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Openness, Intellectual Property and Standardization in the European ICT Sector

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Erratum
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1. Introduction

Interoperability standards form a key part of the microeconomic infrastructure of today's high-technology industries.[1] By facilitating compatibility between products and systems,[2] interoperability standards scaffold the growth and proliferation of networks, both real and virtual[3]: they enable machine-to-machine interaction (as in the case of protocols); permit programs to "speak" to one another (as in the case of interfaces), and allow information exchange between different applications and platforms (as in the case of document formats or structured data standards).[4]

Since networks are becoming increasingly central to the modern economy,[5] the character of the standards which underwrite them have attracted a growing amount of attention. In particular, the eyes of lawyers, economists and policymakers have been drawn to the way in which intellectual property rights (IPR) over interoperability standards can result in technological bottlenecks, leading to reduced competition

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1. GM Peter Swann, Dept. of Trade and Indus., The Economics of Standardization: Final Report for Standards and Technical Regulations Directorate 21 (Dec. 11, 2000), *available at* http://webarchive.nationalarchives.gov.uk/+/http://www.bis.gov.uk/files/file11312.pdf.
2. Tim Simcoe, *Open Standards and Intellectual Property Rights*, *in* Open Innovation: Researching a New Paradigm 161, 162-63 (Henry Chesbrough et al. eds., 2008).
3. A "virtual network" is "a network in which participants are linked together by their economic complementarity and adherence to common technological standards rather than by physical interconnection." *See* Richard N. Langlois, *Technological Standards, Innovation, and Essential Facilities: Toward a Schumpeterian Post-Chicago Approach*, *in* Dynamic Competition and Public Policy: Technology, Innovation, and Antitrust Issues 193, 195 (Jerry Ellig ed., 2005).
4. For a general definition of a 'standard' which embraces all the above, see Paul A. David & Shane Greenstein, *The Economics of Compatibility Standards: An Introduction to Recent Research*, 1 Econ. of Innovation and New Tech. 3, 4 (1990).
5. *See generally* Yochai Benkler, The Wealth of Networks: How Social Production Transforms Markets and Freedom (2006).

and the potential for consumer harm.[6] The root of this concern stems from the uneasy reconciliation of two aspects of interoperability standards: that they should both incorporate leading-edge technology[7] as well as be generally available and accessible for implementation. The aspects fit uncomfortably together because the technological frontier is often occupied by intellectual property: 'inventive' and 'novel'[8] technological features which are attractive to standard-setting organizations (SSOs) may be covered by IPR such as patents, which provide their holders with the right to exclude.[9] Though the European Union (EU) has recently issued a revised set of *Horizontal Guidelines*,[10] which aims to encourage SSOs to adopt IPR policies that mandate licensing on Fair, Reasonable and Non-Discriminatory (FRAND) terms, a number of European stake-holders (including governments) have advocated a further opening up of interoperability standards in the form of mandatory royalty-free (RF) licenses.[11] This tendency to require RF licensing of essential[12] IPR over interoperability standards has provoked condemnation by some powerful private sector software vendor lobbying groups[13] as well as by some traditional formal

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6. *See generally* Mark Lemley, *Intellectual Property Rights and Standard Setting Organizations*, 90 Cal. L. Rev. 1889, 1900 (2002) ("While standardization has great economic value in many markets, group standard setting also poses some potential threats to competition").
7. Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards*, 17 Berkley Tech. L.J. 623, 649 (2002) ("Industry standards often encompass proprietary technology, including technology already patented or the subject of pending patent applications. This is not surprising because one would expect an industry standard to be built upon novel and nonobvious advances in technology rather than upon whatever is available in the public domain.").
8. For the patentability of inventions in Europe (and some other third countries) according the European Patent Office, *see* European Patent Convention, arts. 52-57, Oct. 5, 1973, 1065 U.N.T.S. 19.
9. Deriving from the so called "property rule" of IPR. The rule relating to actual damages for infringement of IPR is called the "liability rule." *See* F. Scott Kieff, *On the Economics of Patent Law and Policy*, *in* Patent Law and Theory: A Handbook of Contemporary Research 3, 5 (Toshiko Takenaka ed., 2008).
10. *See* Communication from the Commission, Guidelines on the Applicability of Article 101 of the Treaty on the Functioning of the European Union to Horizontal Co-operation Agreements, 2011 O.J. (C 11) 1.
11. In particular, during the consultation over the revised *European Interoperability Framework*, where the European Committee for Interoperable Systems (ECIS) advocated a RF licensing regime for 'open standards,' *see infra* note 44.
12. According to the European Telecommunications Standard Institute Rules of Procedure R. 15 (Apr. 8, 2009), "ESSENTIAL as applied to IPR means that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR . . . .", *available at* http://www.etsi.org/WebSite/document/Legal/ETSI_IPR-Policy.pdf.
13. *See* the leaked letter from the Business Software Alliance (BSA) (composed of, inter alia, Microsoft, Apple, Adobe) in the context of the revision of the *European Interoperability Framework*, http://fsfe.org/projects/os/bsa-letter-ec.pdf ("We urge you to vigorously advocate the language be amended to include an express endorsement of technologies made available on . . . FRAND terms, which will allow European innovators who own patents and other . . . IP . . . to participate in standards setting . . . .").

SSOs.[14] The critics of RF licensing argue, inter alia, that by taking the reward component out of the IP regime, the result will be interoperability standards which are less innovative and less widely-used than standards adopted accorded to a FRAND IPR policy.[15] Conversely, RF licensing policy supporters argue that although essential IPR-holders will lose the ability to appropriate value directly from their IP under an RF regime, they may nevertheless still benefit indirectly via harnessing the immense network effects associated with getting technology to read onto a standard.[16] In addition, RF licensing supporters argue that an RF regime enables the fuller participation of open source software suppliers[17] in the market for implementers, which will increase competition and the uptake of the standard.[18]

At least part of the debate over IPR and interoperability standards centres around which approach to IP licensing deserves to wear the epithet, 'open standards'—a term of art with no fixed meaning but which carries strong political force.[19] While it is not the purpose of this essay to vindicate a definition of 'open standards' which is royalty-free, this essay aims to apply pressure to one key argument of FRAND licensing supporters against RF interoperability standards: that RF standards are necessarily less innovative than their royalty-bearing equivalents. However, at the same time as supporting the notion that RF standards may be as innovative as their FRAND equivalents, this essay will also highlight

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14. Juan Carlos López Agüí, chairman of the Joint Presidents' Group (JPG) of European ICT and electronics standards bodies CEN, CENELEC and ETSI, reportedly wrote the UK cabinet in response to their new procurement policy which mandated use of RF interoperability standards. *See* Mark Ballard, *International Alarm Rings over U.K. ICT Policy*, Public Sector IT (May 13, 2011 3:36 PM), http://www.computerweekly.com/blogs/public-sector/2011/05/international-alarm-rings-over.html ("The definition of 'open standards' . . . used by the UK government, is on a road towards excluding standards from the majority of the most important standards bodies . . . from being used in UK public procurement.").
15. For example, the BSA argued against the UK government's RF open standards definition in their new procurement guidelines: "BSA strongly supports open standards as a driver of interoperability; but we are deeply concerned that by seeking to define openness in a way which requires industry to give up its intellectual property, the UK government's new policy will inadvertently reduce choice, hinder innovation and increase the costs of e-government." *See* Andy Updegrove, *Do Royalty-free Standards Stifle Innovation?*, The Standards Blog (Mar. 4, 2011, 12:23 PM), http://www.consortiuminfo.org/standardsblog/article.php?story=20110304122357355.
16. *See id*.
17. Throughout this article, "open source" will be taken to refer to "free software," as well. Technically, the distinction between the two is that the latter utilizes only so-called "copyleft" licensing practices and must meet the strict requirements promulgated by the Free Software Foundation ('FSF'). *See* Richard Stallman, *Copyleft—Pragmatic Idealism*, GNU Operating System (Sept. 20, 2011, 8:15:42), http://www.gnu.org/philosophy/pragmatic.html.
18. *See* Updegrove, *supra* note 15.
19. The term "open standards" is used frequently in political discourse, but seldom defined in a consistent way, if at all. For its use in "political" discourse, see, e.g., Neelie Kroes, former European Comm'r for Competition Policy, Barroso Comm'n, Speech at OpenForum Europe Breakfast Seminar in Brussels: Being Open About Standards (June 10, 2008), *available at* http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/317&format=HTML&aged=0&language=EN&guiLanguage=en.

their increased vulnerability to patent litigation from companies excluded by a royalty-free IPR licensing policy, such as pure IP companies. This essay will conclude that 'openness' comes at a cost and that stake-holders must be prepared to fight both strategically in terms of IP management and perhaps also on a policy-level for changes to the patent system generally.

These arguments will be structured in the following framework. Part 2 will begin by providing a brief background to the issues, including a short summary of the positions of SSOs, Member State public procurers, and the open source software community. Part 3 will then attempt to show how SSOs with an RF IPR licensing policy can still attract participants, including significant holders of relevant IP, in order to produce innovative standards. Part 4 will outline the risks associated with a RF IPR policy, focusing mainly on the challenges brought about by decreased participation in standard-setting. Part 5 will briefly outline some potential remedies to these challenges, as well as some policy considerations. Part 6 will conclude.

2. Background

From a competition policy perspective, an interoperability standard is simply a technological feature—or set of features—which competitors have agreed to not compete on in order to share in the "network effects"[20] and economies of scale associated with the existence of a single dominant standard.[21] The benefits of a single dominant standard accrue on both the demand and supply sides simultaneously[22]: software suppliers reduce costs by focusing their production on a single platform[23]; meanwhile, consumers benefit "from a large installed base that generates lots of software and other complementary goods and services."[24] While fragmented standards have been shown to retard innovation,[25]

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20. These effects are divided into two categories: "direct" and "indirect." Direct network effects are predominantly a feature of real networks, and occur when users are identified with components, and simply means that the utility any adopter derives from a network is an increasing function of the number of adopters. Indirect network effects are simply the positive effects which the development of the downstream markets for complementary products (and services) have on the upstream technical platform. *See generally* Nicolas Economides, *Competition Policy in Network Industries: An Introduction*, *in* The New Economy and Beyond: Past, Present and Future 96 (Dennis W. Jansen ed., 2006).
21. According to Tom Cottrell, the Japanese computer software industry's failure to settle on a single standard (as compared to the dominant "Wintel" standard of the US and Europe) contributed towards its slow pace of innovation in the 1980s-1990s. *See* Tom Cottrell, *Fragmented Standards and the Development of Japan's Microcomputer Software Industry*, 23 Res. Pol'y 143 (1994).
22. See Langlois, *supra* note 3, at 37.
23. According to Annabelle Gawer (quoting West), a "platform is an architecture of related standards . . . ." *See* Annabelle Gawer, Towards a General Theory of Technological Platforms 13 (2010) (unpublished paper), *available at* http://www2.druid.dk/conferences/viewpaper.php?id=501981&cf=43.
24. *See* Langlois, *supra* note 3, at 37.
25. See the already mentioned example of the Japanese software industry in 1980s-1990s. *See generally* Cottrell, *supra* note 21.

cooperatively-set interoperability standards are key innovation-enablers in today's high-technology industries by, inter alia, giving companies' R&D expenditures an important degree of certainty in what is otherwise a highly uncertain and dynamic world.[26]

Given their pivotal role as technological infrastructure, interoperability standards have the potential to become innovation choke points if IPR over them are abused in order to exclude competitors or to charge "excessive prices." To this end, both SSOs and public sector procurers aim to regulate the exercise of IPRs in some way. SSOs do this by requiring their members to sign up to their IPR policies. These policies usually include a duty to declare ex ante during standard formation any essential IPR over a standard as well as either mandating or requesting commitments on how the IPR will be exercised ex post in the market.

2.1 Formal and Informal SSOs IPR Policies

In the case of formal SSOs, these commitments usually entail FRAND licensing of essential IPR, which may either be binding[27] or simply a request to do so.[28] Formal SSOs have publically repudiated the notion that standards should be mandatorily licensed on a royalty-free basis.[29] The *Global Standards Collaboration* (GSC)—an international body comprised of the major SSOs from all over the world[30]—adopted a resolution (*Resolution GSC-13/22*) condemning mandatory RF IPR licensing[31]. The GSC observed, "[T]hat there is a trend in some user communities and some standards development organizations in support of patent policies which enforce compensation-free provisions for standards implementers with respect to SSO IPR policies."[32] The GSC then *resolved* to: strongly voice their opposition to policies that mandate compensation-free licensing provisions[33]

In contrast to formal SSOs, informal SSOs such as fora and consortia, however—and mainly in the context of the Web and the Internet—tend to adopt either non-proprietary

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26. *See* Swann, *supra* note 1, at 21.
27. For example, VITA (VMEbus International Trade Association) has a mandatory (F)RAND IPR policy combined with compulsory essential patent disclosures. *See Disclosure and Licensing of Patents in Standards*, VITA, http://www.vita.com/home/VSO/Disclosure2011.html (last visited Mar. 8, 2012).
28. ETSI 'encourages' FRAND licensing of essential IPR. *See* ETSI Guide on IPRs, Sec, 2.1.1 (Jan. 25, 2007), *available at* http://www.etsi.org/WebSite/document/Legal/ETSI_Guide_on_IPRs.pdf, section 2.1.1 ("Members are encouraged to make general IPR undertakings/declarations that they will make licenses available for all their IPRs under FRAND terms and conditions related to a specific standardization area and then, as soon as feasible, provide (or refine) detailed disclosures.").
29. ETSI, Resolution GSC-13/22, 23-25, (IPRWG) *Intellectual Property Rights Policy* (Revised) (Sept. 2008), *available at* http://tinyurl.com/cnuwhox.
30. Including most of the national standardization bodies from Asia, North America, and the EU.
31. *See* ETSI, *supra* note 29.
32. *Id.*
33. *Id.*

standards or standards adopted according to policies mandating RF licensing.[34] According to Tim Berners-Lee, the current head of the World Wide Web Consortium (W3C), and inventor of the Web:

> Open, royalty-free standards that are easy to use create the diverse richness of Web sites . . . . Openness also means you can build your own Web site or company without anyone's approval. When the Web began, I did not have to obtain permission or pay royalties to use the Internet's own open standards, such as the well-known transmission control protocol and internet protocol (TCP/IP). Similarly, the Web Consortium's royalty-free patent policy says that the companies, universities and individuals who contribute to the development of a standard must agree they will not charge royalties to anyone who may use the standard.[35]

2.2. Member State Public Procurement IPR Policies

In the context of public procurement, Member States often also set criteria for what standards can be accepted as part of the software they procure. Increasingly, Member States are opting for standards which are licensed on a RF basis, as the recent highly controversial example of the United Kingdom procurement policy demonstrates.[36]

The reasons for Member States to adopt RF IPR licensing policies with respect to the standards implemented in the software they procure generally relate to the following concerns:

> Government assets should be interoperable and open for re-use in order to maximise return on investment, avoid technological lock-in, reduce operational risk in ICT projects and provide responsive services for citizens and businesses.[37]

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34. *See* Worldwide Web Consortium (W3C), *W3C Patent Policy* (Feb. 5, 2004), http://www.w3.org/Consortium/Patent-Policy-20040205/; *see also* Network Working Group, *Intellectual Property Rights in IETF Technology* (Mar. 2005), http://www.ietf.org/rfc/rfc3979.txt.
35. *See* Tim Berners-Lee (head of *W3C* and inventor of the Web), *Long Live the Web: A Call for Continued Open Standards and Neutrality*, Sci. Am. (Nov. 22, 2010), http://www.scientificamerican.com/article.cfm?id=long-live-the-web.
36. *See* U.K. Cabinet, Procurement Policy Note, *Use of Open Standards When Specifying ICT Requirements*, Action Note 3/11 31 (Jan. 31, 2011), http://www.cabinetoffice.gov.uk/sites/default/files/resources/PPN%203_11%20Open%20Standards.pdf. However, this policy has since been retracted, and a public consultation on the definition of 'open standards' is currently underway. *See* U.K. Cabinet, Procurement Policy Note, *Open Standards When Specifying IP*, Information Note 09/11 (Nov. 30, 2011), *available at* http://www.cabinetoffice.gov.uk/sites/default/files/resources/20111130_PPN%2009_11%20Open%20Standards.pdf.
37. *See* U.K. Cabinet, Procurement Policy Note, *Use of Open Standards When Specifying ICT Requirements*, *supra* note 36, at background point 4.

The three most important goals are interoperability (in the sense of data exchange between citizens, businesses and other government departments); re-use (i.e. that the standard will continue to be supported in the future); and the avoidance of lock-in (i.e. that there are a diversity of software suppliers able to implement the standard).[38] The last issue of lock-in has been one of real concern for Member State government departments who have often found themselves unable to switch from their current (usually Microsoft-based) information systems to competing systems (often open source), due to lack of interoperability.[39] Indeed, many Member State procurement policies expressly mention that royalty-free "open standards" are required in order to permit open source software suppliers to make use of them as well.[40]

2.3 Interoperability Standards and Open Source Software Implementation

The inability of some[41] open source software to implement royalty-bearing interoperability standards derives from restrictive licensing terms in certain open source licenses. In particular, the GNU General Public License (GPL) family of licenses are incompatible with any royalty-bearing conditions which attach to interoperability standards. The specific clause is found at section 7 of the GPL v2, and has been nick-named, the "Liberty or Death clause."[42] For good reason: any extra restrictions such as patent royalties which prevent users from exercising the freedoms in the license remove the right to continued distribution of the software.[43]

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38. *Id*.
39. As in the case of the German foreign office, which was "forced" after some experimentation with some open source software providers, to revert back to Microsoft due to "interoperability problems." *See* Gijs Hillenius, *DE: Interoperability Forces Foreign Office to Proprietary Desktop*, European Commission Joinup (May 11, 2011), http://www.osor.eu/news/de-interoperability-forces-foreign-office-to-proprietary-desktop.
40. *See* Ministry of Econ. Affairs, *The Netherlands in Open Connection: An Action Plan for the Use of Open Standards and Open Source Software in the Public and Semi-Public Sectors 6*, (Nov. 2007), http://www.whitehouse.gov/files/documents/ostp/opengov_inbox/nl-in-open-connection.pdf.
41. Not all. For example, the permissive BSD and MIT licenses would have no such conflict.
42. *See* Richard Stallman, President of Free Software Foundation, Address at the 2nd International GPLv3 Conference, Presentation Section: The "Liberty or Death" Clause, the Main Change from v1 to v2 (Apr. 21, 2006), *available at* http://fsfe.org/projects/gplv3/fisl-rms-transcript.en.html#liberty-or-death.
43. Section 7, GNU General Public License v2.0, GNU Operating System (June 1991), http://www.gnu.org/licenses/gpl-2.0.html. ("If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you . . . they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.").

The GPL-style family of licenses covers around 65% of all open source projects currently on the market.[44] Furthermore, if we review the main types of software packages—both proprietary and open source—available on the market, often the main rival to the commercial software product is an open source product covered by a GPL-style license.[45] For instance, the main alternatives to the dominant MS Office suite are the two office suites, OpenOffice.org[46] and LibreOffice (covered by the LGPL v3).[47] One of the main alternatives (in terms of market share[48]) to the dominant Microsoft Windows PC operating system is Linux (covered by GPL v2). Likewise MySQL (covered by the GPL) is a popular open source database which competes with Oracle's commercial offering.[49]

3. RF Interoperability Standards and Innovation

Although the open source community has been among the most vocal supporters of RF interoperability standards, strong supporters also exist among traditional ICT companies. In particular the *European Committee for Interoperable Systems* (ECIS) is composed of members 'such as IBM, Oracle and Nokia, [and] are among the most innovative information and communications technology (ICT) companies on the planet and include owners of some of the largest patent portfolios in the ICT sector'.[50] During the consultation for the revised *European Interoperability Framework*[51] v2, the ECIS supported an open standards definition which included an RF IPR policy: "to be fully open, a software interoperability specification may not be encumbered with running intellectual property ('IPR') royalties."[52]

Admittedly, some of the companies which make up the ECIS rely on peripheral services associated with open source software as a lucrative revenue stream.[53] However,

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44. Although the percentage of open source projects licensed under the GPL-family of licenses is apparently in the decline, it still covers around 65% of such projects. *See* Matthew Broersma, *Study: GPL Loses Ground in Open Source Development,* ZDNet Asia (July 2, 2009), http://www.zdnetasia.com/study-gpl-loses-ground-in-open-source-development-62055659.htm.
45. Rishab A. Ghosh, *Open Standards and Interoperability Report:* An *Economic Basis for Open Standards* 8-9, FLOSSPOLS, (Dec. 2005), http://wenku.baidu.com/view/08c7ee8a84868762caaed5c4.html?from=related.
46. However, it should be noted that Openoffice.org's recent transfer from Oracle to the Apache Foundation may mean the next release will be under the Apache 2 license rather than the LGPL.
47. *See LGPL License*, LibreOffice, http://www.libreoffice.org/.
48. *See Desktop Operating System Market Share*, NetMarketShare (Feb. 2012), http://marketshare.hitslink.com/operating-system-market-share.aspx?qprid=8&qpcustomd=0.
49. *I.e.,* Oracle pursues an "open core" model in relation to MySQL.
50. *See ECIS Statement on the Proposed New European Interoperability Framework*, European Committee for Interoperable Systems [ECIS] (Oct. 13, 2010), http://ecis.eu/documents/ECISStatementreEIF13.10.10.pdf.
51. The purpose of the (non-binding) EIF is to provide an 'overarching set of policies, standards and guidelines which describe the way in which organizations have agreed, or should agree, to do business with each other' under the heading of eGovernment.
52. *See* ECIS, *supra* note 50.
53. For instance IBM receives around $2 billion annually from open source related revenue. *See* Benkler, *supra* note 5, at 47-48.

many do not.[54] What incentives do these companies have to contribute technology to RF standards? Before this question can be properly answered, it is important to distinguish between categories of potential participants in standard-setting, each of whom have different incentives.

3.1 Participants in Standard-Setting

This essay follows Damien Geradin's identification of three main participants in standard-setting.[55] These are pure IP companies, vertically-integrated companies and pure downstream companies (standard implementers). Pure IP companies do not engage in manufacturing (of either hardware or software), but merely produce IP which is licensed to produce revenues. Vertically-integrated companies engage in R&D yielding IP, as well as manufacturing downstream products making use of IP. Pure downstream companies only produce the final product, which may implement the IP produced by both pure IP companies and vertically-integrated companies.[56]

In a standards context where the IPR licensing policy is undefined, a vertically-integrated company has incentives to get its IP to read onto standards for two reasons. First, in order to tap into the potentially lucrative revenue streams of IP licensing from other companies making use of its IP. Second, by getting its IP to read onto a standard, a vertically-integrated company can raise the relative costs of implementation for its competitors in the downstream market for implementation. Even in the case where a vertically-integrated company fails to get its IP included in the eventual standard, it can still lower its implementation costs vis-à-vis pure downstream companies by concluding cross-licenses with other vertically-integrated companies which were successful in getting their IP included.[57]

Pure IP companies on the other hand would seem to only have incentives to get their IP included in a standard in so far as they can monetize that IP directly into licensing fees, although there may also be some weaker incentives to benefit indirectly through complementary assets not essential to the standard.[58] Unlike vertically-integrated companies, a pure IP company would not be interested in cross-licensing.[59] The special threat that these companies present to RF interoperability standards will be assessed in section 4.1.

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54. For example, *Nokia* and *Oracle*.
55. *See generally* Damien Geradin, *What's Wrong with Royalties in High-Technology Industries?*, *in* Competition Policy and Patent Law under Uncertainty: Regulating Innovation 462 (Geoffrey A. Manne & Joshua D. Wright eds., 2011).
56. *See id*. at 466-70.
57. *Id*. at 472.
58 . *See generally* David J, Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 Res. Pol'y 285 (June 1986), *available at* http://www.mbs.edu/home/jgans/tech/Teece-1986.pdf.
59. *See* Geradin, *supra* note 55, at 469.

Pure downstream companies which do not have any IP clearly have incentives to lower their standard implementation costs as much as possible in order to maximize their final product margins, in so far as this drive does not affect the technological quality to the extent consumers are put off.[60]

In the following assessment of the incentives for participation in royalty-free standard-setting, it is important to keep these categories of participants in mind.

3.2 Fast Adoption Rates and Network Effects

One obvious advantage of RF standards from the point of view of a technology contributor is fast adoption rates. All things being equal, zero licensing fees over a standard encourage that standard's adoption by pure downstream companies, and thus increases its foothold in a market vis-à-vis competing standards. If the vertically-integrated company owning the IP already has a downstream product on the market, then it can expect its market share to increase due to first-mover advantages and the natural monopoly characteristics and network effects often associated with standards.[61] As Andy Updegrove has argued, these network effects:

> [A]re so enormous that having even a slight advantage or head start, such as having your technology rather than a competitor's included in a new standard, can greatly outweigh any royalties that might have been obtained under the old regime. Companies are therefore quite happy to compete to get their technology included for free.[62]

Clearly this model of indirect appropriation of the value from essential IPR requires that the company contributing the technology is also a manufacturer of downstream products. This argument would not apply to pure IP companies.

3.3 Strategic Considerations

Probabilistically it is clear that vertically-integrated companies with larger patent portfolios[63] in the relevant field of standardization may have relatively less incentive to participate in RF licensing since they have a higher chance of getting essential IPR reading

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60. Clearly there is a compromise between quality and price such that consumers still demand leading-edge technology, but are not always willing to pay top dollar. The concept is that pure downstream companies wish to pay as little for implementation as they can get away with in the *market conditions*.
61. A "first mover" in the literature analysing the 'increasing returns to scale' is W. Brian Arthur. *See generally* W. Brian Arthur, Increasing Returns and Path Dependence in the Economy (1994).
62. *See* Updegrove, *supra* note 15.
63. Overwhelmingly, the size of a company's patent portfolio is proportional to the size of the company. *See* K. Blind et al., *Interaction between Standardisation and Intellectual Property Rights*, Inst. for Prospective Technological Stud. 67 (2004), *available at* http://ftp.jrc.es/EURdoc/eur21074en.pdf.

onto the eventual standard and benefitting from the resulting licensing revenue stream or cross-licensing agreements (and vice-versa for companies with smaller patent portfolios). However, even large vertically-integrated companies may place a significant weight on using an unencumbered standard, particularly if the standard relevant area of technology has a high concentration of pure IP companies, who are uninterested in cross-licensing, and thus raise implementation costs for all implementers (whether vertically-integrated or pure implementers). If the weight placed by companies participating in an SSO on having an unencumbered standard is significant, then the tendency would be to drive standards towards non-proprietary technology in the technical committee phase of standard-setting. In an SSO with open participation, the "collective will" is most likely to lead to this outcome where, all things equal,[64] among IP contributors: pure IP companies outnumber vertically-integrated companies; and among, implementers: pure implementers outnumber vertically-integrated companies; and where the sum of all implementers is greater than the sum of all IP contributors. Whether the software sector conforms to this structure is an empirical question, but at least one study[65] points to the high potential, if not yet reality, of SMEs—which are usually pure implementers—to attain significant concentrations in this sector. According to Trond Undheim, director of Standards Strategy and Policy at the Oracle Corporation, participants in FRAND-based SSOs in the ICT sector largely push for, and adopt, unencumbered or royalty-free technologies as the final standard:

> The interesting thing is that, notwithstanding the fact that the overwhelming number of ICT standards are still created in standards development organizations that allow royalties to be charged, very few standards are ever released that do, in fact, require the payment of royalties—even though those that have developed them often do own patents that would be "necessarily infringed" by a product built to their standards.[66]

If Undheim is accurate in his assessment, this demonstrates that there are forces at work—even if this essay has incorrectly identified them—which drive IP holders to contribute to royalty-free standardization even where their IP could potentially yield licensing fees. In other words, innovators (excluding, of course, pure IP companies) voluntarily choose to compete on implementation as opposed to attempting to capture the standard.

This state of affairs would seem to suggest that direct IPR compensation in the form of FRAND licensing fees may well be assessed by rational companies as less lucrative than

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64. "*Ceteris paribus*" here may be an unreasonable assumption since different technologies are more or less appropriate for standards. Indeed, some SSOs allow exceptional technology to be adopted as part of a standard even without any licensing commitments at all, e.g., ETSI and IETF.
65. *See* Ghosh, *supra* note 45, at 9.
66. See Trond Undheim, *Portugal's New Interoperability Law*, Oracle—Trond's Opening Standard (Apr. 13, 2011), http://blogs.oracle.com/trond/entry/portugals_new_interoperability.

harnessing the network effects of wide RF standard implementation in the downstream market. The existence of these incentives may go some way to ensure that the quality of technology contributed to the standard is of the same value as that contributed to a traditional FRAND licensing regime.

3.4 Mandatory RF Licensing in Practice

Few formal European and international SSOs contain mandatory RF IPR licensing provisions, though many explicitly provide for the possibility of RF licensing.[67] The greatest concentration of those that do mandate RF IPR licensing is found in the software sector. In particular, standards relating to the Web and the Internet are almost without exception licensed on an RF basis.[68] By and large, this is due to the RF IPR policy of the W3C, which creates standards for the Web, and the "preference"[69] for non-proprietary and RF technologies of the Internet Engineering Task Force (IETF), which creates standards for the Internet backbone. Outside of the context of the Web and the Internet, RF standards for stand-alone client-side software are less common, though still present. For example, the *Organization for the Advancement of Structured Information Standards* (OASIS) has an RF IPR policy "track," under which the Open Document Format (ODF) was adopted (now an ISO standard[70]). Microsoft has also adopted an arguably[71] "open" RF document format, Open Office XML (OOXML).

Given that this essay aims to assess IPR policies in relation to the ICT sector as a whole, the question arises whether there is an important distinction to be made between Web standards and client-side software standards. It is submitted that the distinction between the two, though easy to support only a few years ago, is of less relevance today. The exponential growth of Web-enabled devices[72] and the advent of cloud computing which permits Web applications to take over most of the functionality of client-side stand-alone software[73], is

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67. *See* ETSI, Resolution GSC-13/24, (IPRWG) Intellectual Property Rights Policy (Revised), (Sep. 2008). (The GSC-13/24 definition of "open standards" explicitly provides for RF licensing: "The standard is subject to RAND/FRAND Intellectual Property Right (IPR) policies which do not mandate, but may permit, at the option of the IPR holder, licensing essential intellectual property without compensation.").
68. Some key and recognizable examples are: HTML, CSS, XML, TCP/IP, etc.
69. *See* IETF IPR Policy, *supra* note 34.
70. International Organization for Standardization, ISO/IEC 26300 – Information Technology – Open Document Format for Office Applications, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43485.
71. RedHat, and a number of other open source companies, argue that OOXML "is not fully implementable by non-Microsoft vendors or partners." *See Red Hat's Position on OOXML and Open Standards*, Red Hat, http://www.redhat.com/f/pdf/RedHatOOXMLPosition.pdf (last visited Mar. 9, 2012).
72. In 2008 the number of web-enabled devices exceeded the population of humans on earth. By 2050, Cisco projects that this number will reach fifty billion. Dave Evans, *Infographic: The Internet of Things*, The Platform (July 15, 2011, 9:00PM), http://blogs.cisco.com/wp-content/uploads/internet_of_things_infographic_3final.jpg.
73. There are many examples of this phenomenon, including Google Docs (for Word Processing); and Spotify and Grooveshark (for music playing applications).

making the very notion of "stand-alone" computing a thing of the past. This is particularly visible in relation to codecs,[74] the software devices responsible for encoding and decoding digital audio-visual information. Traditionally, such standards have been licensed on FRAND terms. The MPEG format for example, and which the software vendor's lobbying group, the *Business Software Alliance* (BSA), cites[75] as a successful FRAND standard, is ubiquitous in the ICT sector in both client-side applications and on the Web. However, this situation seems to be changing. The *Moving Picture Experts Group* (MPEG), the ISO Working Group responsible for digital audio-visual compression codecs, such as MPEG and variants, announced in January 2011 that it envisages the next generation standard to be adopted under the ISO/IEC "type 1 licensing model," which is royalty-free.[76] It is plausible that this change in tact is a response to Google's development of a new royalty-free audio-visual compression codec, called *WebM* (V8), which Google and others[77] intends as an alternative to the MPEG-4 AVC (H264) codec.[78] In addition to demonstrating a shift towards RF licensing with respect to codecs, this example also shows the effect Web standards are starting to have on the licensing practices on the client-side. In short, the interpenetration of the Web and client-side software may be leading to a shift in the traditional "control" approach of the client-side towards the more "open culture"[79] and RF licensing models of the Web.

4. Risks Faced by RF Interoperability Standards

In practice, however, even an RF IPR policy might not be enough to guarantee an unencumbered standard. SSOs such as the W3C also make use of provisions granting conditional reciprocal patent licenses, otherwise known as "non-assertion clauses" (NACs). These provisions work to solve a possible prisoner's dilemma besetting patents in standards: that essential IPR-holders (from either inside or outside the formal/informal SSO) over a standard may decide to enforce their patents in any case. NACs demand that essential IPR-holders over an RF standard grant all other essential IPR-holders free use of their IP on condition of mutual non-assertion.[80] These provisions aim to nudge participants towards the cooperation/cooperation equilibrium of patent non-assertion as opposed to the defection/defection equilibrium of a potential all-out patent war. Such provisions however are only effective if essential IPR-holders actually practice in the industry (are vertically-integrated).

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74. *See, e.g.*, *Codec*, Wikipedia, http://en.wikipedia.org/wiki/Codec (last visited Mar. 9, 2012).
75. *See* BSA Letter, *supra* note 12, at 2.
76. *See* Press Release, Int'l Org. for Standardisation, MPEG Envisages Royalty-free MPEG Video Coding Standard (Jan. 28, 2011), *available at* http://mpeg.chiariglione.org/meetings/daegu11/daegu_press.htm.
77. Supporters of *WebM* include Mozilla Firefox, ARM, ORACLE, AMD, etc.
78. *See H.264/MPEG-4*, Wikipedia, http://en.wikipedia.org/wiki/H.264/MPEG-4_AVC (last visited Mar. 13, 2012).
79. *See* Andrew L. Russell, *The W3C and its Patent Policy Controversy: A Case Study of Authority and Legitimacy in Internet Governance* 18-20 (2003), http://www.arussell.org/papers/alr-tprc2003.pdf.
80. *I.e.*, NACs have arguably a function like a de facto patent pool.

It does not protect against the threat of "patent trolls"[81] (also known as Non-Practising Entities (NPE)), or legitimate pure IP companies. For example, the *Bluetooth Special Interest Group* (Bluetooth SIG) is a consortium which licenses essential IPR over Bluetooth technology to all members on an RF basis, provided the member grants a reciprocal license for any essential IPR it may have over the standard.[82] However, the enticement of an NAC has not prevented the *Washington Research Foundation*,[83] a third party to the consortium and a pure IP company, from asserting its patents across the industry. This case serves as an important reminder that the "openness" of standards is always under threat, regardless of the character of ex ante IPR policies, even if those policies mandate royalty-free licensing.

Indeed, RF standards may well be even more vulnerable to third party patent infringement claims than if they were adopted under FRAND licensing conditions.

4.1 The Challenge of IP Companies and Patent Trolls to RF Standards

One unfortunate side effect of interoperability standards adopted according to a RF IPR licensing policy is that it may exclude pure IP companies from participating in standardization as well as some large vertically-integrated companies.

As already explained, pure IP companies follow a business model where licensing fees are the only revenue source. Situations can be imagined where such companies may nevertheless choose to contribute IP to an RF standard—as in where they expect to appropriate value indirectly from licensing complementary assets—but these incentives would be comparatively weak.[84] The majority of pure IP companies would have little incentives to engage in RF standard-setting. By not participating in SSOs, pure IP companies would not be bound by the IPR policies which usually mandate, inter alia, the ex ante disclosure of essential IPR over a standard. In comparison, pure IP companies would have incentives[85] to join SSOs with a FRAND IPR licensing policy and so would be bound by both the duty of disclosure as well as the duty not to charge excessive fees.[86] At

81. A possible difference between a pure IP company and a patent troll (if we care to make the distinction) is that pure IP companies actually invest in R&D, while patent trolls tend just to acquire patents in company buy-outs or bankruptcy proceedings.
82. For details of Bluetooth SIG's IPR policy, see *Examine the SIG Membership Agreements*, Bluetooth® Special Interest Group (2012), https://www.bluetooth.org/apps/content/?doc_id=44514.
83. *See Background*, Washington Research Foundation, http://www.wrfseattle.org/about/ (last visited Mar. 13, 2012).
84. The uncertainty of these benefits might not make the overall participation worthwhile.
85. However, some commentators have suggested that companies which get a significant proportion of their revenue from licensing tend to stay away from standardization altogether. *See generally* Knut Blind, *The Influence of Companies' Patenting Motives on their Standardization Strategies*, *in* Proceedings, 13th EURAS Workshop on Standardization 19 (2008).
86. As determined by the so-called *United Brands* test under EU competition law. *See* Case 27/76, United Brands v. Comm'n of European Cmty., 1978 E.C.R. 207.

the very least, the existence of RF SSOs may lead to the development of multiple competing standards.[87] More dangerously, though, third party IP companies (both pure and vertically-integrated) may choose to enforce their patents generally against implementers and users after the standard has been adopted.

This risk is non-trivial since the SSO technical committee would not have had the opportunity to "design around" the IP of IP companies in a royalty-free standard.[88] The risk is far from academic: in 2002, after the "royalty-free" JPEG was already a well-established image-compression standard, a company called Forgent Networks started enforcing a claimed patent right over technology essential to the standard.[89] Before being declared invalid in 2006, the patent had already been asserted against more than thirty companies, raking in in excess of $105 million in licensing fees.[90]

Admittedly, the RF standards which underwrite the Web and the Internet have so far escaped much patent litigation.[91] However, the technologies adopted as standards by the W3C and the IETF are highly specialized, pioneering, and relate mainly to the deep infrastructure of the Internet and Web. In contrast, interoperability standards such as, inter alia, document formats, structured data standards and compression codecs are the subject of independent R&D efforts by a number of private companies.[92] For this reason, companies implementing royalty-free standards covering these areas are at higher risk of ex post patent litigation. Furthermore, recent years have seen a marked proliferation of pure IP companies[93] as well as a general increase in patenting worldwide.[94] These factors suggest that the risk is growing.

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87. *See* Anne Layne-Farrar et al., *Payments and Participation: The Incentives to Join Cooperative Standard Setting Efforts* 32, (July 29, 2011), *available at* http://www.ftc.gov/os/comments/patent-standardsworkshop/00034-80123.pdf.
88. Of course, participants to an SSO adopting a royalty-free standard have incentives to search for any third-party patents in order to avoid the situation described. However, given the extremely large number of patents in existence, this task can never be exhaustive, and SSOs strongly depend on the duty of disclosure of their members. Importantly, even members to an SSO often only have a duty to perform a "good faith" or "reasonable" patent search in recognition of the heavy burden involved.
89. Priscilla Caplan, *Patents and Open Standards*, at 2-3 (Nat'l Info. Standards Org. White Paper, Oct. 2003), http://www.niso.org/publications/white_papers/Patents_Caplan.pdf.
90. *See JPEG—Patent Issues*, WIKIPEDIA, http://en.wikipedia.org/wiki/JPEG#Patent_issues (last visited Mar. 13, 2012).
91. The author is not aware of any cases to date over the ownership of the underlying Web or Internet standards.
92. A considerable number of companies such as Apple Inc., Panasonic, Sony, and Hitachi all held essential patents to the H.264 codec standard for video compression. *See* Valentin Spirik, *H-264 List of Shame: All the Patent Holders*, INDIWORKS (May 5, 2010, 1:52PM), http://indiworks.wordpress.com/2010/05/18/h-264-list-of-shame-all-the-patent-holders/.
93. *See* Simcoe, *supra* note 2, at 162-63.
94. Dietmar Harhoff et al., *The Strategic Use of Patents and Its Implications for Enterprise and Competition Policies* 4, Final Report Tender for No ENTR/05/82, (July 8, 2007) ("A surge in patent applications, 'a patenting explosion,' has been observed at the European Patent Office (E.P.O.) as well as at the patent office for the United States of America (U.S.P.T.O) and other patent offices world wide.").

5. Dealing with the Challenge of Third Party IP Companies

Given that RF interoperability standards have a higher risk of exposure to third party IP litigation than FRAND standards, governments, implementers, and users must adopt a strategy to deal with this risk in order to maintain the openness of interoperability standards.

5.1 Defensive Patenting

One option would be to follow the lead of the open source community and adopt a strategy of "defensive patenting." In order to protect the openness of the Linux kernel, an IP company called the *Open Invention Network*[95]

has a practice of acquiring patents relevant to the kernel and arranging royalty-free cross-licenses with third-party patent holders in order to guarantee mutual patent non-assertion, in a kind of "outsized" Non-Assertion Clause. The company plays a crucial role in maintaining the continued openness of the Linux operating system by a combination of the carrot of a royalty-free license to essential Linux patents and the stick of patent litigation.

If RF interoperability standards are to be defended in the same way as the Linux kernel, it would require SSO participants, as well as downstream implementers and users, to develop a culture of cooperation around IP management and filing patents similar to the open source community. This is perhaps not inconceivable given the potential for open source software companies to enter the market under a royalty-free licensing policy, who may well have incentives as well as experience of dealing with such risks. However, as in the case of NAC's already discussed, pure IP companies and in particular, patent trolls, often have little to lose by the threat of a counter-suit. For this reason, defensive patenting would only be partially effective as a solution to maintaining the openness of interoperability standards.

5.2 Competition Law Remedies

Compared to the United States, the EU has taken a stronger stance on using competition law to control the abuse of IP in the context of technological standards.[96] In the EU "patent ambush" case of *Rambus*,[97] the EU Commission imposed certain "commitments"[98]

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95. *See Welcome*, Open Invention Network, http://www.openinventionnetwork.com/ (last visited Mar. 17, 2012).
96. *See* Carl Mair, *To What Extent Did the European Court of First Instance Apply the Essential Facilities Doctrine in Re Microsoft* (Aug. 20, 2010) (unpublished manuscript) (on file with author).
97. *See* Press Release, European Union, Antitrust: Commission Accepts Commitments from Rambus Lowering Memory Chip Royalty Rates (Dec. 9, 2009), *available at* http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1897.
98. *See* Counsel Regulation 1/2003, art. 9, 2003 O.J. L 1/1 (EC), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:l:2003:001:0001:0025:en:PDF.

designed to neutralize the deceptive conduct of the company, including granting "royalty holidays" to licensees of the essential patents, as well as royalty caps on several others.[99]

In the earlier EU case of *Microsoft*, the Court of First Instance (now the "General Court") arguably applied the so-called "essential facilities doctrine" to grant a compulsory license to certain "interoperability information" under FRAND terms to competitors in a derivative market to which that information was essential to compete.[100]

The European Courts' proactive stance on maintaining the openness of technological standards might seem to be encouraging for the situation of third party IP enforcement over an RF interoperability standard which we envisage. However, certain technical legal barriers make reliance on competition law for a remedy highly uncertain in practice.

First, the essential facilities doctrine requires that the IP owner[101] is in a dominant position.[102] Though this could occasionally be the case, third party IP companies may very rarely meet this condition.[103] Second, the pure IP company would need to have refused to license the IP. In the circumstances we envisage, it is much more likely a third party IP company would attempt some sort of 'patent holdup' against standard implementers: so the problem would be one of 'excessive pricing' rather than one of refusal to supply. Third, even if, as in *Microsoft*, the third party IP company is compelled to license its IP under the essential facilities doctrine, such a license would most likely be on mandatory FRAND terms, and would not be royalty-free. In the case of *Rambus*, where certain 'royalty holidays' were granted, this was on facts where the company concerned deliberately misled the SSO by not disclosing its essential patent applications over the standard.[104] In the situation we envisage, the third party company would never have participated in the SSO so could not be accused of deception nor misconduct of any kind. Furthermore, Art 31(h) of the *TRIPS*

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99. *See* Commission Decision of Case Comp/38.636 – Rambus, 2010 O.J. C 30/15, para 49, *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:030:0015:0016:EN:PDF.
100. *See generally* Case T-201/04, Re Microsoft v. Comm'n, 2007 E.C.R. II-3601.
101. Furthermore, this analysis only concerns patents, not copyright. Copyrighted interoperability standards are able to be reverse-engineered (though, admittedly, often with great practical difficulty) under EU law. *See* EU Directive 2009/24/EC, Legal Protection of Computer Programs, art. 6.2, 2009 O.J. L 111/17 *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:111:0016:0022:EN:PDF, in conjunction with EU Directive 2001/29/EC, recital 50, 2001 O.J. L 167, Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0029:EN:HTML.
102. *See* Mair, *supra* note 96.
103. A common misconception is that all essential IP rights over standards necessarily give rise to a dominant position. However, Damien Geradin outlines that there are a number of potential constraints which limit an essential IPR-holder's full discretion to maximize its royalties, such as "horizontal," "vertical," "dynamic," and "institutional constraints." *See* Damien Geradin *Standardization and Technological Innovation: Some Reflections on Ex-ante Licensing, FRAND, and the Proper Means to Reward Innovators*, at 3 (TILEC Discussion Paper 2006-017, June 2006), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=909011.
104. *See* Case Comp/38.636 – Rambus, *supra* note 99.

Agreement would likely prevent a competition authority from granting compulsory licensing without providing the patentee with 'adequate remuneration'.[105] This would rule out the possibility of compulsory licensing on royalty-free terms.

Given the above, once a royalty-free interoperability standard is successfully challenged by a third party as infringing its patent, competition law can offer no remedy to reinstate its royalty-free status. The most it could do would be to grant a compulsory license on FRAND terms, as was the case in *Microsoft*. And as in *Microsoft,* this remedy offers little in the way of respite for open source software suppliers utilizing the GPL-family of licenses, who would remain unable to implement the standard.[106]

5.3 Patent System Remedies

In terms of remedies supplied by the patent system itself, the choices are considerably narrower. If we assume that the third party IP company's patents over the royalty-free interoperability standard were not achieved by deception as in the case of *Rambus*[107] or by misusing the patent system as in *Astrazeneca*,[108] then very few options are available outside of outright patent invalidation.[109] Patent invalidation, however, would depend on the particular circumstances of each specific case.

Nevertheless, as in the case of the JPEG standard, patent invalidation in the context of software-related patents is a promising choice of action. This is because the current European practice[110] of granting software-related patents is deficient in many important

105. It is still not exactly clear to what extent *TRIPS* needs to be applied by the EU courts. In *Microsoft*, for instance, the General Court stated that Community law prevails over international norms, but went on to argue that its judgment was nevertheless consistent with Article 31(k) of *TRIPS*—a provision that allows competition concerns to trump IP rights in some cases. In any case, the fact that the Court chose to make the IP licensed on FRAND rather than royalty-free terms is perhaps indicative of the kind of licensing terms to be expected in future cases involving anti-competitive behaviour absent misconduct. For further discussion of the relation between *TRIPS* and EU competition law, see Sujitha Subramanian, *EU Obligation to the TRIPS Agreement: EU Microsoft Decision*, 21 Eur. J. Int'l L. 997 (2010), *available at* http://ejil.oxfordjournals.org/content/21/4/997.full.

106. Krzysztof Siewicz, Towards an Improved Regulatory Framework of Free Software, (Apr. 20, 2010) (unpublished doctoral thesis, University of Leiden), *available at* https://openaccess.leidenuniv.nl/bitstream/handle/1887/15276/Towards_an_Improved_242.pdf?sequence=3.

107. *See* Case Comp/38.636 – Rambus, *supra* note 99.

108. Case T-321/05, Aztrazeneca v. Comm'n, 2010 Gen. Ct.

109. The possibility of pure patent system remedies (as opposed to antitrust remedies) based on the equitable doctrine of patent misuse—such as the above cases represent—would not be a good course of action in the EU in any case. Firstly, EU patent laws are still jurisdiction-specific, meaning that pan-European remedies would not be available. Secondly, the doctrine is still under-developed for use in standards-related cases, particularly in the EU. For an assessment of the arguments for its use in such cases in the U.S. context. *See* Daryl Lim, *Misconduct in Standard-setting: A Case for Patent Misuse*, http://www.atrip.org/Content/Essays/Daryl%20Lim.pdf.

110. By "European," it is here meant the practice of EU Member States patent offices as well as to a lesser degree, the European Patent Office ("EPO") generally.

respects, such as prior-art searches which only involve patent databases and occasionally non-patent literature.[111] The cursory nature of these prior-art searches means that a great deal of software-related patents are probably granted which are technically invalid,[112] including perhaps those which may be relevant to interoperability standards. The UK Intellectual Property Office's on-going trial of a Peer-2-Patent programme—where patent validity examinations are outsourced to interested external experts, such as open source software programmers[113]—is just one policy which is being investigated to try to improve the quality of software-related patents, and which could help in the long run to protect the openness of royalty-free interoperability standards.

Indeed, perhaps only real policy changes such as this will really have any effect on the risk exposure of royalty-free interoperability standards to third party IP infringement suits. This is because the risks of third party IP infringement which we envisage here are a result of SSO participants and technical committee's collective inability to locate relevant third-party patents during patent searches; and this, in turn, was due to the search burden created by excess patent proliferation. If the search burden is reduced due to the systematic invalidation of unmeritorious software-related patents by crowdsourcing prior-art searches, then the patent system itself as well as royalty-free interoperability standards will be generally more robust.

6. Conclusion

This essay has applied pressure to the notion that RF interoperability standards are less innovative than standards adopted under a FRAND licensing policy. Companies do have incentives to contribute proprietary technology to RF standards. These incentives relate to the potential of network effects to increase the penetration of their end-products incorporating the technology which can then be indirectly monetized by selling more products. However these incentives do not apply to pure IP companies and some large vertically-integrated companies, which an RF IPR policy may well discourage from participating in standardization. Since these companies are excluded from RF standard-setting, they could pose a threat to the integrity and openness of royalty-free interoperability standards in practice. This threat could be in the form of asserting patent claims against

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111. The IPKat Blog summarized a presentation by Nigel Hanley from the UK IPO about software patents prior art searches. *See P2P; The Aftermath*, The IPKat Blog, (June 13, 2011, 11:02PM), http://ipkitten.blogspot.com/2011/06/p2p-aftermath.html ("Nigel Hanley from the UK IPO introduced the subject with an admission that the United Kingdom's Intellectual Property Office (IPO) primarily search patent databases and only search some of the available non-patent literature. They do some Internet searching but not much. P2P is about accessing that part of the prior art inaccessible to examiners.").

112. In addition to concerns involving 'patent quality' (i.e., the issuance of invalid patents), commentators have also expressed concern regarding the (broad and sometimes vague) claim construction of software-related patents. See in particular, for the an analysis of the situation in the United States, James Bessen & Michael J. Meurer, Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk (2008).

113. *See supra* note 111.

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implementers of the RF standards or by creating standard fragmentation. While defensive patenting in the tradition of the open source community might offer a partial remedy to this problem, it would require a more cooperative effort between all stake-holders who have an interest in keeping RF interoperability standards royalty-free. Competition law remedies would be difficult to rely on since although they may be able to exert some price control on licensing fees and prevent outright refusals to license, they would be unable to maintain a standard's royalty-free status in the face of a valid patent, even if abused. To this end, patent invalidation remains the only sure solution against a third party claiming that an RF interoperability standard infringes its patent.

In the long-run, the openness of interoperability standards could only be maintained with improvements to the patent system itself and some cap on software-related patent proliferation. The UK's current trial of Peer-2-Patent might well be an answer to this problem on the policy level. In any case, if indeed royalty-free interoperability standards are what governments, users, and the open source software community want, they will have to be prepared to fight for them. ■