p. 8 *etseq.*, available at http://www.chicagofed.org/news_and_conferences/conferences_and_events/files/west.pdf

For the aforementioned reasons, the increasing popularity of OSS projects and Open Standards initiatives has been met with various reactions by owners of IPRs (particularly patent owners), some of which were found to be in violation of competition law and legal principles. In this paper therefore, we attempt to discuss this tension between established IPRs and the gradual expansion of OSS and adoption of open standards by SSOs. Our views are based on the examination of specific examples of patent abuse in the software and IT industry from an intellectual property and competition law perspective. In this context, we begin (Part 2) by illustrating the relationship between IPRs and OSS, how patents have gradually gained importance in the protection of software, and how its use (or threat of use) may impede OSS development. Simultaneously, we attempt to evaluate the various initiatives taken by the OSS community aiming to neutralize opportunistic patent behaviour and assess the impact of such behaviour for competition in the relevant market. Subsequently, Part 3 of the present paper begins with a brief discussion on the nature of open/closed standards (and their relation to OSS) and focuses on the effect of abusive behaviour of patent owners in the context of Standard Setting Organisations (SSOs), where the patentee attempts to undermine or surprise the standard setting process, by concealing its patents and/or asserting them against the SSO, its members or against third parties. After evaluating several defence arguments from an intellectual and competition law perspective, we attempt an overall conclusion, by identifying key policy issues which may serve as indicators towards the mitigation of the tension between IPRs, OSS and Open Standards.

2. Patents in OSS software – IP and competition considerations

a. Software patents as a Trojan horse?

As an introductory but useful remark, it should not be disregarded that open source software is, exactly like proprietary software, protected by intellectual property laws and licensed to users on terms chosen by the property owner or owners. Of course, there is no doubt that the property owners in an open source and free software project "disclaim or

waive" some of their rights, however, the fact that open source projects are regulated on the basis of specific licenses (which are qualified as "open source licenses"[11]) indicates that open source software is built on the foundations of intellectual property (particularly copyright) protection, and that is owned by its authors, who license it to the public under more "generous" terms, in comparison with proprietary licensing. In this context, open source software has more in common with proprietary software than with software in the public domain, which, in turn is used to describe works that have no owner, and therefore, are literally available for everyone to use without any permission or license.[12]

Copyright protection for software programmes was not always taken as granted: During the 1970s and early 1980s, at the dawn of the new technology, there was considerable debate as to the most appropriate legal vehicle of protection of software, within the realm of intellectual property law.[13] Copyright was finally favoured for several practical and conceptual reasons. Thus, copyright regulated the protection of software under the EC Software Directive 91/250 and article 10(1) of the TRIPs Agreement, and, as a general rule, "computer programs as such" were excluded from patentability.[14] In simple terms, hardware sought patent protection and software copyright, whilst "computer programs" were patentable as part of the claimed subject-matter, if a technical contribution to the known art was found, were it the result of software or hardware.[15] However, technological progress blurred this distinction and gradually software patent claims were treated more

[11] In general, an open source license is a copyright license for computer software that makes the source code available under terms that allow for modification and redistribution without having to pay the original author. Such licenses may have additional restrictions such as a requirement to preserve the name of the authors and the copyright statement within the code. One popular (and sometimes considered normative) set of open source software licenses are those approved by the Open Source Initiative (OSI) based on their Open Source Definition (OSD). See http://www.opensource.org/licenses

[12] Rosen, L., Einschlag, M., "Why the Public Domain isn't a License", 2004, available at http://rosenlaw.com/lj16.htm

[13] E.g., for the UK see the Whitford Committee Report (1977), for the US, Final Report of the CONTU (1979), also the WIPO Model Provisions (1978)

[14] See e.g. article 52(2) of the European Patent Convention.

[15] The seminal EPO decision VICOM, T 208/84, 1987 EPOR 74 et seq. See also, IBM T 6/83, 1990 EPOR 91

and more leniently.[16] Recently, the European Patent Office (EPO) even made a referral to the EPO's enlarged Board of Appeal seeking further clarification[17], in the light of seemingly divergent EPO decisions.

Therefore, it appears that the rise of software patents is not a coincidence. To a certain extent, one could argue that the rise of OSS with its cooperative basis and interoperability mentality is also a good incentive for software patents. This is so because an attractive element of a software patent stems from the software - hardware interaction which makes the patent's scope of protection broader than copyright – applicable to virtually endless versions of different software producing the same interaction. Indeed, software development can result to a noteworthy number of patented elements being incorporated in single a software program, but also, software patents are not limited to a single software application but may rest in the body of virtually thousands. In view of the above, the open source software industry seems to be a good terrain for the exercise of patent rights. The usual disadvantages of a patent, namely that term of the monopoly is considerably less than that of copyright and the patent is really not a "unquestionable" asset, unless its validity is tested in court[18] may not be that discouraging in the realm of fast-paced technological production and opportunistic rent-seeking.

b. Using patents in the context of OSS development

i. Patent hold-up and other stratagems based on IPRs

As noted above, software patens are broader than copyright and cannot be easily circumvented by re-writing the source code. In this context, patent rights become an asset in a manner quite distinct to the way they were originally understood – they allow a patent

[16] See EPO's decisions T 424/03 (Microsoft/Clipboard Formats I) and T 1173/97 (Computer Program Product/IBM). The situation was always easier in the United States

[17] "Patentability of programs for computers : President of the EPO asks for clarification of exclusion", *EPO website*, 24 October 2008, available at "http://www.epo.org/topics/news/2008/20081024.html

[18] since under patent law internationally, a patent can be invalidated following a relevant counter-claim within the context of a patent infringement action

owner to use the threat of injunction to impose a fee much larger than the actual value of the patented element.[19] In this context, also, patent "hold up" becomes a genuine risk, quite frequent in the information technology industry.[20] In fact, the tension between proprietary software and OSS/open standards can also be noted if one examines how companies focused on proprietary software business models (based in strict and lucrative licensing terms) have implemented various strategies to discourage customers and/or competitors from using OSS software and open standards. In fact, both of the most prominent stratagems demonstrated *infra* (part 2.b.ii) have as a starting point the company's established intellectual property rights portfolio, which is then used to either discourage customers or counter the potential threat of "openness" of an open standard or the potential success of an OSS project.

It appears that computer industry's biggest companies are simultaneously the main generator and the ideal (i.e. lucrative) target of the patent hold up threat:[21] Their huge patent portfolios allow them more opportunities to initiate profitable patent litigation, yet their revenues make them targets for opportunistic patent owners. Under normal circumstances, the patent hold up cross-threat creates a fragile balance leading to either tolerance of patent infringement or evencross-licenses. Of course, the threat of a "patent troll", namely a small firm engaged in the business of patent litigation rather than productive activity, cannot be eliminated, since the threat of counter-suit patent litigation will not hinder this sort of opportunistic patent owner. Small firms on the other hand are not usually a lucrative defendant for patent trolls, but they remain exposed to competition-initiated litigation. And since, such firms will usually neither have a large counter-threatening patent portfolio nor a sizeable litigation budget, they tend to restrict

---

[19] Lemley M., Shapiro, C., "Patent Holdup and Royalty Stacking", Stanford Law and Economics Olin Working Paper No. 324, 2006, available at http://ssrn.com/abstract=923468

[20] Leveque, F., Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues,* 2007, vol. 4(1), p. 38, available at: http://ssrn.com/abstract=997191

[21] Hall, B., and Ziedonis, R., "The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95", *RAND Journal of Economics,* 2001 pp 101-128

themselves to niche markets where they can manage the risk of litigation more effectively.[22]

One can easily see how the above issues are also true for the OSS industry. In fact, the patent hold up threat grows together with the open source movement. OSS firms are increasingly filing patents, whilst the large software and hardware firms get increasingly involved in open source projects and thus tend to extend their patent portfolios in that direction as well or simply import their existing patent portfolio. A study conducted in 2004 by Open Source Risk Management informs us that 283 patents could potentially be used to support claims of infringement against the Linux kernel.[23] On the question whether the patent hold-up threat is more serious for open source software (in comparison with proprietary software), there is no tangible empirical evidence to guide us.[24] However, it seems that the fact that the smallest scale of OSS organizations (in comparison with the large proprietary software firms) spend less in patent screening, points to the conclusion that OSS is a "field of glory" for patent trolls. On the other hand, OSS developers are not real money-makers, hence not an attractive defendant. Of course, this would not apply to big corporate users of successful OSS software such as Linux.[25] The *SCO v. IBM* case is a lucid example of targeting OSS users, even though it is not primarily a patent infringement case. On March 6, 2003, the SCO group filed a $1 billion lawsuit against IBM claiming that IBM has, without authorization, contributed SCO's IP to the open source codebase, Unix-like Linux operating system. In May 2003, SCO sent a letter to members of large US firms

---

[22] as is the case in the semi-conductor industry, B. Hall and R. Ziedonis, The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95, *RAND Journal of Economics, 2001 pp 101-128*

[23] Leveque, M., Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues,* 2007, vol. 4(1), pp. 39-40, available at: http: // ssrn.com / abstract = 997191

[24] Perens, B., "The Monster Arrives: Software Patent Lawsuits Against Open Source Developers", June 30 2006, available at http://technocrat.net/d/2006/6/30/5032.

[25] Leveque, M., Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues,* 2007, vol. 4(1), p. 40, available at: http: // ssrn.com / abstract = 997191

warning them of the possibility of liability if they use Linux. Another series of letters was sent in December 2003 alleging copyright infringement related to 65 files in the Linux code tree. Following a series of lawsuits and counter-lawsuits, the cases are still pending before various courts.

ii. "Fear, Uncertainty and Doubt" (FUD)

The threat of software patent litigation has generally created an atmosphere of legal uncertainty that is detrimental to the OSS community as a whole, particularly due to the "sharing" mentality of OSS. Indeed, if one OSS developer is a patent infringer, then so are all other users and developers of the same software. This collective exposure to patent hold up represents a stronger incentive for patent trolls to attack OSS users, because it generates economies of scale in litigation.[26] This legal uncertainty due to software patents is usually termed FUD – acronym for "Fear Uncertainty and Doubt". it was first used in the computer hardware industry in 1975, as an attempt to describe IBM's marketing and public relations policy, as a strategy aiming to influence the public by disseminating unfavourable opinions about a competitor's product, to overstate the estimation of switching costs if current customers decide to migrate to a rival company's products or to maintain a leverage over a current business partner who could potentially become a rival.[27] Additionally, when said strategy is combined with the threat of enforcing IPRs that belong to the company, then the specific IPRs are not only used to expose individual companies to legal threats, but also to create a climate of legal uncertainty which is detrimental to the OSS community and the industry as a whole. Moreover, the same tactic would have a similar effect, if it were used in

[26] Farrell, J., and Shapiro, C., "How Strong are Weak Patents?" University of California at Berkeley Working Paper No CPC05-054, 2007.

[27] The term was attributed to Gene Amdahl, an IBM employee, after he left IBM to start his own company, Amdahl Corp. In the 1970s, when IBM had come to dominate the mainframe industry, Amdahl created plug-compatible machines that could be used with the same hardware and software as offerings from IBM, but were more cost-effective. Amdahl owed some of its success to antitrust settlements between IBM and the U.S. Department of Justice, which assured that Amdahl's customers could license IBM's mainframe software under reasonable terms. Further information and references at Russel, A., Smethurst, K., Salamie, D., "Amdahl Corporation Company History", available at http://www.answers.com/topic/amdahl-corporation

the context of a standard setting procedure: if one implementer of the standard is sued for patent infringement, then the fear of legal exposure propagates to all adopters of the same standard.

Since the 1990s, the term has been used to characterise a facet of Microsoft's response to the open source movement, which has been implicitly acknowledged in the company's internal "Halloween Documents"[28], according to which OSS is identified as a "long-term credible" product and thus "FUD tactics cannot be used to combat it".[29] Still, over the following years, Microsoft has made various announcements regarding the potential dangers of developing or using OSS software, particularly with regard to the General Public License's (GPL) "viral nature" which "[...] poses a threat to the intellectual property of any organisation that derives its product from GPL source"[30], and to the potential liability for users of Linux, since the latter software allegedly infringes 235 of Microsoft's patents.[31] This acknowledgement has been recently followed by relevant legal action taken by Microsoft against a company using Linux as the software platform for their products.[32]

---

[28] The Halloween documents comprise a series of confidential Microsoft memoranda (drafted by Microsoft employees Vinod Valloppillil and Josh Cohen) on potential strategies relating to free software, open-source software, and to Linux in particular; and a series of responses to these memoranda. Both the leaked documents and the responses were published by Eric S. Raymond, an open source advocate co-founder of the Open Source Initiative. Marked "Microsoft confidential", these documents identify open-source software, and in particular the Linux operating system, as a threat to Microsoft's dominance of the software industry, and suggest ways in which Microsoft could disrupt the progress of open source software. The text of the documents is available at http://www.catb.org/~esr/halloween/index.html

[29] Halloween Document I, available at http://www.catb.org/~esr/halloween/halloween1.html

[30] Microsoft Press Release, "Accessibility with Responsibility", available at http://www.microsoft.com/presspass/features/2001/may01/05-03csm.mspx

[31] Parloff, R., "Microsoft takes on the free world", *Fortune Magazine*, 14 May 2007, available at http://money.cnn.com/magazines/fortune/fortune_archive/2007/05/28/100033867/

[32] Fried, I., "Microsoft's TomTom suit includes Linux claims", *cnet news*, 25 February 2009, available at http://news.cnet.com/8301-13860_3-10172442-56.html?tag=mncol;txt . At the conclusion of the present paper news of a settlement of the said lawsuit were only just announced, see: Microsoft Press Release, "Microsoft and TomTom Settle Patent Infringement Cases", 30 March 2009, available at http://www.microsoft.com/Presspass/press/2009/mar09/03-30MSTomTomPR.mspx

As mentioned *supra,* the Linux community of developers and users has also been targeted in the *SCO v. IBM* legal battle, where IBM has explicitly noted that SCO has engaged in said technique[33], so as to create a false perception that SCO holds the IPR rights to UNIX which permit it to control not only all UNIX technology, but also Linux. This impression has been further reinforced by various statements of SCO's chief executive officer, regarding potential liability for Linux users.[34]

iii. "Embrace, Extend"(and Extinguish?)

A different strategy, founded on the same basis of IPRs, has been followed in the course of open standards (HTML 4.0 standards in particular), in the seminal competition case between Microsoft and the U.S. Department of Justice. As referenced in the proposed findings of the Department of Justice[35], "[...] Microsoft's response to the browser threat was to "embrace, extend, extinguish"; in other words, Microsoft planned to 'embrace' existing Internet standards, 'extend' them in incompatible ways, and thereby 'extinguish' competitors."[36] In this context, the first step involves the development of software which is substantially compatible with competing products and which implements the public standard, the second step refers to the adding or promoting features which are not supported by competing products or part of the standards, and thus creating

[33] The SCO Group v IBM – answer to amended complaint and counterclaims (US District Court - Utah, Kimball J, filed 6 August 2004), Section E, paras. 22-24, available at http://www.groklaw.net/pdf/Doc-27.pdf

[34] Indicatively, we note the following remarks: "When you take our intellectual property and move it into open source, then we have a big problem" (Delio, M., "Developers back IBM in UNIX Suit", *Wired Magazine*, 7 March 2003, available at http://www.wired.com/techbiz/it/news/2003/03/57955), "This is our most prized possession. We're the source of AIX, HP UX, Solaris, Linux, Mac OSX. It all comes from us. The only one that hasn't been rationalized [from a licensing perspective] is Linux. If people signed a source code license with us, they have to think hard about how they protected it or didn't protect it." (Rooney, P., "CRN interview: SCO CEO defends $1 Billion Lawsuit Against IBM", *CRN Magazine*, 24 April 2003, available at http://www.crn.com/it-channel/18830075). A concise list of references is available at http://www.groklaw.net/quotes/showperson.phtml?pid=1

[35] US Department of Justice, Plaintiff's Proposed Findings of the Fact, available at http://www.usdoj.gov/atr/cases/f2600/2613pdf.htm

[36] US Department of Justice, Plaintiff's Proposed Findings of the Fact, Section V.A.3.b. para. 91.3.2 available at http://www.usdoj.gov/atr/cases/f2600/2613f.pdf

interoperability problems for customers who attempt to use the standard without said additions or features, whereas the third and final step involves the marginalisation of the competitors, by the time these additions or features become a *de facto* standard because of the company's dominant market share.[37]

A similar example is also the contest between Sun Microsystems and Microsoft, whereby, Sun accused Microsoft of attempting to use the same technique to "extinguish" its Java cross-platform language. This example is further discussed *infra*, in the context of open (source) standards.

c. OSS strategies against offensive use of patents

The (ab)usive potential of software patents was not left unanswered. Both individual and collective initiatives have been proposed and adopted to defend the development of OSS in the light of the risk posed by software patents and opportunistic patent owners. Indeed, in this respect, it seems that *the SCO v. IBM* provided the wake-up call for the rest of the industry.[38] Since legal security is self-evidently a key aspect for the development of OSS, and since OSS bears, historically, a collective connotation, it was only natural that OSS communities aspired "to produce collective security as well as they produce collective code"[39].

One of the first – and obvious solutions – has been open source patents. In particular, a good number of the possibly threatening patents to OSS are owned by OSS companies. A typical example is Red Hat, a OSS software house, the patent policy of which sums the issue

---

[37] West, J., "What are Open Standards? Implications for Adoption, Competition and Policy", presented at Standards and Public Policy Conference, Chicago, USA, 11 May 2004, p. 22, available at http://www.chicagofed.org/news_and_conferences/conferences_and_events/files/west.pdf

[38] See also Leveque, F., and Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues*, 2007, vol. 4(1), p. 41. Moreover the SCO saga serves as a good example that it will not be so easy to establish infringement. Indeed, SCO failed to identify the version or the line numbers of the Unix code it claimed had been inappropriately transfer in Linux code).

[39] Leveque, F., and Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues*, 2007, vol. 4(1), p. 42

quite eloquently: "Red Hat has consistently taken the position that software patents generally impede innovation in software development and that software patents are inconsistent with open source/free software [...] At the same time, we are forced to live in the world as it is, and that world currently permits software patents. […]. One defense against such misuse is to develop a corresponding portfolio of software patents for defensive purposes. […] Red Hat has elected to adopt this same stance. We do so reluctantly because of the perceived inconsistency with our stance against software patents; however, prudence dictates this position"[40].

Although, this justification may be true and genuine, it does not diffuse the explosive dynamics of software patents for OSS. Legal certainty and security further require that the "brothers in arms" will not turn against each other. To this end, a variety of steps have been taken to alter OSS software patents into a sort of commune open source IPR, guaranteed for all within the OSS community. The steps range from unilateral commitments made by patent owners to encourage the development of open source projects to more strict collective obligations that tend to apply to patents the sort of open source licensing requirements one usually faces under copyright licensing. In this respect, open source communities face the same problem as standard setting organizations (SSOs).

A prominent example of individual commitment is that patent owners are self-restricted from asserting patent rights against users/developers of a given open source software (or a SSO and its members).[41] At a larger scale, software patent owners undertake or "pledge" not to pursue patent infringement against those are willing to comply to a particular

[40] Red Hat Inc., "Statement of Position and Our Promise on Software Patents", available at http://www.redhat.com/legal/patent_policy.html

[41] e.g., the 2006 agreement between Microsoft and Novell - a Linux distributor - , whereby Microsoft undertook not to assert its patents against the version of Linux distributed by Novell (Microsoft Press Release, "Microsoft and Novell Announce Broad Collaboration on Windows and Linux Interoperability and Support", 2 November 2006, available at: http://www.microsoft.com/presspass/press/2006/nov06/11-02MSNovellPR.mspx)

"statement of permitted use".[42] These pledges or commitments are sometimes made by companies (or requested by SSOs) in the context of a standard setting process, whereby the participant in the SSO should disclose any relevant IPRs he may own that are essential for the standard in question.

As an example on the collective efforts front, the Open Source Development Lab (OSDL) is the host of a "patent commons", which includes a large number of software patents owned by companies involved in the promotion and distribution of Linux.[43] According to its proponents, the patent common project "[…] provides a meaningful way for those who oppose software patents to use the current patent system for the benefit of the open source community and industry. Patenting ideas reduces the likelihood that detractors of open source software and open standards will obtain a patent on that same invention and use it against the community and industry, or extract royalties for its use. More importantly, patenting ideas and then pledging the patents in support of The Commons expands and reinforces the protective environment of The Commons". [44]

The scheme works self-evidently on a reciprocity basis. A software patent owner will lose the protection of the patent commons should he decide to sue another beneficiary of the project for patent infringement. In this context, "Patent commons therefore serves two purposes. Firstly, it gives shelter to OSS developers to innovate in using the code in the commons. Secondly, it reduces patent litigation in amassing a defensive patent portfolio that benefits to OSS developers. The patent commons project even encourages the patenting of ideas and then pledging the patents to expand the commons".[45]

---

[42] e.g. IBM's 2005 release of 500 software patents into a patent commons available for the open source community. (Lohr, S., "IBM to Give Free Access to 500 Patents", *The New York Times*, 11 January 2005, available at: http://www.nytimes.com/2005/01/11/technology/11soft.html?_r=1&oref=regi

[43] http://www.patentcommons.org

[44] http://www.patentcommons.org/about/the_commons.php

[45] Leveque, F., and Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues,* 2007, vol. 4(1), p. 43

The collective initiatives are evidently firmer than a mere unilateral commitment and provide a wider scope of protection, still they remain optional for members of the OSS community. Accordingly, they will always allow room for opportunistic patent holders.

A more effective strategy is the inclusion of patent related rules in the open source license itself. Patent defence clauses are already explicitly included in recent OSS licenses such as Mozilla Public License (MPL)[46] and Nokia open source licenses[47]. The issuance of GPLv3 is the major current development in this respect. It includes both an express patent license and an effective patent defence clause. Generally, the core of a patent defence clause is that the license is terminated if the licensee asserts patent infringement claims against the licensor. So, if the licensee sues the licensor, he will have to stop use (including modification) of the licensed program. Of course, the scope of the patent defence clauses may range from being limited to legal actions concerning the licensed software, or may encompass patent attacks to other software of the licensor as well as actions against groups he may wish to protect, such as customers and users.

It follows that a very wide patent defence clause may, in fact, deter open source users. The same applies to patent commons initiatives, since the strong commitment which is expected cannot delete the uncertainty generated by software patents. This would essentially amount to patent owners accepting to self-annul their patent rights, which is not something one could or should reasonably expect.

Within the framework of collective initiatives, solutions can also vary from (collective) efforts to re-engineer the section of the program covered by the asserted patent, to litigation funding and insurance[48]. Another collective initiative can be the creation of a

---

[46] http://www.mozilla.org/MPL/

[47] http://www.opensource.org/licenses/nokia.html

[48] HP, for instance, provides indemnification and legal defence to its customers for claims by SCO (Fried, I, "HP outlines Linux indemnity plan", *CNET news*, 24 September, 2003, available at http://news.cnet.com/HP-outlines-Linux-indemnity-plan/2100-1016_3-5081407.html). Red Hat has created a legal defence fund for open source developers (Kirby, C., "Red Hat steps up for Linux: Source defense fund starts with $ 1 million",

database of prior art information, which can be an effective counter-attack to invalidate the patent(s) asserted in case of patent litigation. Interestingly, this idea has also created "patent risk management products". Blackduck Software[49] and Palamida[50], for instance, are private companies focusing screening code that comes from third parties for patent infringement. OSRM is another example: it offers a risk assessment of the open source components used by firms as well as insurances against claims of patent infringement.[51]

d. How do software patents affect competition in OSS and OSS-based proprietary software?

The invasion of software patents in copyright's open source software domain has not only created intra-IP tension, due to the interplay between these two intellectual property rights categories; it has also brought about competition implications. In principle, as far as the "questionable" reciprocal/viral method of development and diffusion of open source software is concerned (essentially a reciprocal royalty-free licensing scheme), it is considered pro-competitive.[52] Of course, there have been counter-arguments. The reciprocal royalty-free nature of OSS licensing has been accused of violating competition rules as a price-fixing method (fixing prices to zero) and a grant-back scheme.[53] One could also argue that there is the possibility of abuse of dominance, in the cases of a licensor holding a dominant position and abusing it in distortion of competition. However, in Europe, it appears that OSS licenses are generally aligned with the technology transfer

---

San Francisco Chronicle, 5 August 2003, available at http://news.cnet.com/HP-outlines-Linux-indemnity-plan/2100-1016_3-5081407.html

[49] http://www.blackducksoftware.com/

[50] http://www.palamida.com/

[51] http://www.osriskmanagement.com/

[52] For a general overview, see Valimaki, M., "Copyleft Licensing and EC Competition Law", *European Competition Law Review,* Vol. 27, No. 3, 2006, pp.130-136

[53] See Rahnasto, I., *Intellectual Property Rights, External Effects and Anti-trust Law*, Oxford University Press, 2003

block exemption[54] and there really does not seem to be any tangible evidence of OSS companies attempting to leverage their intellectual property rights in this direction.[55] In fact, it appears to be the other way around, with regard to proprietary software companies and patent trolls. It has been asserted that the copyleft clause can create an entry barrier for open source companies if dominating proprietary companies refuse to license their standards with compatible royalty-free terms. In 2005, for example, Free Software Foundation Europe's president Georg Greve critically argued against Microsoft's royalty-based license proposal for the interoperability information they were required to disclose.[56]

It is clear then that the aggressive use of software patents in the realm of the open source software industry can certainly be anti-competitive. On one hand, the large patent portfolios can be (ab)used as a method posing considerable barriers to entry. And since the cooperative foundations of open source software create economies of scale, a single patent would allow its owner to keep a large number of OSS developers out of the market or control their presence via predatory licensing, which would have a quasi-foreclosure effect. Moreover, the patent litigation threat and its FUD effect are also an effective barrier to entry tool. The financially catastrophic possibility of a patent infringement suit is more than enough to deter small aspiring OSS developers and users from producing potentially actionable software.

Further, the threat of patent litigation may have a significant foreclosure effect. Small OSS developers will tend to restrict themselves to niche markets, specializing in software products, where the possibility of conflict with patent rights has in practice proven easier

---

[54] EC Regulation 722/2004

[55] Valimaki, M., "Copyleft Licensing and EC Competition Law", *European Competition Law Review,* Vol. 27, No. 3, 2006, pp.130-136

[56] "The proposal specifically precludes the information from being used in a Free Software implementation, such as the Samba workgroup server software. As Samba is the only remaining major competitor of Microsoft in this market, the Microsoft proposal translates to: Of course we will give you the specifications - unless you happen to be a serious competitor of ours…" ,as cited in M. Valimaki, *supra*

to avoid. Even worse, since patent portfolios tend to grow, it may be reasonably concluded that, if these companies do not apply for their own patents covering their respective business fields, they will sooner or later be driven out of the market.

As noted above, these anti-competitive results may operate on a wider level. OSS is considered a pro-competitive tool for encouraging technology innovation and increasing the pressure for interoperability on proprietary software giants, with obvious benefits for consumers and end users. But if patent portfolios and patent litigation are used in a way that subverts innovation and deters open source software development, then the foreclosure effect will not be limited to the OSS domain but will affect the software market in general.

e. Interim conclusions (– how real is the danger? – how effective is the OSS community strategy – can we expect the open standards initiatives to help?)

We have discussed the dangers posed to OSS by software patents, as well as the defence strategies adopted. In our view, these strategies will not suffice to completely shield OSS users against offensive use of patent rights.

Programme re-engineering might help to avoid future patent litigation but will not save the defendant from a damages claim. Litigation funding cannot be endless and it will not save everyone, particularly in the face of massive litigation initiatives. Patent commons will only help members of the OSS community, not other IPRs owners. Additionally, they require a level of commitment, which is too high to create certainty: if a patent commons contributor is not sure if he could give up all his patent rights to the benefit of the commons, how could he trust he competitors to do the same? For this reason, the most effective tool is patent license and patent defence clause included in the OSS license. However, if they are narrow, they will not provide significant protection, whilst if they are wide, they may discourage OSS developers as well.

But, perhaps, the key question does not revolve around the degree of protection, but the degree of actual patent litigation risk. It is clear that the threat of OSS related patent litigation is behind all of the above described efforts to face it, and it is also clear that,

unless patent litigation was a feared prospect, no such extensive counter-strategy would be adopted. We have indeed seen examples of large firms demonstrating the intention to exploit their patent portfolio against members of the OSS community.[57] There are thousands of patents that cover the subject-matter of OSS and patent infringement is much easier to detect in the case of OSS, because – by definition- the source code will be easier to check. So, the logical conclusion would be that there exists a substantial risk of patent infringement liability.

However, Mann counter-argues[58] that this may just be an overstatement. The fact remains that a good percentage of software patents would not hold up in court, since it is generally considered feasible to develop non-infringing software which achieves functionality of the innovation represented by the patent. It is the pattern of software innovation itself that provides multiple paths to most design problems. Also, in practice, the large software market players have developed – for obvious reasons – patent screening mechanisms, which will generally avert interference from issued patents. Even if a possibly threatening patent is detected, there are still ways to manage the problem varying from re-writing the code, obtaining a license or even ignore the patent, if it is considered a "weak" one[59]. In view of the above, the patent litigation threat is at least moderated. This opinion, although it does not claim that the threat of strategic patent litigation is minimized with regard to the OSS community, it seems to disregard the detrimental effect of FUD to the OSS movement, which deters small companies from engaging in innovative attempts in areas where there is a vague fear of patent litigation. Moreover, this opinion does not take into consideration the fact that small enterprises active in the software market are easy targets for patent trolls, which may "bully" them into accepting less onerous royalties for a license,

---

[57] Mann, R.J. "Commercializing Open Source Software: Do Property Rights Still Matter?", 2006, available at http:/law.bepress.com/expresso/eps/1042. p. 40, citing the controversy over Sun's willingness to enter into a cross-licensing agreement with Microsoft that extends protection from Microsoft's portfolio to Sun's proprietary products but not to OpenOffice

[58] Mann, R.J., *Ibid*

[59] Even OSDL performs similar checks to secure commercially important open source programs, such as Linux or Apache

instead of engaging in expensive patent litigation, even if the validity of the patent in question is highly disputable (as the example of the JPEG format case demonstrates – see *infra*)

In this context, the patent troll remains a real threat for the OSS community, whose business model depends on the aggressive and opportunistic assertion of its IPRs (effectively turning the patent system into an "innovation tax"). According to the aforementioned reasons, this does not rule out small OSS developers, as it is eventually a matter of choice: either aim for the well defended but extremely lucrative big software houses, or "bully" and "prey" on the smaller software companies, which may even avoid a legal battle and prefer a quick settlement. In either case, competition is harmed and the market is distorted.

That said, it would seem that the likelihood of patent infringement litigation is essentially the same for commercially important proprietary products and open source software products, albeit the transparency and availability of open source of OSS projects allows for easier "targeting". Along the same lines, although software patents seem to bear significant anti-competitive potential, reality shows that they are an integral part of the open source software development practice. Indeed, OSS firms increasingly thicken their patent portfolios both to protect their research and development investment and generate revenues from patent licensing, and the market seemingly functions properly.

3. Patents in open software standards

a. Open/close standards in the software and IT related markets

Considering the networked nature of the software industry as a cluster of markets interconnected through platforms and applications, the necessity of compatibility and interoperability between software, protocols and formats calls for standardisation initiatives, which, in turn, will produce better economies of scale and greater competition among companies implementing the specification chosen by the standard. For example, if

competing firms can design and manufacture system components that correctly interoperate, then consumers can 'mix and match' software components and applications from different manufacturers and developers to get the set of components and applications that offer the best combination of price and performance.

Standards can be open or closed, controlled by a single firm (*de facto* standards[60]), a group of firms (often leading to a patent pool), a formal (albeit voluntary) Standard Setting Organisation ("SSO", such as W3C[61] or ETSI[62]), an (inter-)governmental institution[63], or the industry at large (e.g. through a trade association or an ad-hoc SSO).[64] Depending on the policy adopted with regard to the use, licensing and enforcement of IPRs related to a standard, this standard will be considered as open or closed, proprietary or non-proprietary. Although the benefits of controlling a technology which is established as a standard can be extremely profitable for a company[65], open standards are generally[66] more

---

[60] Such as the Portable Document Format (.pdf) standard, before it was officially released as an open standard on July 1 2008, and published by the International Organization for Standardization as ISO 32000-1:2008

[61] The World Wide Web Consortium, an international consortium where Member organizations, the SSO, and the public work together to develop Web standards (http://www.w3.org/)

[62] The European Telecommunications Standards Institute, an independent, non-profit, standardization organization in the telecommunications industry in Europe, with worldwide projection. ETSI is recognised as an official European Standards Organisation by the European Commission

[63] Such as the European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardization (CENELEC), and other national standards bodies or entities recognized under Directive 98/34 on technical standards and regulations (OJ L 204, 21.7.1998, pp. 37–48), available at http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31998L0034&model=guichett

[64] See Besen, St., Farrell, J., "Choosing How to Compete: Strategies and Tactics in Standardization", *Journal of Economic Perspectives,* Vol 8, iss. 2, 1994, pp. 117-31, for an analysis on how firms may choose to compete for the prize of owning a proprietary standard or choose to agree on a standard and compete within such standard, rather than between different proprietary standards.

[65] Examples may include IBM's historical dominance on the mainframe computer industry, as well as Microsoft's dominance on the operating systems for personal computers.

[66] The exception to such rule is probably the case of small or niche markets (such as the market for Digital Rights Management Systems), where closed standards can be quite useful, since they can ensure code integrity, allow greater control on the features, and make it easier to manage and direct the standard. Merges,

beneficial to an industry and its consumers for various reasons: from an economic perspective, a standard which is freely disseminated has a better chance of being widely adopted than one with restricted access[67]. Moreover, with regard its trustworthiness, an open standard is more reliable and receives long-term support[68], in comparison to the one used only by a few market players. Finally, although the development of open standard may harm market incumbents[69], it helps consumers through reduced uncertainty, reduced lock-in, increased competition *within* the market rather than *for* the market, increased competition on price rather than features, and competition for embedded applications and components instead for the operation systems on which these applications run.[70]

From a different perspective, innovation is also spurred through the establishment of IPRs (particularly patents), as the latter can be perceived as the reward for creative effort and research conducted by the patentee.[71] Still, in order to obtain a patent, the inventor has to disclose all essential information regarding his invention, which may legally be used by anyone for research purposes even during the life of the patent. In this context, the patent may be perceived as "the price of disclosure"[72], mandating a *quid-pro-quo*, in the sense that it grants an exclusivity right to the patent owner provided that the owner has disclosed the

---

R., Kuhn, J., "An Estoppel Doctrine for Patented Standards", March 2008, *California Law Review*, forthcoming., available at SSRN: http://ssrn.com/abstract=1134000, p. 6

[67] Commission Communication COM (2008) 133 final of 11.03.2008, "Towards an increased contribution from standardisation to innovation in Europe", p.9, available at http://ec.europa.eu/enterprise/standards_policy/standardisation_innovation/doc/com_2008_133_en.pdf

[68] Merges, R., Kuhn, J., *Ibid*, p. 7

[69] Shapiro, K., Varian, H., *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, 1998, p. 235

[70] Shapiro, K., Varian, *Ibid*, pp. 227-233, Simoe T., "Open Standards and Intellectual Property Rights", in Chesbrough, H., Vanhaverbeke, W., West, J., *Open Innovation: Researching a New Paradigm,* Oxford University Press, 2006, p. 167 (161-183)

[71] For an interesting approach on the relationship between patents, invention and innovation, see Audretsch, D., "Small firms, innovation and competition", in Neumann, M., Weigand, J., (eds.) *The International Handbook of Competition*, Edward Elgar Publishing, 2006, pp. 92 *etseq.*

[72] Korah, V., *Intellectual Property Rights and the EC Competition Rules*, Hart Publishing, 2006, p.2

nature and details of its invention. However, the increasing importance and ubiquitous presence of patent rights[73] has led to several examples of their misuse, with negative effects for the relevant industry.

b. Two examples of misuse of IP in open standards

Owners of IPRs in the IT, software and telecommunications sector are sometimes reluctant to provide timely information regarding the existence of a potential IPR which may be deemed essential during the process of defining a new standard, even after such standard is set. This can be a matter of negligence, lack of full understanding of the details of a particular standard (which sometimes can be extremely complex) or even legitimate doubt as to whether the standard in question fails under the protective scope of a specific patent claim. Still, the most prominent examples in recent case law, concern cases where patens were concealed by owners of IPRs, in their attempt to acquire a competitive edge over the standards-based market.

Arguably the most famous case concerns the industry of memory integrated circuits used in computers, as illustrated in the *Rambus v. Infineon* patent/fraud/antitrust saga: In a nutshell, Rambus sued Infeneon (both companies are active in the computer memory industry) for patent infringement. Infineon counterclaimed on the basis of fraud, pointing out that in the early 1990s, Rambus used its membership of the Joint Electron Device Engineering Council (JEDEC – a SSO for memory chips) to promote a Synchronous DRAM standard while at the same time amending its patent applications to cover the JEDEC Synchronous DRAM specifications. Allegedly, according to Infineon, Rambus's strategy was to breach the JEDEC IPR policy, which required a declaration of known essential patents, since declaration would likely have resulted in JEDEC opting for a different specification, in order to avoid the patent. After 1996, Rambus withdrew from JEDEC but used inside sources to acquire further information on the standard development. As of March 2009,

---

[73] Krechmer, K., "Communications Standards and Patent Rights: Conflict or Coordination?", *Proceedings of the "Economics of the Software and Internet Industries" Conference*, Toulouse, France, 2005, available at http://www.csrstds.com/star.html#_edn1

there are various (some of them even conflicting) court decisions regarding the behaviour of Rambus, which are based on a "hodgepodge" of application of patent law, competition law and bad faith. To cite the most recent: In August 2006, the U.S. Federal Trade Commission (FTC) has ruled that Rambus has illegally monopolized the memory industry under section 2 of the Sherman Antitrust Act, as well as practiced deception that violated section 5 of the Federal Trade Commission Act.[74] This Decision has been overturned by the DC Court of Appeals in April 2008, citing that FTC has failed to establish that Rambus had harmed the competition.[75] Moreover, in July 2007, the European Commission launched antitrust investigations against Rambus, arguing in its "statement of objections" that Rambus engaged in intentional deceptive conduct in the context of the standard-setting process, by not disclosing the existence of the patents which it later claimed were relevant to the adopted standard, and thus breached the EC Treaty's article 82 on abuse of dominant position, by subsequently claiming unreasonable royalties for the use of those relevant patents.[76] In addition, in January 2009 a Delaware federal judge ruled that Rambus could not enforce patents against an alleged infringer, stating that Rambus had a "clear and convincing" show of bad faith, and ruled that Rambus' destruction of key-related documents nullified its right to enforce its patents against the infringer[77], and yet, on February 2009, the U.S. Supreme Court turned down the FTC's bid to impose antitrust

[74] Shiloy, A., "Rambus Monopolized Computer Memory Industry – FTC", 3 August 2006, available at http://xbitlabs.com/news/memory/display/20060803085050.html

[75] Cullen, Dr., "US Court beats up FTC over Rambus 'patent ambush' ruling", 22 April 2008, available at http://www.theregister.co.uk/2008/04/22/rambus_ftc_victory/

[76] European Commission Press Release, "Antitrust: Commission confirms sending a Statement of Objections to Rambus", 23 August 2007, available at http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/330

[77] "Rambus shares fall on patent ruling", *Silicon Valley / San Jose Business Journal*, 9 January 2009, available at http://sanjose.bizjournals.com/sanjose/stories/2009/01/05/daily83.html?ana=yfcpc

penalties, that would have limited the royalties collected by Rambus, thereby leaving intact the Decision issued in April 2008 by the DC Court of Appeals.[78]

It should also be noted that abusive behaviour of an owner of IPRs may take place outside the context of an SSO standard setting procedure: a company, for example, which retains a portfolio of unknown patents silently observes the SSO adopting an ostensibly open standard, which in reality infringes its IPRs. Rather than asserting its patens promptly, the company waits until the standard is adopted, therefore making it harder for the industry to migrate to another standard since it would suffer higher switching costs. In this context, as long as the company asks for royalties which are lower than the specific switching costs, it is likely that the market players will prefer to pay for the license. However, these royalties will definitely be artificially higher in comparison to the royalties that would result from an ex ante negotiation, should the patentee had informed the SSO before the adoption of the standard.

An example of such "misbehaviour" outside the context of a SSO, is the case of JPEG format: In 2002, Forgent Networks asserted that it owned and that would enforce patent rights on the JPEG technology (which is a commonly used technology for compression in photographic images and the most common image format for storing and transmitting photographic images over the Internet), based on a patent filed in 1986. Although the JPEG Committee[79] had concluded in 2002 that the specific patent claims should be invalidated by prior art[80], Forgent managed to obtain over $ 100 million from companies which have adopted the standard between the years 2002-2004, and it was engaged in litigation with the vast majority of the industry for further license payments until 2006, when it announced that it will abandon enforcement of patent claims against the use of the JPEG

[78] Stohr, G., "FTC Rejected by U.S. Supreme Court in Rambus Case", *Bloomberg*, 23 February 2009, available at http://www.bloomberg.com/apps/news?pid=20670001&refer=home&sid=at5P6AmiOMsQ#/

[79] The Joint Photographic Experts Group (JPEG) is a joint committee between ISO/IEC JTC1 and ITU-T, that has created the JPEG standard and was formed in 1982

[80] The JPEG Committee, "Concerning recent patent claims", 19 July 2002, available at http://www.jpeg.org/newsrel1.html

standard. Besides demonstrating the obvious threat for the industry, this example may serve to indicate that usually small actors in the software and internet industries prefer to settle with the patentee even if the validity of the patent is disputable, instead of engaging in arduous and expensive patent litigation.

Although it is not the aim of this paper to discuss the impact of SSOs on competition, we should nevertheless mention that, although it is assumed that openly published standards lower the barriers to entry in a market because potential entrants can design compatible components that interoperate with the existing products, it may be the case that a standard setting process is manipulated to achieve anticompetitive ends, and eventually create or raise barriers to entry. Similar to the function of a price-setting consortium (e.g. a cartel), a SSO comprised of companies may harm competition when its membership characteristics satisfy conditions for market power and barriers to entry.[81] In this context, the 2001 Commission Guidelines for Horizontal Agreements[82] noted that participation in standard setting should be open to all, unless the parties demonstrate "important inefficiencies"[83] in such participation or unless recognized procedures are foreseen for the collective representation of interests, as in formal standard bodies. Examined under Artilcle 81 (3) of the EC Treaty, a limitation on membership of groups with larger market share may be exempted, if the selection criteria are necessary, objective, and relevant, and exclusion decisions can be appealed to a neutral panel or court. In this context, the Commission exempted membership restrictions in *X/Open*[84] on the grounds that the development of

---

[81] MacKie-Mason, J., Netz, J., "Manipulating Interface Standards as an Anti-Competitive Strategy", in Greenstein, S., Stango, V., (eds.) *Standards And Public Policy*, 2007, Cambridge University Press, available at SSRN: http://ssrn.com/abstract=978068

[82] Commission Notice — Guidelines on the applicability of Article 81 of the EC Treaty to horizontal cooperation agreements, *OJ C 3, 6.1.2001, p. 2–30*

[83] *Ibid*, para. 172

[84] Commission Decision 87/69/EEC (15 December 1986) relating to the X/Open Group, *OJ L 035, 06/02/1987, pp. 0036-0043*, available at http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!CELEXnumdoc&numdoc=387D0069&lg=en. Membership to the specific group was subject to a majority decision, and limited to major manufacturers with UNIX expertise and a European presence. In its decision The Commission took into consideration as well the

standards for a common application environment were beneficial for competition, and that restriction of membership was necessary for practical and logistical reasons, considering the potential delays and administrative slowdown that would occur, if all industry members were admitted.[85] An essential factor for the outcome of the Commission's decision was that the negative effect on competition was reduced by the group's aim of making the results of the cooperation available "as widely and as quickly as possible"[86]. Having limited ourselves in this interpolative comment with regard to SSO impact on the competition, we should now examine the behaviour of IPR holders in relation of the SSO standard setting process.

c. Abuse of IP or infringement of competition law?

The aforementioned examples of *Rambus* and *Forgent* are indicative of the contrast between the interests of a company aiming to "reap the licensing benefits" from its patent portfolio, and the intention of a SSO towards establishing royalty-free standards. In its attempt to maximise revenues from licensing its IPRs, a company may indeed engage in dubious behaviour, so as to either:

A. Encourage the industry that any patent it owns that covers some aspect of the standard will not be enforced in some way and then, once the standard has been adopted and the industry is "locked-in", seek to enforce its patents in contradiction to its previous pledge.[87] Although these "pledges"[88] can be considered as effective PR and marketing strategies, their legal foundation is not well established.[89]

---

fact that the members were not obligated to implement the standard or to refrain from implementing other standards

[85] Van Bael, I., *Competition Law of the European Community*, 4th Edition, Kluwer Law International, p. 565

[86] Commission Decision 87/69/EEC, rec. 42

[87] The establishment of bad faith in this case may not be as clear as it initially seems, particularly in cases where the company originally made a pledge of openness in good faith. For a company whose patented technology is included in the standards specification may be "forced" to resort to patent licensing, as an *ultimum refugium*, on the verge of bankruptcy. Similarly, said company might as well assign or license the relevant patents to another firm, which, in turn, is not bound by that pledge.

B. Conceal the existence of patents in order to assert them against a standard which the industry has already adopted. By revealing these patents in a later stage (often called "submarine patents") the patent holder can force the adopters/implementers of the specific standard to pay excessive royalties than they would have agreed to if they were aware of such patents before adopting the standard and could have bargained "at arm's length", or even choose a different standard.

Recent examples of the aforementioned practices have taught SSO's to anticipate and contractually counter such situations, leading to the insertion of provisions imposing an obligation to disclose patents as well as penalties for non-disclosure. Still, although this sort of provisions may prove useful, they do not tackle the problem at its source, which is the behaviour of the owner of IPRs. In this context, it is necessary to examine the specific behaviour can be countered, either by the non-enforceability of the underlying patents based in intellectual property law, or by seeking an affirmative claim against those IPR owners, by applying competition legislation or the law of torts.

---

[88] See for example, Lohr, S. "I.B.M. to Give Free Access to 500 Patents", *New York Times online*, 11 January 2005, available at http://www.nytimes.com/2005/01/11/technology/11soft.html?_r=1&oref=login&oref=regi, "Microsoft and Novell Announce Broad Collaboration on Windows and Linux Interoperability and Support", Microsoft Press Release, 2 November 2006, available at http://www.microsoft.com/presspass/press/2006/nov06/11-02MSNovellPR.mspx (as part of this agreement, Microsoft will provide a covenant not to assert its patent rights against customers who have purchased SUSE Linux Enterprise Server or other covered products from Novell), "Patent Pledge for Open Source Developers", Microsoft Corporation, 22 February 2008, available at http://www.microsoft.com/interop/principles/osspatentpledge.mspx, "Microsoft Open Specification Promise", Microsoft Corporation, 12 September 2006, available at http://www.microsoft.com/interop/osp/default.mspx, "Blackboard Patent Pledge", Blackboard Inc., available at http://www.blackboard.com/getdoc/ee803a3a-cf08-464c-8926-7268a5dcdb15/Patent-Pledge.aspx

[89] Sanders, T., "Microsoft's EU patent pledge incompatible with GPL", *vnunet.com*, 24 October 2007, available at http://www.vnunet.com/vnunet/news/2201856/microsoft-eu-patent-pledge, Fiveash, K., "Free software lawyers warn over Microsoft patent pledge", *Channel Register*, 13 March 2008, available at http://www.channelregister.co.uk/2008/03/13/ooxml_software_freedom_lawyers/, Byfield, Br., "Blackboard patent pledge greeted with mixed reactions", *linux.com*, 2 February 2007, available at http://www.linux.com/feature/59976

d. Validity of defences under IP

i. Estoppel / "Venire contra factum proprium"

Estoppel is a legal doctrine at common law, where a party is barred from claiming or denying an argument on an equitable ground. Similarly, the equivalent civil law principle of *venire contra factum proprium* represents a specific case of violation of the principle of good faith. It generally protects an aggrieved party, if the other party through its affirmative actions induced an expectation from the aggrieved party, and the aggrieved party reasonably relied on the expectation and would suffer detriment if this expectation is not met. In this context, estoppel can be used as a defence that prevents a party from enforcing his legal rights (for example, patent rights), or from relying on a set of facts that would give rise to enforceable rights, if said enforcement would be unfair to the other party.[90]

By applying the equitable estoppel doctrine in our context, the infringer may escape liability if he relied upon representations by the patentee that the patent would not be enforced, and if that reliance harmed the infringer in a significant or material way. Traditionally, however, estoppel deals only with affirmative actions made from a patentee to another party who is somehow related to the patentee and it examines whether a patentee has pledged that it either will not enforce patents related to a particular standard or it has no patents related to a particular standard. It has also been argued that courts should then hold that such pledges constitute an implied license and that enforcement of patents in contradiction of such pledge should be estopped.[91]

Fairness suggests that, although normally the application of the estoppel doctrine requires a relationship demonstrated by an affirmative communication between two parties, the

---

[90] For further information and references see Wilken, S., *The Law of Waiver, Variation and Estoppel*, Oxford University Press, 2nd Edition, 2002, Chapters 7-12, Feltham, P., Hochberg, D., Leech, T., (eds.) *Spencer Bower and Turner: Estoppel by Representation*¸ LexisNexis UK, 4th edition, 2003

[91] Merges, R., Kuhn, J., "An Estoppel Doctrine for Patented Standards", March 2008, *California Law Review*, forthcoming., available at SSRN: http://ssrn.com/abstract=1134000, p. 19

fact that the patentee's pledge was directed to the industry at large or the members of an SSO and not to a specific party should not impede the implementers of the standard to defend against the patentee. Likewise, if the presence of network effects (clearly present in the software and telecommunications industry) and high switching costs further indicate that the industry's choice to adopt the standard is, to a certain extent, practically irrevocable, then the patentee's pledge should be entail legal consequences. This however may be considered as a problematic issue for the application of the estoppel doctrine, since the traditional privity of contract extends only between well-defined parties to an explicit agreement. Unless privity in the context of standards is re-examined by taking into consideration the specificities of the network industries, then the application of the estoppel doctrine is questionable. Such re-examination should be made on the basis of considering promises of openness or long periods of silence despite an industry standard that infringes the patent, as establishing a relationship. To the further strengthen our argument, we believe that, considering that software and its adjacent markets are network markets, analytically isolating a particular standards adopter in the vacuum of patent litigation would make no sense.[92]

Even in the absence of promises or pledges by the patentee, acquiring or concealing patents with a purpose to strategically assert them against an ostensibly open standard is also indicative of bad faith and abusive behaviour, which is contrary to the purpose of patent law. Indeed, the rationale behind the establishment of the "right to exclude" others from using someone's intellectual property, is to provide incentives for innovation, within the context of lawful behaviour. That said, ex ante notifying the industry/SSO of the existence of IPRs and negotiating for the licensing terms of a such technology, provides the opportunity to the SSO to base its decision on an informed choice, whereas, waiting until the industry is "locked-in" so as to ask for excessive royalties which would otherwise would be avoided by the SSO, should be considered as indication of bad faith, therefore be excluded of from the protective scope and purpose of patent law. The right to exclude

[92] Merges, R., Kuhn, J., "An Estoppel Doctrine for Patented Standards", March 2008, *California Law Review*, forthcoming., available at SSRN: http://ssrn.com/abstract=1134000, p. 29

should only be applied when the parties are allowed to negotiate at "arm's length", not when the negotiating power of one party is greatly undermined by the detrimental behaviour of the other.

This principle should be upheld not only in cases where bad faith occurs in an explicit form (e.g. by acts aiming to establish a false perception of reality, e.g. that the proposed standard is indeed free of any IPRs) but also where bad faith is inferred from omissions of the patentee. However, for the establishment of implicit bad faith, the courts must apply a "knew or should have known" standard: if the patentee knew or should have known that the industry/SSO was adopting a standard which is believed to be, then the company has a duty to promptly inform the SSO. However, according to relevant case law, "silence alone will not create an estoppel unless there was a clear duty to speak"[93], a condition which is not usually met in the context of an SSO standard setting process, unless, a. The patentee is a member of the SSO and b. The patentee has contractually accepted an obligation to disclose all relevant essential patents and claims relating to the standard. Moreover, even if those conditions are met, the requirement of a prior relationship and communication between the patentee and the infringer entails that the traditional estoppel defence cannot be evoked by industry members outside the SSO, or late-entrants to the SSO.

ii. Laches

As with estoppel, this doctrine bears significant limitations for its application in the context of the SSO standard setting context, since a. It requires and affirmative action/misrepresentation by the patentee to the infringer, and therefore requires a direct relationship between the two parties, b. It requires reasonable reliance by the infringer on the affirmative actions of the patentee, which presupposes that the existence of the patent is known to the infringer(s) prior to the adoption of the standard, and c. It requires

[93] *B. Braun Med., Inc. v. Abbott Labs*., 124 F.3d 1419 (Fed. Cir. 1997)

material prejudice, that is, proof of either evidentiary[94] or economic prejudice of the alleged infringer.

With regard to the requirement of misrepresentation (a), it should be established that the patentee's conduct reasonably gave rise to an inference that the infringer would not be sued. As mentioned in the requirements for estoppel, unless the estoppel doctrine is adjusted for application in the standard setting context, the misrepresentation element requires that there be some communication or relationship between the parties, so that the mere silence of the patentee is evaluated under the obligation of a duty to disclose.

As far as the requirement of reasonable reliance (b) is concerned, it is also necessary to establish a relationship between the patentee and the infringer, as a result of which the infringer is dissuaded into a sense of security in proceeding with the implementation of the adopted standard. Still, considering the nature of networked markets, reliance is not based on direct communication between the patentee and the adopters. Instead, industry participants who may not have participated in the formation of the standard "join the bandwagon" and adopt it in a later stage, usually based on the rapid propagation of the standard in the networked market. Therefore, the direct relationship between the infringer and patentee is often absent in during and after the adoption of a standard, and as a result, these infringers cannot evoke this defence.

For those infringers that meet the aforementioned prerequisites, they can evoke laches and mitigate their exposure if the patentee unreasonably delayed to file suit, provided that the delay has harmed the infringer in a material or significant way.[95] Still, the patentee can overcome this defence by providing a valid excuse for this delay. Furthermore, notwithstanding the aforementioned limitations, this doctrine provides limited protection for infringers of patented standards, since a. It only limits the claimed damages to the post-

[94] That is, unavailability of witnesses or documents

[95] The laches defence has two underlying elements: first, the patentee's delay in bringing suit must be 'unreasonable and inexcusable', and second, the alleged infringer must have suffered 'material prejudice attributable to the delay', *Intirtool Ltd v. Texas Corp.* 369 F.3d 1289, 1297 (Fed. Cir. 2004)

laches period, instead of completely immunizing the infringer; b. It can be evoked only if a patentee knew (or should have known) of a particular infringer's infringing activity[96] (therefore, this defence is unable to provide "blanket immunity" for a group of adopters, but instead each infringing activity must be examined *in concreto*); c. Infringers would have to prove the "material prejudice" requirement, a task that may be rather difficult for them, considering that they will have to produce evidence that they adopted the standard specifically in reliance on the patentee's actions or declarations, rather than for other reasons (e.g. technical superiority, popularity of the standard); and d. Laches offers no protection against injunctive relief.[97]

That said, it becomes evident that, in the context of software standards, the limitation of damages only to the post-laches period is insufficient for the protection of the standard adopters, particularly considering the fact that the majority of actors involved in open source software opt to adopt open and royalty-free standards, *exactly* because they cannot afford to license patented technology, nor pay rents for fundamental file formats or common transfer protocols implemented horizontally across the software and telecommunications industries.

Finally, with regard to the third prerequisite of material (economic) prejudice, it is necessary for the infringer to establish that he has invested and based his production and business model in reliance upon continued access to the patented technology, and particularly demonstrate a connection "between the patentee's delay in filling suit and the expenditures"[98], thus proving that the infringer expenditures would have been prevented if the patentee would have filled his suit earlier. Moreover, regardless of the investments by

---

[96] *IXYS Corp. v. Advanced Power Technology, Inc* 321 F. Supp. 2d 1156 (N.D. Cal. 2004)

[97] Merges, R., Kuhn, J., "An Estoppel Doctrine for Patented Standards", March 2008, *California Law Review*, forthcoming., available at SSRN: http://ssrn.com/abstract=1134000, p. 29

[98] *State Contracting & Eng'g Corp. v. Condotte Am., Inc*., 346 F.3d 1057, 1066, (Fed. Cir. 2003) citing further references

the infringer, courts usually deny laches if the infringer would have continued (or continued) development and sales regardless of action by the patentee.[99]

In addition, another factor of networked markets that traditional economic prejudice fails to evaluate the economic prejudice suffered by the industry adopting an ostensibly royalty-free standard. Indeed, network effects often result in broad-based standards adopted by the majority of the software industry. Thus, while any single firm may not suffer greatly from economic prejudice, the software industry can suffer enormous damage in the aggregate. The traditional equitable analysis breaks down in the face of widespread industry reliance because economic prejudice typically takes into account only damage to the parties at suit. For example, in February 2007, a U.S. district court jury ordered Microsoft to pay $1.52 billion in patent damages to Alcatel-Lucent, over infringement of the proprietary MP3 music format.[100] This award was based on sales of Microsoft Windows operating systems, which have included MP3 playback support through Windows Media Player. MP3 is a well established, proprietary standard, but the precise extent to which patents owned by different entities applied to MP3 has always been in question.[101] Still, in view of the fact that the industry needed a reliable format for storing music, hundreds of companies active in the relevant market made every effort to obtain the appropriate licenses, under the reasonable assumption that obtaining a license from Fraunhofer was all that was needed to legally implement MP3 technology. This unexpected outcome could even affect other markets as well, indirectly connected to the software market, such as that of portable MP3 players, but eventually, the first jury decision was dismissed by the District

---

[99] 'the requirement [of proving economic prejudice] is almost impossible to meet when the accused infringer knew about the patent and received notice that it would face litigation if he persisted', *In re Mahurkar*, 831 F. Supp. 1354, 1379-80 (N.D. Ill. 1993)

[100] Reiner, J., "Microsoft ordered to pay $ 1.5 billion in MP3 patent lawsuit", *ArsTechnica¸* 22 February 2007, available at http://arstechnica.com/old/content/2007/02/8910.ars

[101] The compression technology used in MP3 files was co-developed by the German technology firm Fraunhofer and the former Bell Laboratories. Fraunhofer was the first group to release an MP3 encoder, in 1994. Microsoft claimed that they licensed the technology from Fraunhofer for $16 million before they ever shipped MP3 playback support in Windows. Bell Labs was spun off by parent company AT&T into Lucent Technologies back in 1995, and it was acquired by competitor Alcatel in a merger in April 2006.

Court judge, whose decision was later upheld by the Court of Appeals.[102] This however does not mean that the patent "woes" of the MP3 standard will be over any time soon, since many companies have cooperated for the development of this format[103], while at the same time it is sure that the specific format will perpetuate due to the strong network effects caused by a. the large quantity of music available in this format, b. users' familiarity with the format, and c. the wide variety of existing software and hardware that takes advantage of this format.

The aforementioned example serves to illustrate our previously state comment, that there is need for implementing a modified estoppel doctrine which would take into account the particularities of networked markets and thus would prevent companies from strategically asserting patents to gain inefficiently high rewards for their IPRs.

iii. Adverse possession

It has also been argued that the conflict between the enforcement of IP law and the impact on competition could be resolved through the application of the doctrine of adverse possession, based on the Lockean concept of preventing valuable resources from being left idle for long periods of time, by specifying procedures for a productive user to take title from an unproductive user.[104] In this context, applying the doctrine of adverse possession in patent law would entail to continuous and long-standing use of intellectual property: "Just as the original property owner loses the right to eject those who successfully adversely posses the real property in question, if a firm allows an ancillary market to

---

[102] Fiveash, K., "Alcatel-Lucent loses $1.5bn MP3 patent claim against MS", *ChannelRegister*, 26 September 2008, available at http://www.channelregister.co.uk/2008/09/26/microsoft_alcatel_lucent_patent_claim/

[103] Heingartner, D., "Patent Fights Are a Legacy of MP3's Tangled Origins", *The New York Times,* 5 March 2007, available at http://www.nytimes.com/2007/03/05/technology/05music.html?em&ex=1173243600&en=3aefaa5212a6d89c&ei=5087%0A

[104] Bangley, C., Clarkson, G., "Adverse Possession for Intellectual Property: Adopting an Ancient concept to Resolve Conflicts between Antitrust and Intellectual Property Laws in the Information Age", *Harvard Journal of Law and Technology,* Vol. 16, 2003, p. 327-393

develop, it should not be able to later extinguish that market by changing its policy of intellectual property rights enforcement".[105] A similar approach has also been proposed, whereby "the right to exclude is only partially necessary to achieve the stated goals of property and IP".[106]

A modified approach of the estoppel doctrine which would be tailored to the particularities of networked markets would share with these proposals the underlying principle that the patentee builds up a sort of reliance interest when he uses a technology that is later determined to infringe a patent, aiming not to protect industry participants individually, but rather the software industry as a whole.

e. Validity of defences under competition law

In the context of SSOs, a claim of violation of competition by an owner of IPRs will likely focus on the competitive advantage the owner receives by misleading the SSO into adopting a standard they believe to be free to use, but which is in fact intellectual property of the defendant.

In the U.S., a likely route of opposition against efforts to control the standard-setting process by failure to disclose an IPR is an attempted monopolization claim under section 2 of the Sherman Act,[107] which must prove and demonstrate: a. a specific intent to monopolize the relevant market, b. an anticompetitive conduct in furtherance of that intent, c. a dangerous probability of successful monopolization[108], and d. a causal antitrust

---

[105] Bangley, C., Clarkson, G., *Ibid*, p. 374

[106] Carrier, M., "Cabining Intellectual Property Through A Property Paradigm", *Duke Law Journal,* Vol. 54, No.1, 2004

[107] Said article reads : "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding $10,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court"

[108] Lemley, M., "Intellectual Property Rights and Standard Setting Organizations", California Law Review, Vol. 90, p. 1889, 2002, available at SSRN: http://ssrn.com/abstract=310122, p.65

injury[109]. With regard to the prerequisite of wilful intention of such behaviour, it has already been mentioned *supra* that this conduct may not only take the form of explicit statements, but also an omission, such as failing to openly assert ownership in the standard until after it is adopted.

More precisely, in order to prove the causation requirement (d.) it should be established that the SSO would not have adopted the standard in question but for misrepresentation of the patentee. This is needed because the failure to disclose the existence of a patent to a SSO will not affect the competitive marketplace if the SSO would have approved the standard even if it had known about the patent. Moreover, it should be established that the SSO's decision to adopt the patented technology as a standard will influence the market (c.). Such influence is more likely when the SSO members collectively share a dominant position in the relevant market, as well as in cases where previous standards adopted by the SSO have dominated the market or when the patentee is unwilling to license the undisclosed patent on FRAND terms.[110] In this context, and considering the networked nature of the markets in question, it appears more likely that disclosure will violate competition law where interface standards and formats are adopted by SSO, rather than quality or safety standards. Finally, assuming that the plaintiff can prove both (c.) and (b.), it should also be proved that the patentee's failure to disclose its relevant IPRs was intentional (a) and not an oversight, although the latter might suffice if the decision would be based on contract or intellectual property law.[111]

In view of the aforementioned prerequisites, if a company contributes patented technology to a SSO, it must disclose those patents to the members of the SSO or risk losing the right to enforce them. The case law in this regard is better demonstrated by the *Dell* case, which, although it involves the hardware market, it is important for the software community as

---

[109] *MeGlinchy v. Shell Chem. Co.*, 845 F.2d 802 (9th Cir. 1988)

[110] Lemley, M., "Intellectual Property Rights and Standard Setting Organizations", California Law Review, Vol. 90, p. 1889, 2002, available at SSRN: http://ssrn.com/abstract=310122, p.73

[111] Lemley, M., *Ibid*, p.74

well: in the early 1990's, Dell participated in a several meetings of the "Video Electronics Standards Association" ("VESA") to help promulgate a new local bus[112] standard for personal computers. Considering that VESA's aim was to adopt standards that do not infringe any IPRs of its members, VESA's intention was to adopt an open standard. During the standard setting process, Dell certified that it held no patents in the proposed standard. Thus, finding that Dell has acted in bad faith, the FTC held Dell's patent unenforceable against those using the aforementioned standard.[113] Although, as admitted by the FTC, Dell's anticompetitive behaviour amounted to an unreasonable restraint in competition (among other things, having a "chilling effect" on the willingness to participate in industry standardization efforts), the FTC did not examine in depth the aforementioned criteria, and in particular, did not assert that Dell acquired market power, nor did it assert that Dell intentionally misled VESA.[114]

Still, even if the aforementioned criteria are met, the application of antitrust law is not guaranteed. For example, in *Townshend v. Rockwell International*[115], the court did not follow *Dell* and held that the defendants did not commit an antitrust violation by failing to disclose IP to a SSO. At issue here where the attempts by Townshend and 3Com to produce industry standards which incorporated Townshend's patented technology in modems[116].

---

[112] In computer architecture, a bus is a subsystem that transfers data between computer components inside a computer or between computers

[113] Anthony, S., "Antitrust And Intellectual Property Law: From Adversaries To Partners", *AIPLA Quarterly Journal*, Vol. 28, No.1, 2000, p.7, available at http://www.ftc.gov/speeches/other/aipla.shtm#N_1_

[114] Katz, M., Shapiro, C., "Antitrust in Software Markets" (pp.29-83), in Lenard, T., Eisenach, J., *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Age*, Springer, 1999, p. 61

[115] *Townshend v. Rockwell Int'l Corp,* No. 99-0400, 2000, WL 433505 (District Court of the Northern District of California, 28 March 2000)

[116] During the standards setting process, the two companies submitted technical contributions to the International Telecommunications Union (ITU) containing Townshend's patented technology, but also notified the ITU that Townshend had filled patent applications on these technical contributions and submitted a proposal for licensing this technology. In 1998, the ITU adopted the specific standard which included the patented technology and in 1999 Townshend filed a patent infringement action against other implementers of the standard, companies Rockwell and Conexant. In response, said companies asserted two antitrust counterclaims, namely that A. Townshend and 3Com have combined and conspired to deceive the

The court differentiated the facts of the case with regard to those in *Dell*, considering that[117]: a. Townshend's patents were issued after the SSO (ITU) adopted the standard in question, b. 3Com has informed the SSO that Townshend had pending patent applications with relevant subject matter, c. In *Dell*, the FTC recognized that an industry standard which incorporates patented technology can confer market power in a market for *products* which incorporate the specific standard, but it did not consider the issue of whether this standard conferred market power in a market consisting of *proprietary technology*, such as the market for Townshend, and d. There is no assertion in *Townshend* that the adoption of the industry standard in question prevented the development of proprietary technology that could otherwise be developed (and thus there was no evidence of monopolization in the market for proprietary technology).[118]

Within the context of EU competition law, suppliers with a dominant position must not engage in excessive pricing, discrimination, exclusionary practices or retaliation against competitors. They may be required to license their IPRs (including their patents) against their will, but this will be the case only in exceptional circumstances, under the application of the essential facilitates doctrine. Moreover, the European Commission has indicated that if a standard has been adopted, implemented and made mandatory by a Community instrument, a refusal to license the technology necessary to use the standard would raise serious questions under article 82 EC.[119] This, however, would not apply to technology that is not considered as "essential" for a standard, even if that technology gives the user a

---

ITU into incorporating the patented technology into the standard, to deny competitors access to this technology, and thus restrain competition; and B. That 3Com and Townshend wilfully engaged in conduct creating dangerous probability that 3Com will acquire and maintain monopoly power in the market for modem chipset products.

[117] *Ibid*, considerations 11-13

[118] American Bar Association, *Intellectual Property and Antitrust Handbook*, 2007, p. 399

[119] European Commission Communication "Intellectual property rights and standardisation", COM (92) 445 final, October 1992, para. 5.1.11

competitive advantage in the standardised sector[120]. In general, the essential facilities doctrine may apply to firms that hold a monopoly in a critical stage of production in an industry, and control a resource which is essential to the plaintiff's viable competition with the monopolist which is not available from another source or capable of being duplicated by the plaintiff or others.[121]

Article 82 of the EC Treaty bans abuses of dominant position (regardless of the intention of the abuser – in contrast to US antitrust law) in a substantial part of the common market. For this article to be applied however, it must be established that the owner of the "essential" IPRs that lies on the basis of the standard's specification indeed enjoys a dominant position. This however cannot be held as an indisputable fact, particularly considering that the definition of the relevant technology markets is a complex undertaking. According to one opinion[122], article 82 EC is applicable in this field because standardization of a given technology ends competition between technologies for the essential components of the standard. In this context, each owner of patented technology essential to the standard would therefore enjoy market power akin to dominance, and thus be in position to impose terms and charge royalties for its essential patents in excess of fair market-determined rates. This abuse would be even more highlighted by the "hold-up" of potential licensees who would be lock-in to the standardized technology by virtue of the substantial investments made for its implementation.

---

[120] See for example ECJ cases: Case C-481/01, *IMS Health*, [2004] O.J. (C3) 16, Case C-7/97, *Oscar Bronner*, [1998] E.C.R. I-779, Joint Cases T-69/89 etc., *RTE v Commission*, [1991] ECR II-485, upheld by the ECJ in Joint Cases C-241/91 P etc. *RTE and ITP v Commission*, [1995], ECR I-743 ("*Magill*"), C-396/96 P, *Companie Maritime Belge Transports v Commission*, [2000], ECR I-1365, Case T-342/99, *Airtours v Commission*, [2002], ECR II-2585, Case 238/87, *Volvo*, [1988] ECR 6211

[121] European Commission, Notice on the application of competition rules to access agreements in the telecommunications sector, 1988, O.J. C 265/2, para. 68

[122] Glader, M., Larsen, S. Ch., "Article 82: Excessive Pricing – An outline of the legal principles relating to excessive pricing and their future application in the field of IP rights and industry standards", *Competition Law Insight*, July 2006, p. 3

According to a contradicting opinion[123], the aforementioned argumentation is misplaced because it equates inclusion in a standard with dominance. This presumption, however, overlooks the existence of vertical competitive constraints resulting from the fact that although the adoption of a standard may effectively terminate competition between technologies *within* the scope of the specific standard, it does not affect competition *between* standards, either in the guise of downstream competition between substitutable end-products compliant with different standards or as competition between standards at the upstream licensing level. In this context, if licensees of the standardised technology can switch to alternative technologies or standards, patented or royalty-free, then the patent holder will lose sales if he tries to set an excessive royalty rate. Similarly, if the end users can easily switch to substitute products which do not use the patented technology, such competition between end products will represent a significant competitive constraint on the holder of patents essential to the standard. Moreover, the aforementioned argument does not take into account the existence of horizontal and dynamic competitive constraints stemming from the complementary nature of each patent that is essential to a specific standard, as well as the ongoing competition that takes place, not only before an SSO adopts a specific standard, but also after such adoption (e.g. for the inclusion of new releases, and its adaptation to new technologies).[124]

In considering the appropriate legal standard to apply, it is helpful to consider the circumstances in which patent litigation has been found to constitute an abuse of dominance under Article 82 EC. In the EU's seminal case on this issue, *ITT Promedia*,[125] the Commission rejected a complaint alleging that Belgium's incumbent telecom operator, Belgacom, violated Article 82 by suing a business partner. The complainant appealed to the Court of First Instance of the European Communities (CFI), albeit with no success as his

---

[123] Geradin, D., Rato, M., "Article 82, IP Rights and Industry Standards: In Reply", 2006, available at SSRN: http://ssrn.com/abstract=950215

[124] Geradin, D., Rato, M., "Article 82, IP Rights and Industry Standards: In Reply", 2006, available at SSRN: http://ssrn.com/abstract=950215, p. 2

[125] Case T-111/96, ITT Promedia NV v. Commission, [1998] E.C.R. II-2937

complaint was deemed to be unfounded. According to the Court, the ability to assert rights through judicial recourse is a general legal principle, common to the legal traditions of the Member States and an inalienable human right. The Court emphasized that only in "wholly exceptional circumstances" will the commencement of legal proceedings amount to an abuse of dominance.[126] In this context, the Commission took the position that two exceptional sets of circumstances needed to be present for establishing an abuse of dominance: a. it had to be clear that the lawsuit is "manifestly unfounded", in the sense that it would "not reasonably be considered as an attempt to establish the right of the lititgant" and could "only serve to harass the opponent"; and b. the suit had to be part of an orchestrated scheme to eliminate competition.

Considering that the aforementioned criteria constitute limitations to a fundamental human right, the Court stressed that they should be interpreted strictly[127], however, it did not went so far as to examine their validity, either on the concept of frivolous and vexatious litigation as an abuse, or on the Commission's particular application of said criteria in the case in question. Still, although not explicitly upheld by the courts, these criteria provide nevertheless a rough indication of the types of circumstances in which the Commission would consider that patent litigation is "wholly exceptional", giving rise to an abuse of dominance.[128]

In our view, the crux of the aforementioned test lies on whether the litigation could reasonably be considered as an attempt to establish legitimate rights or whether it serves an implicit, anti-competitive purpose and thus is "manifestly unfounded". Answering this question is particularly difficult in relation to the patent litigation in the specific industry markets, given the often complex and technical nature of the underlying facts, and standard implementations. Moreover, until today, *ITT/Promedia* has remained the only precedent on

---

[126] Case T-111/96, ITT Promedia NV v. Commission, [1998] E.C.R. II-2937, para. 60

[127] Case T-111/96, *ITT Promedia NV v. Commission*, [1998] E.C.R. II-2937, para. 61

[128] Jones, A., Sufrin, B., Smith, B., *EC Competition Law: Text, Cases and Materials*, 3rd Edition, Oxford University Press, p. 583

unmeritorious and vexatious litigation, thus illustrating the high level at which the Commission has set the significant evidentiary standard. In this context, our general impression remains that enforcing patent rights under EU Competition law is a legitimate way of protecting them.

However, it should also be stated that although the concept of abuse is an objective one and does not require "fault",[129] exclusionary practices are normally directed at damaging or eliminating other industry competitors and therefore are often part of a predatory "plan" or "intent" which can be sufficiently proven.[130] In this context, should the behaviour of the patentee indicate such a scheme, particularly if the dominant company's behaviour was aiming to charge royalties which are unfairly high in comparison to the "economic value" of the licensed technology (which should be evaluated on the basis of a legitimate conduct and not the eventual "lock-in" of the market because of the patentee's misrepresentation), then Article 82 EC may be applied, particularly considering that in recent case law, the Commission has also taken into account non-cost related factors, such as the demand for the product or service in question,[131] an aspect which is of significant importance for standards, formats and protocols in networked markets.

Indeed, in emerging technological markets where there is often competition *for* the market, it is sometimes suggested that very significant profits should be justified for those who manage to win the market (e.g. by establishing a *de fact* standard), since they compensate for the risk undertaken by the winner, and offset the losses suffered by the many losers. However, it is not clear that profits need compensate for the losses suffered by the many losers in order to create an efficient market. Therefore, a conventional analysis, which takes into account the cost of developing the product over its lifetime in an analysis of

---

[129] Case T-65/89, *British Plaster Board Industries v Commission*, [1993], ECR II-389, para. 70

[130] Ritter, L., Braun, D., *European Competition Law: A Practitioner's Guide*, 3rd Edition, Kluwer Law International, 2004, p. 454

[131] Case COMP/A.36.568/D3, *Scandlines*, 23 July 2004, and Case COMP/A.36.570/D3, *Sunbusserne*, 23 July 2004

whether or not licensing terms are excessive, does not appear to be an unjustified approach for the evaluation of royalties.[132]

f. Fraud as component of an anti-competitive practice

Depending on the factual circumstances, it is possible that a failure to comply with an explicit SSO patent policy mandating disclosure of essential IPRs could constitute fraud. This would probably be the case where the facts are similar to the aforementioned *Dell* case, where the patentee had an obligation to disclose the existence of an IPR and knowingly fails to do so or affirmatively declares that none exist. Although a complaint that is based in fraudulent conduct may be less cumbersome to uphold in comparison to an antitrust claim (which would require extensive inquiry into market definition and market power), it has its limitations: most notably, a fraud claim must necessarily be based on some duty of the plaintiff, and therefore it would preclude suits by non-members of the SSO (such as –class- actions by consumers or other companies). In this context, a defence based on fraudulent behaviour cannot be seen as a substitute to an antitrust suit, as it subject to some of the same problems as a claim based on a breach of contract. It could however be considered as aggravating evidence for proving the anti-competitive conduct of the patentee.

g. Room for legitimate enforcement actions? examples

Notwithstanding the possibility of unlawful behaviour from an owner of IPRs under IP law or competition law, we should consider whether a patent owner may legitimately engage in patent enforcement actions, if his patented technology is included as a standard specification. From the outset, it should be clear that, following the reasoning in *ITT/Promedia*, a patent holder may legitimately assert his IP rights on a patented technology incorporated into a standard, if the SSO or the industry adopted the standard in full knowledge of the fact that such technology is protected by IP rights. As an example, the recent dispute between Qualcomm and Nokia is based on a completely legitimate

[132] Smith, G., Boardman, R., *Internet Law and Regulation*, 4th Edition, Sweet & Maxwell, 2007, p. 1211

enforcement action regarding a patent related to a standard.[133] In our view, this type of litigation is limited to a licensing dispute over a standard and should not raise major concerns for the industry, being a legitimate assertion of patent rights. The industry adopted the CDMA standard in full knowledge of Qualcomm's proprietary technology, and therefore the dispute concerns the actual licensing terms and not the behaviour of Qualcomm.

A different situation where the assertion of patent rights should be deemed as legitimate is when the patent owner attempts to retain control of the patent. The antitrust and patent infringement litigation between Sun Microsystems (Sun) – the developers of the Java programming language – and Microsoft demonstrates this situation, and it is also related to the aforementioned strategy of Microsoft to "embrace, extend and extinguish" the standards related to the Java language.[134] In 2003, the 4th U.S. Circuit Court of Appeals reversed the decision of a lower court, by deciding that Microsoft did not have to distribute a version of Java endorsed by Sun, but on the same time affirmed that Microsoft violated Sun's copyright by distributing its own version of the language for the Windows

[133] Mobile handsets in America employ Qualcomm's patented technology, Code-Division Multiple Access (CDMA) to achieve interoperability between networks. Mobile phone manufacturers such as Nokia license patents related to CDMA in order to produce phones that will be marketed in America, and which utilize the CDMA standard. Recently, Qualcomm and Nokia disputed the terms of the license agreement and eventually Qualcomm filed suit for patent infringement. In response, Nokia filled a complaint seeking "fair and reasonable" licensing terms. Finally, in July 2008, the adversaries reached a new patent agreement, effectively settling all litigation between the companies, including the withdrawal of Nokia of its complaint before the European Commission and numerous lawsuits filed in the U.S., Europe and Asia. More information on the facts of the case see: Fehrenbacher, K., "Timeline: Qualcomm, Nokia Duel", *GigaOM*, 4 April 2007, available at http://gigaom.com/2007/04/04/timeline-of-the-qualcomm-nokia-duel/, Luna, L., "Qualcomm, Nokia reach new patent agreement, end years of bitter disputes", 24 July 2008, *Fierce Wireless,* 24 July 2008, available at http://www.fiercewireless.com/story/qualcomm-nokia-reach-new-patent-agreement-end-years-bitter-disputes/2008-07-24

[134] Sun allowed users to freely download the tools needed to read and write programmes in the Java language, which has become popular because of its cross-platform interoperability. In this context, Sun licensed Java technology to Microsoft for its inclusion in the Windows platform. However, Microsoft applied a stratagem of "embrace and extend", by implementing additional features in Java which were not part of Sun's standard. In this context, if developers wrote software that took advantage of the extra features, this software would only run in Java running on the Windows platform, thus "extinguishing" Java's cross-platform compatibility that Sun was aiming for. For this reason, Sun sued Microsoft based on patent infringement and antitrust violations

platform.[135] In this context, Microsoft was not burdened with a "must-carry" obligation, but simultaneously was prohibited from distributing any version of Java other than that licensed to Microsoft in a 2001 Agreement with Sun. Finally, the companies reached a settlement over Sun's antitrust claims in 2004.[136]

4. Conclusion

a. Findings

Issues of intellectual property and innovation have become central in our economy and, therefore, increasingly prominent in antitrust enforcement. The described tension between the enforcement of patents and competition law in the field of technology surpasses the function of the traditional theory of patents as mechanisms for maintaining market exclusivity, and its impact should be perceived under the specific dynamics of the software, IT and telecommunications markets. The exponential granting of patents in these markets indicates that they are most likely (if not deterministically) overlap and to block the development of necessary improvements, particularly in relation to protocols and formats, where interoperability is essential for the creation of economies of scale. In fact, the aforementioned industries serve to demonstrate a swift in the traditionally offensive use of a patent, which mainly served as a means to increase revenues through royalties: this swift is reflected in the extent of royalty-free cross-licensing initiatives (which are not limited to the open source community) as well as the creation of patent pools, and indicates that patents are also used for defensive purposes, since by acquiring a patent (or a bundle of patents), the patentee has effectively establishes "virtual borderlines" (as laid down in his patent claims), within the limits of which he may innovate without fear that he is infringing IPRs of another party. In our view, this response of the OSS community was not made in vain as it may dissuade opportunistic rent-seeking attacks.

---

[135] "Microsoft does not need to carry Sun's Java Support", *Out-law news*, 30 June 2003, available at http://www.out-law.com/page-3679

[136] "Sun and Microsoft settle antitrust claims for $ 2 billion, *Out-law news,* 5 April 2004, available at http://www.out-law.com/default.aspx?page=4436

However, this swift also demonstrates that although it would appear that the open source software industry would stand to lose significantly from the rise of the software patents, their use is important for their business. If we filter out the polemic voices against software patents which are based on philosophical or theoretical arguments, we understand that these threats may be mitigated through the adoption of certain elements of the regulatory system established by intellectual property law. In this context, it should not be disregarded that the OSS movement (a "child" of copyright law itself) incorporated certain qualities of the intellectual property law system and adapted it to its own needs, not only for defensive purposes (e.g. patent pooling, royalty free cross-licensing) but also for further establishing and securing its own existence and propagation (such as the reciprocal copyleft clause). Thus said, we believe that the tension between intellectual property and open source / open standards initiatives is not a conflict between the use of patents and OSS/SSO, but indeed, a conflict between the *misuse* of patents and OSS/SSOs. To our view, the misappropriation of IP rights is indeed a significant threat, alongside other threats of equal significance, such as the anti-competitive behaviour of market players or organisations active in this sector.

Having said that, we have used examples taken from recent case law to indicate what may be considered as abuse of IPRs (patent rights) in the context of OSS and open standards, how these abuses are countered by OSS developers and the industry at large, as well as the efficiency of such counter mechanisms or strategies under the scope of intellectual property and competition law, since the abuse of patent rights ultimately has an impact on market competition. It is our view that open strategies, such as IPR contributions, royalty-free standard setting and defensive patent pooling encourage value creation by enhancing the availability of the underlying technology. In this context, the mildest implementation of an open IPR strategy is the decision to disclose, but not assert, essential patents to the OSS community or to a SSO. A step further is the royalty-free patent pools, which may tackle any potential coordination problems and exposure to patent trolls by aggregating the IPRs needed to proceed with the development of an OSS project or an open standard. The reciprocal open source licensing model is essentially an extension of royalty free patent pooling, aiming to make openness a self sustaining feature of the technology. All these

strategies should be considered as a response of the market towards an anomaly in the enforcement of IPRs and attempt to tackle the patent threat problem at its source and proactively, and do not require the violation of IP or competition law.

On the other hand, the legal defences analyzed in part 3 of this paper are based on a presumption that the law has been violated by the patent holder, and that the court should intervene to correct this abuse, either by properly interpreting the boundaries of protection granted by patent law, or by investigating the detrimental impact to the market by the patentee's behaviour, or even both. In any case however, judicial protection is sought exactly because the law has been disregarded by the patentee. It follows that if the patentee has not acted in violation of the law, then the enforcement of his IPRs is completely legitimate. The answer to this question rests solely on the evaluation by the courts of the factual circumstances under which the assertion of patents has been attempted. Should this evaluation lead to the acceptance of the criteria stated in the aforementioned sections of part 3, then the abuse of rights will be proven and the patentee will not be able to enforce his rights against the "infringer". Towards the evaluation of such abuse, the particularities of the nature of the IT-related markets as markets characterised by strong network effects should be taken into consideration, so as to overcome any shortcomings regarding the lack or direct relationship between the act of misrepresentation of the patentee and the alleged infringer.

b. Policy considerations: open innovation and the SSO IPR policies.

Perhaps the demonstrated increasing conflict over the misuse of IPRs and open source/open standards, dictates a need towards the adoption of an innovation model characterized by its "openness", a model promoting and encouraging "Open Innovation"[137]. By acknowledging that in a world of widely distributed knowledge, it would be more efficient for companies not to rely entirely on their own research, but they should instead

[137] Open Innovation is a term used by Henry Chesbrough, a professor at Berkeley University. See Chesbrough, H. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, 2003

buy or license third party IPRs from other companies. Within the OSS context, Open Innovation may seem to conflict on some issues regarding patent licensing, however, in our view and considering that OSS is founded on the present system of intellectual property, these two terms are not mutually exclusive, as the aforementioned examples of patent commons, open source patents and royalty-free patent licensing for OSS have illustrated. Within the context of standardisation, both open standards and open innovation refer to a process that involves sharing or exchanging technology beyond a company's own boundaries. This is consistent with the conclusion that the broad trend towards increased specialization in technology production has lead to a thriving technology input market, on which many companies now rely to procure standards-based inputs and/or monetize their inventions. Moreover, it also explains why some companies which supply the technology input market do not "compete on implementation" (since they specialize at supplying the technology) and therefore have few incentives to "cooperate on standards", as previously stated.[138]

In the view of the above, SSOs active in IT and software industries may indeed provide a way for private parties to "contract-around" the effect of misuse of intellectual property rights. As it has already been mentioned, members of SSOs in these sectors are effectively contracting "in the shadow of patent law", "[b]argaining from an inefficiently powerful set of property rules to a world in which intellectual property rights are either removed from the picture entirely or are licensed in advance on standardized terms" [139]. That said, the SSO patent policies developed in these industries may be perceived as a partial solution from the market, to a statutory problem created by an overbroad and rigid intellectual property protection.

Formulation of a policy on how to address the tension between patents and standards is not a simple maximization exercise and requires the a careful balancing among various

[138] Simoe T., "Open Standards and Intellectual Property Rights", in Chesbrough, H., Vanhaverbeke, W., West, J., *Open Innovation: Researching a New Paradigm,* Oxford University Press, 2006, p. 165 (161-183)

[139] Lemley, M., "Intellectual Property Rights and Standard Setting Organizations", California Law Review, Vol. 90, p. 1889, 2002, available at SSRN: http://ssrn.com/abstract=310122, p. 138

factors involved, directly or indirectly in the process, such as the SSOs, the owners of IPRs as participants in the development process, the users of standards (that is the implementers and integrators) as well the end customers and consumers of standardised products and services. The interests represented by the aforementioned parties and particularly how will these interests will be balanced and addressed in the context of formulating a patent policy of an SSO will undoubtedly determine the speed, liability and effectiveness of the standardisation process, the control over the patent rights, the relevant obligations which burden the participants, the possible implications with regard to patent and competition law, as well as the impact on costs and innovation. In addition, the complexity and legal implications of licensing vary depending on product characteristics and the actual depth of the standard specifications. Also, the state of existing licensing and cross-licensing arrangements among the expected adopters, including potential entrants, may affect, the degree of benefit in considering the licensing implications as part of the standard setting process.

Because of the possible costs of royalties, the essential question appears to be whether SSOs should avoid IP-protected technology altogether or opt for FRAND licensing. This is a controversial issue, especially in the Internet and software environment, as this is reflected in the choices and backtracks of one of the most important SSOs in the field, the World Wide Web Consortium, which eventually decided to offer its specification standards on a royalty-free basis.[140] Considering that the W3C should probably be considered as dominant in the Internet standard setting, there are doubts as to whether such complete boycott to IPRs is allowed under EC competition law, if milder and more proportionate solutions could equally guarantee that the open source community could compete on the merits with

[140] The World Wide Web Consortium (W3C) is the main international standards organization for the World Wide Web (http://www.w3.org/). As of March 2009, the W3C has 407 members (http://www.w3.org/Consortium/Member/List). In the fall of 2001, W3C proposed an IPR policy that would have allowed owners of IPRs to charge FRAND royalties for technologies incorporated in W3C standards. Still, in April 2002, the W3C backtracked and opted for "royalty-free" standards, under the weight of criticism from the open source community.

owners of IPRs (for example, the possibility of allowing IPR owners to charge certain end-users that do not impede the open source development process)[141].

[141] Dolmans, M., "Standards for Standards", Paper for American Bar Association (Section of antitrust law), Spring meeting 2002, Session on Trade Associations, Washington, April 2002, p. 17, available at http://www.ftc.gov/opp/intellect/020522dolmans.pdf.

References (all internet sources last accessed on 30 March 2009)

American Bar Association, *Intellectual Property and Antitrust Handbook*, 2007

Anthony, S., "Antitrust And Intellectual Property Law: From Adversaries To Partners", *AIPLA Quarterly Journal*, Vol. 28, No.1, 2000, p.7, available at http://www.ftc.gov/speeches/other/aipla.shtm#N_1_

Asundi, J., Carare, O., Dogan, K., "Competitive Implications of Software Open-Sourcing", 2008, available at http://ssrn.com/abstract=1185374

Audretsch, D., "Small firms, innovation and competition", in Neumann, M., Weigand, J., (eds.) *The International Handbook of Competition,* Edward Elgar Publishing, 2006, pp. 92 *etseq*

Bangley, C., Clarkson, G., "Adverse Possession for Intellectual Property: Adopting an Ancient concept to Resolve Conflicts between Antitrust and Intellectual Property Laws in the Information Age", *Harvard Journal of Law and Technology,* Vol. 16, 2003, p. 327-393

Besen, St., Farrell, J., "Choosing How to Compete: Strategies and Tactics in Standardization", *Journal of Economic Perspectives,* Vol 8, iss. 2, 1994, pp. 117-31

Byfield, Br., "Blackboard patent pledge greeted with mixed reactions", *linux.com*, 2 February 2007, available at http://www.linux.com/feature/59976

Carrier, M., "Cabining Intellectual Property Through A Property Paradigm", *Duke Law Journal,* Vol. 54, No.1, 2004

Chesbrough, H. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, 2003

Cullen, Dr., "US Court beats up FTC over Rambus 'patent ambush' ruling", 22 April 2008, available at http://www.theregister.co.uk/2008/04/22/rambus_ftc_victory/

Delio, M., "Developers back IBM in UNIX Suit", *Wired Magazine*, 7 March 2003, available at http://www.wired.com/techbiz/it/news/2003/03/57955

Dolmans, M., "Standards for Standards", Paper for American Bar Association (Section of antitrust law), Spring meeting 2002, Session on Trade Associations, Washington, April 2002, p. 17, available at http://www.ftc.gov/opp/intellect/020522dolmans.pdf

European Commission Press Release, "Antitrust: Commission confirms sending a Statement of Objections to Rambus", 23 August 2007, available at http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/330

Farrell, J., and Shapiro, C., "How Strong are Weak Patents?" University of California at Berkeley Working Paper No CPC05-054, 2007

Fehrenbacher, K., "Timeline: Qualcomm, Nokia Duel", *GigaOM*, 4 April 2007, available at http://gigaom.com/2007/04/04/timeline-of-the-qualcomm-nokia-duel/

Feltham, P., Hochberg, D., Leech, T., (eds.) *Spencer Bower and Turner: Estoppel by Representation,* LexisNexis UK, 4th edition, 2003

Fiveash, K., "Alcatel-Lucent loses $1.5bn MP3 patent claim against MS", *ChannelRegister*, 26 September 2008, available at http://www.channelregister.co.uk/2008/09/26/microsoft_alcatel_lucent_patent_claim/

Fiveash, K., "Free software lawyers warn over Microsoft patent pledge", *Channel Register*, 13 March 2008, available at http://www.channelregister.co.uk/2008/03/13/ooxml_software_freedom_lawyers/

Fried, I, "HP outlines Linux indemnity plan", *CNET news*, 24 September, 2003, available at http://news.cnet.com/HP-outlines-Linux-indemnity-plan/2100-1016_3-5081407.html

Fried, I., "Microsoft's TomTom suit includes Linux claims", *cnet news*, 25 February 2009, available at http://news.cnet.com/8301-13860_3-10172442-56.html?tag=mncol;txt

Geradin, D., Rato, M., "Article 82, IP Rights and Industry Standards: In Reply", 2006, available at SSRN: http://ssrn.com/abstract=950215

Glader, M., Larsen, S. Ch., "Article 82: Excessive Pricing – An outline of the legal principles relating to excessive pricing and their future application in the field of IP rights and industry standards", *Competition Law Insight,* July 2006

Hall, B., and Ziedonis, R., "The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95", *RAND Journal of Economics, 2001 pp 101-128*

Heingartner, D., "Patent Fights Are a Legacy of MP3's Tangled Origins", *The New York Times,* 5 March 2007, available at http://www.nytimes.com/2007/03/05/technology/05music.html?em&ex=1173243600&en=3aefaa5212a6d89c&ei=5087%0A

Jones, A., Sufrin, B., Smith, B., *EC Competition Law: Text, Cases and Materials*, 3rd Edition, Oxford University Press

Katz, M., Shapiro, C., "Antitrust in Software Markets" (pp.29-83), in Lenard, T., Eisenach, J., *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Age,* Springer, 1999

Kirby, C., "Red Hat steps up for Linux: Source defense fund starts with $ 1 million", *San Francisco Chronicle,* 5 August 2003, available at http://news.cnet.com/HP-outlines-Linux-indemnity-plan/2100-1016_3-5081407.html

Korah, V., *Intellectual Property Rights and the EC Competition Rules*, Hart Publishing, 2006

Krechmer, K., "Communications Standards and Patent Rights: Conflict or Coordination?", *Proceedings of the "Economics of the Software and Internet Industries" Conference,* Toulouse, France, 2005, available at http://www.csrstds.com/star.html#_edn1

Lemley M., Shapiro, C., "Patent Holdup and Royalty Stacking", Stanford Law and Economics Olin Working Paper No. 324, 2006, available at http://ssrn.com/abstract=923468

Lemley, M., "Intellectual Property Rights and Standard Setting Organizations", California Law Review, Vol. 90, p. 1889, 2002, available at SSRN: http://ssrn.com/abstract=310122

Leveque, F., Meniere, Y., "Copyright vs. Patents: The Open Source Software Legal Battle", *Review of Economic Research on Copyright Issues*, 2007, vol. 4(1), available at: http://ssrn.com/abstract=997191

Lohr, S., "IBM to Give Free Access to 500 Patents", *The New York Times*, 11 January 2005, available at: http://www.nytimes.com/2005/01/11/technology/11soft.html?_r=1&oref=regi

Luna, L., "Qualcomm, Nokia reach new patent agreement, end years of bitter disputes", 24 July 2008, *Fierce Wireless,* 24 July 2008, available at http://www.fiercewireless.com/story/qualcomm-nokia-reach-new-patent-agreement-end-years-bitter-disputes/2008-07-24

MacKie-Mason, J., Netz, J., "Manipulating Interface Standards as an Anti-Competitive Strategy", in Greenstein, S., Stango, V., (eds.) *Standards And Public Policy*, 2007, Cambridge University Press, available at SSRN: http://ssrn.com/abstract=978068

Mann, R.J. "Commercializing Open Source Software: Do Property Rights Still Matter?", 2006, available at http:/law.bepress.com/expresso/eps/1042

Merges, R., Kuhn, J., "An Estoppel Doctrine for Patented Standards", March 2008, *California Law Review*, forthcoming., available at SSRN: http://ssrn.com/abstract=1134000

Microsoft Press Release, "Accessibility with Responsibility", available at http://www.microsoft.com/presspass/features/2001/may01/05-03csm.mspx

Microsoft Press Release, "Microsoft and Novell Announce Broad Collaboration on Windows and Linux Interoperability and Support", 2 November 2006, available at: http://www.microsoft.com/presspass/press/2006/nov06/11-02MSNovellPR.mspx

Microsoft Press Release, "Microsoft and TomTom Settle Patent Infringement Cases", 30 March 2009, available at http://www.microsoft.com/Presspass/press/2009/mar09/03-30MSTomTomPR.mspx

Parloff, R., "Microsoft takes on the free world", *Fortune Magazine*, 14 May 2007, available at http://money.cnn.com/magazines/fortune/fortune_archive/2007/05/28/100033867/

Perens, B., "The Monster Arrives: Software Patent Lawsuits Against Open Source Developers", June 30 2006, available at http://technocrat.net/d/2006/6/30/5032

Peterson, Sc. "Consideration of Patents during the Setting of Standards", FTC and DOJ Roundtable on 6-11-2002: *Standard Setting Organisations: Evaluating the Anticompetitive Risks of Negotiating IP Licensing Terms and Conditions Before a Standard is Set,* available at http://www.ftc.gov/opp/intellect/021106peterson.pdf

Rahnasto, I., *Intellectual Property Rights, External Effects and Anti-trust Law*, Oxford University Press, 2003

Red Hat Inc., "Statement of Position and Our Promise on Software Patents", available at http://www.redhat.com/legal/patent_policy.html

Ritter, L., Braun, D., *European Competition Law: A Practitioner's Guide*, 3rd Edition, Kluwer Law International, 2004

Reiner, J., "Microsoft ordered to pay $ 1.5 billion in MP3 patent lawsuit", *ArsTechnica¸* 22 February 2007, available at http://arstechnica.com/old/content/2007/02/8910.ars

Rooney, P., "CRN interview: SCO CEO defends $1 Billion Lawsuit Against IBM", *CRN Magazine¸* 24 April 2003, available at http://www.crn.com/it-channel/18830075

Rosen, L., Einschlag, M., "Why the Public Domain isn't a License", 2004, available at http://rosenlaw.com/lj16.htm

Russel, A., Smethurst, K., Salamie, D., "Amdahl Corporation Company History", available at http://www.answers.com/topic/amdahl-corporation

Sanders, T., "Microsoft's EU patent pledge incompatible with GPL", *vnunet.com*, 24 October 2007, available at http://www.vnunet.com/vnunet/news/2201856/microsoft-eu-patent-pledge

Schadler, T., "Commentary: IBM's open-source stance", *cnet* news, 21 January 2003, available at http://news.cnet.com/Commentary-IBMs-open-source-stance/2009-1069_3-981484.html

Schwartz, J., "Open source versus open standards", *cnet news*, 10 April 2003, available at http://news.cnet.com/2010-1071-995823.html

Shankland, S., "HP considers open-source services", *cnet* news¸ 17 January 2006, available at http://news.cnet.com/HP-considers-open-source-services/2100-7344_3-6027842.html

Shapiro, K., Varian, H., *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, 1998

Shiloy, A., "Rambus Monopolized Computer Memory Industry – FTC", 3 August 2006, available at http://xbitlabs.com/news/memory/display/20060803085050.html

Simoe T., "Open Standards and Intellectual Property Rights", in Chesbrough, H., Vanhaverbeke, W., West, J., *Open Innovation: Researching a New Paradigm,* Oxford University Press, 2006, p. 167 (161-183)

Smith, G., Boardman, R., *Internet Law and Regulation*, 4th Edition, Sweet & Maxwell, 2007

Stohr, G., "FTC Rejected by U.S. Supreme Court in Rambus Case", *Bloomberg*, 23 February 2009, available at http://www.bloomberg.com/apps/news?pid=20670001&refer=home&sid=at5P6AmiOMsQ#/

US Department of Justice, Plaintiff's Proposed Findings of the Fact on *US Department of Justice v Microsoft*, available at http://www.usdoj.gov/atr/cases/f2600/2613pdf.htm

Valimaki, M., "Copyleft Licensing and EC Competition Law", *European Competition Law Review,* Vol. 27, No. 3, 2006, pp.130-136

Van Bael, I., *Competition Law of the European Community*, 4th Edition, Kluwer Law International

West, J., "How open is open enough? Melding proprietary and open source platform strategies", *Research Policy*, Vol 32, Issue 7, 2003, pp. 1259 – 1285, available at http://www.cob.sjsu.edu/west_j/Papers/West2003a.pdf

West, J., "What are Open Standards? Implications for Adoption, Competition and Policy", presented at Standards and Public Policy Conference, Chicago, USA, 11 May 2004, available at http://www.chicagofed.org/news_and_conferences/conferences_and_events/files/west.pdf

Wilken, S., *The Law of Waiver, Variation and Estoppel*, Oxford University Press, 2nd Edition, 2002

"Blackboard Patent Pledge", Blackboard Inc., available at http://www.blackboard.com/getdoc/ee803a3a-cf08-464c-8926-7268a5dcdb15/Patent-Pledge.aspx

"Microsoft does not need to carry Sun's Java Support", *Out-law news*, 30 June 2003, available at http://www.out-law.com/page-3679

"Microsoft Open Specification Promise", Microsoft Corporation, 12 September 2006, available at http://www.microsoft.com/interop/osp/default.mspx

"Patent Pledge for Open Source Developers", Microsoft Corporation, 22 February 2008, available at http://www.microsoft.com/interop/principles/osspatentpledge.mspx

"Patentability of programs for computers : President of the EPO asks for clarification of exclusion", *EPO website*, 24 October 2008, available at http://www.epo.org/topics/news/2008/20081024.html

"Rambus shares fall on patent ruling", *Silicon Valley / San Jose Business Journal,* 9 January 2009, available at http://sanjose.bizjournals.com/sanjose/stories/2009/01/05/daily83.html?ana=yfcpc

"Sun and Microsoft settle antitrust claims for $ 2 billion, *Out-law news,* 5 April 2004, available at http://www.out-law.com/default.aspx?page=4436

"The Halloween Documents", available at http://www.catb.org/~esr/halloween/index.html

"What is SourceForge.net", available at http://apps.sourceforge.net/trac/sourceforge/wiki/What%20is%20SourceForge.net?