

Patent Markets: An Opportunity for Technology Diffusion and FRAND Licensing?

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PATENT MARKETS: AN OPPORTUNITY FOR TECHNOLOGY DIFFUSION AND FRAND LICENSING?

STÉPHANIE CHUFFART-FINSTERWALD*

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INTRODUCTION

The increased complexity of technological features and a growing pace of innovation are forcing the innovation industry to adopt new research and development (R&D) strategies. Indeed, the production of most of today's technologies requires a variety of machines and processes that are significantly more diverse than those available in any single firm. In addition, the nature of firms is changing and as firms have a tendency to become smaller, there is a greater need for access to technologies that small firms cannot develop themselves. An increase in technology diffusion is also needed to address global challenges such as climate change and human health. For these reasons, there is a need for strategic alliances and innovative licensing agreements among industries.¹ At a time when technology diffusion is thus more needed than ever before, new solutions are required. However, in the absence of efficient forums, licensors, and licensees miss important opportunities in valuing intellectual property assets and diffusing technology. The emergence of patent markets where patents have become tradable assets can therefore present a unique opportunity, as these markets appear to be a relevant way of getting around the anti-commons.

Furthermore, patent markets are of interest in the current fair, reasonable, and non-discriminatory (FRAND) licensing debate.² As flagged by the recent *amicus curiae* submission presented by the Federal Trade Commission (FTC) in *Apple v. Motorola*,³ FRAND licensing commitments are central to the fight against anticompetitive practices in the much needed, but highly complex, standard setting processes. In our interconnected society ruled by technology intensive devices, industry has come together to institute standard-setting organizations (SSOs), which are industry groups establishing technical models, rules, and principles authoritative in a particular industry. These organizations have become increasingly important and promote innovation as well as interoperability of products.⁴ Standard setting and standard-essential patents

1. See, e.g., THEODORE HAGELIN, TECHNOLOGY INNOVATION LAW AND PRACTICE, 5–6 (2011); John Barton, *New Trends in Technology Transfer: Implications for National and International Policy*, in INTERNATIONAL INTELLECTUAL PROPERTY IN AN INTEGRATED WORLD ECONOMY 313, 314 (Frederick M. Abbott et al. eds., 2d ed. 2011).

2. In the United States, it seems that RAND commitments (hence dropping the 'fair' requirement) are more common than FRAND ones, which appear more frequently in Europe. To adopt a global approach to the issue, this article will nevertheless refer to "FRAND."

3. *Oversight of the Impact on Competition of Exclusion Orders to Enforce Standard-Essential Patents: Hearing Before the S. Comm. on the Judiciary*, 112th Cong. 11 (2012) [hereinafter *Standard-Essential Patents Hearing*] (statement of Edith Ramirez, Comm'r, Fed. Trade Comm'n).

4. See generally Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organizations*, 90 CAL. L. REV. 1889, 1892 (2002); Alan Devlin, *Standard-Setting and the Failure of Price Competition*, 65 N.Y.U. ANN. SURV. AM. L. 217 (2009-2010); Joseph Farrell et al., *Standard*

can nevertheless be problematic from an antitrust point of view. This issue has been receiving a lot of attention lately, notably because of numerous litigations in the high-tech industry. Illustrative of these debates surrounding standard setting processes is the Senate Judiciary Committee's Subcommittee on Antitrust, Competition Policy and Consumer Rights' hearing on "Standard Essential Patent Disputes and Antitrust Law" held on July 30, 2013.⁵ Conscious of the competition issues caused by standard-essential patents, SSOs have adopted rules that control the disclosure and licensing of such patents. One of these rules is the requirement of FRAND licensing commitments by standard-essential patent owners.⁶ These commitments have however proved difficult to enforce. Innovative implementation tools are therefore needed and patent markets may be relevant in establishing FRAND terms.

The aim of this article is to analyze the legal opportunities presented by patent markets for technology diffusion, as well as the role of patent markets as tools in establishing and fulfilling FRAND terms. As an illustration, the article will focus on the system established by Intellectual Property Exchange International Inc. (IPXI), an intellectual property platform already carrying 55,000 patents from Ford, Sony America, Philips, Com-Pac, MetaPower and Hewlett-Packard among others. The article focuses primarily on patents and patent markets because they are most central to technology diffusion and FRAND licensing issues. Patent licensing activities are therefore at the core of our analysis. As put forth by distinguished commentators, "[l]icensing [is] . . . the predominant transaction model in the information economy."⁷ The reason

Setting, Patents, and Hold-Up, 74 ANTITRUST L.J. 603 (2007); Alden F. Abbott & Nicholas J. Kim, *Standard Setting and Hold-ups Under Section 5 of the Federal Trade Commission Act*, in INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS 325 (Steven Anderman & Ariel Ezrachi eds., 2011); Michael A. Carrier, *Standard Setting Analysis Under U.S. Law*, in INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS 355 (Steven Anderman & Ariel Ezrachi eds., 2011); Philippe Chappatte & Paul Walker, *European Competition Law, Non-Practicing Entities, and FRAND Commitments*, in INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS 373 (Steven Anderman & Ariel Ezrachi eds., 2011); Roger G. Brooks & Damien Geradin, *Taking Contracts Seriously: The Meaning of the Voluntary Commitment to License Essential Patents on 'Fair and Reasonable' Terms*, in INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS 389 (Steven Anderman & Ariel Ezrachi eds., 2011).

5. *Standard Essential Patent Disputes and Antitrust Law: Hearing Before the Subcomm. on Antitrust, Competition Policy & Consumer Rights of the S. Comm. on the Judiciary*, 113th Cong. (2013), available at <http://www.judiciary.senate.gov/hearings/hearing.cfm?id=042c67570e0fe19705acabb8230ee0c> (last visited Aug. 1, 2013).

6. See generally Abbott & Kim, *supra* note 4; Carrier, *supra* note 4; Chappatte & Walker, *supra* at note 4; Brooks & Geradin, *supra* at note 4; Anne Layne-Farrar et al., *Pricing Patents For Licensing in Standard-Setting Organizations: Making Sense of FRAND Commitments*, 74 ANTITRUST L.J. 671, 679–85 (2007).

7. ROBERT W. GOMULKIEWICZ ET AL., LICENSING INTELLECTUAL PROPERTY – LAW AND APPLICATION 3, 18 (2d ed. 2011).

for this success appears to be a combination of increasing needs for technologies from the demand side, and the recognition of the flexible solutions offered by licensing activities. Nevertheless, other intellectual property rights can be of relevance in the technology diffusion and FRAND discussions. Therefore intellectual property rights will be addressed when appropriate.

The first section of this article explains how licensing can be used to enhance technology diffusion, and then introduce the process of standard setting as well as the concept of FRAND licensing terms. The second section, presents how the intellectual property market emerged and recount the milestones in the market building process. The third section then introduces one of the most sophisticated intellectual property market platforms at the present: the IPXI. Finally, this article assesses whether patent markets can be relevant as an incentive towards enhanced technology diffusion and as helpful criteria in defining and meeting FRAND licensing terms.

I. LICENSING AND TECHNOLOGY DIFFUSION

A. *Why Patent Licensing Enhances Technology Diffusion*

Patents appear as both an incentive and a barrier to technology diffusion. As stated by Rudolph Peritz, “patent protection is the private incentive necessary to spur invention and at the same time the social cost that prevents its optimal use.”⁸ Patents are legal and financial barriers to technology diffusion because they slow the rate of access to technologies, complicate the access process in general, and make technologies more expensive. Indeed, proprietary products undoubtedly cost more than generic ones. Moreover, patents can be barriers to accessing technologies as right holders may simply refuse to license a technology to competing manufacturers or to those in certain countries.

On the other hand, one of the central arguments put forward by proponents of strong intellectual property rights regimes, and underlying the adoption of the World Trade Organization’s (WTO’s) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), is that such approaches not only increase innovation by firms, but also favor increased

8. Rudolf J.R. Peritz, *Competition Within Intellectual Property Regimes: The Instance of Patent Rights*, in *INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS* 27, 34 (Steven Anderman & Ariel Ezrachi eds., 2011). On the trade-off between inventiveness and underutilization, see generally, Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609 (R. Nelson ed., 1962).

diffusion of technologies.⁹ It is important to distinguish between the role of intellectual property rights as incentives to innovation, and their role in enhancing technology diffusion. Although it falls outside of the scope of the present study to analyze this distinction, we will briefly present both incentives separately.

The justification behind the exclusive rights granted by patents and other intellectual property rights is precisely to provide a private incentive in favor of innovation. The U.S. Constitution indeed provides that Congress has the power “*To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.*”¹⁰ As underlined by the U.S. Department of Justice’s Antitrust Division in a recent statement,

[p]atents, provided for in Article I of the U.S. Constitution have long played a central role in promoting innovation and economic growth by encouraging individuals and companies to apply their knowledge, take risks and invest in research and development to create a new product or process.¹¹

Since development of new technologies is largely led by private corporations driven by market incentives, intellectual property regimes appear to be incentives in favor of technology innovation as they reward inventors’ efforts and investments. As stated by Mark Lemley, “[i]ntellectual creations are public goods that are much easier and cheaper to copy than they are to produce in the first place. Absent some form of exclusive right over inventions, no one (or not enough people) will bother to innovate.”¹² Moreover, the protection offered by patents encourages firms and inventors to put products on the market and is, therefore, an incentive to design around the patented products. Some commentators have furthermore underlined that stronger intellectual property rights may facilitate the development of specialized technology markets.¹³ The existence of intellectual property regimes is hence necessary to secure and boost research and innovation.

9. See, e.g., Lee G. Branstetter, *Do stronger patents induce more local innovation?*, in INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER A GLOBALIZED INTELLECTUAL PROPERTY REGIME 309, 311–16 (Keith E. Maskus & Jerome H. Reichman eds., 2005).

10. U.S. CONST., art. I, § 8, cl. 8 (emphasis added).

11. Renata Hesse, Deputy Assistant Attorney General, Antitrust Division, U.S. Department of Justice, Six “Small” Proposals for SSOs Before Lunch, Remarks as Prepared for the ITU-T Patent Roundtable, 3, Remarks Prepared for the ITU-T Patent Roundtable Geneva, Switzerland (October 10, 2012).

12. Lemley, *supra* note 4, at 1892.

13. Branstetter, *supra* note 9, at 316.

The role of patents in diffusing technology stems from both the disclosure requirement in patent applications and any licensing agreements that may be subsequently entered into. The patenting of an invention indeed requires that the inventor disclose its invention in its application to the Patent and Trademark Office (PTO),¹⁴ thus revealing major technological information on the invention. This information will be precious in order to avoid R&D overlaps and to direct R&D in the industry. Moreover, licenses grant licensees the right to use intellectual property content otherwise protected by exclusive rights. More precisely, a license “conveys the patentee’s permission to enjoy exclusively or non-exclusively some or all of the statutory exclusionary rights under [patent law] for a limited time and purpose, within a geographic area, and in certain distribution channel[s].”¹⁵ Licensing contracts should also contain all the relevant knowledge to allow the licensee to work with the technology, thus diffusing additional technological information. A licensing operation may further involve technical assistance and know-how, which are needed to adopt and adapt the relevant technology.

Licensing activities are complex and may occur either within firms or between unrelated entities and concern a broad range of actors, from big multinational companies to small start-ups and universities. Moreover, they can be international transactions submitted to numerous legal regimes. The licensing of technologies leads to important diffusion of technologies. As stated by an expert in the field, “[t]hrough licensing, [intellectual property] becomes the legal embodiment of collaboration, which allows for an entire industry to adopt a single enabling technology.”¹⁶ Technologies thus ‘spill over’ from one person or entity to another, and licensing operations are therefore one of the channels through which technologies may be diffused. This process has been identified as a ‘value-added process’ where “[e]ach firm in the chain adds value to the technology as it incorporates its core competence . . . into the technology.”¹⁷ As the number of granted patents is significantly increasing every year, both nationally and internationally, patents and subsequent licensing operations undoubtedly contribute to worldwide increased technology diffusion.¹⁸ To this respect, a number of studies show a clear link between

14. 35 U.S.C. § 112 (2013) (unchanged under the America Invents Act); TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, art. 3, THE LEGAL TEXTS: THE RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS 320 (1999), 1869 U.N.T.S. 299, art. 29 (1994) [hereinafter TRIPS Agreement].

15. GOMULKIEWICZ ET AL., *supra* note 7, at 202.

16. Ian D. McClure & James E. Malackowski, *The Next Big Thing in Monetizing IP: A Natural Progression to Exchange-Traded Units*, 3(5) LANDSLIDE 1, 2 (May/June 2011).

17. HAGELIN, *supra* note 1, at 5.

18. See *Strong Growth in Demand for Intellectual Property Rights in 2012*, WORLD

patents and technology transactions.¹⁹ Specifically, increases in patent protection have been proved to heighten licensing propensity.²⁰ It has equally been demonstrated that patent grants increase the probability that a licensing agreement will be achieved.²¹

Interestingly, technology diffusion appears as one of the core objectives of the TRIPS Agreement, which states that:

[t]he protection and enforcement of intellectual property rights should contribute to *the promotion of technological innovation and to the transfer and dissemination of technology*, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.²²

Moreover, technology diffusion is a fundamental principle of the Agreement.²³ The importance of both articles was further reinforced by both the Doha Declaration and the Doha Ministerial Declaration,²⁴ which made technology diffusion one of the fundamental aims of international intellectual property law.

For sure, the patent system and the licensing approach are far from being perfect solutions. Some commentators have even argued that “patents today constitute a *brake* on innovation, not a *roadblock*.”²⁵ Moreover, the step from innovation to diffusion is extremely complex, albeit outside of the scope of the present article. Other means of encouraging and diffusing innovations have been identified. With respect to innovation, one should not underestimate the impact of the social and professional recognition enshrined in the publication

INTELLECTUAL PROPERTY ORGANIZATION (Mar. 19, 2013), http://www.wipo.int/pressroom/en/articles/2013/article_0006.html. For U.S. statistics see, e.g., *Statistics*, UNITED STATES PATENT AND TRADEMARK OFFICE (May 13, 2011, 2:32:46 PM), <http://www.uspto.gov/about/stats/index.jsp>.

19. See, e.g., Gaétan de Rassenfosse, *How SMEs exploit their intellectual property assets: Evidence from survey data*, 39 SMALL BUS. ECON. 437, 441 (2012).

20. See, e.g., Ashish Arora & Marco Ceccagnoli, *Patent Protection, Complementary Assets, and Firms' Incentives for Technology Licensing*, 52(2) MGMT. SCI. 293, 293 (2006).

21. See, e.g., Joshua Gans et al., *The Impact of Uncertain Intellectual Property Rights on the Market for Ideas: Evidence from Patent Grant Delays*, 54(5) MGMT. SCI. 982 (May 2008).

22. TRIPS Agreement, *supra* note 14, at art. 7 (emphasis added).

23. *Id.* at art. 8 ¶ 2 (emphasis added).

24. World Trade Organization, Ministerial Declaration of 14 Nov. 2001, ¶ 9, WT/MIN(01)/DEC/1, 41 I.L.M. 746 (2002) (Doha Declaration) and World Trade Organization, Ministerial Declaration of 14 Nov. 2001, ¶ 4, WT/MIN(01)/DEC/2, I.L.M. 746 (2002). For more details see notably Peter K. Yu, *The Objectives and Principles of the TRIPS Agreement*, in RESEARCH HANDBOOK ON THE PROTECTION OF INTELLECTUAL PROPERTY UNDER WTO RULES INTELLECTUAL PROPERTY IN THE WTO VOLUME I, 152–55 (Carlos M. Correa ed., 2010).

25. JAMES BESSEN & MICHAEL MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS AND LAWYERS PUT INNOVATORS AT RISK 145 (2008).

industry as well as in academic and private prizes such as the Nobel Prizes. In the same line, a great amount of knowledge is disseminated through scientific reviews and other journals.

Going further, a traditional answer to enhancing access to proprietary technologies has been compulsory licensing, a state-created liability rule entitlement.²⁶ As explained by Robert Merges, the compulsory licensing approach means that “[l]egislation granting [intellectual property rights] is conditioned . . . with a statutory mandate that the rights must be licensed to all comers willing to pay the pre-set price.”²⁷ Because compulsory licensing ensures access to technologies while reducing transaction costs, this approach has played an important role in the technology diffusion debate.²⁸ However, compulsory licensing presents great political difficulties and is equally subject to lock-in consequences.²⁹ Another approach that has been suggested in order to enhance access to proprietary technologies is the reliance on privately established Collective Rights Organizations (CROs).³⁰ Like intellectual property markets, CROs are based on property rule entitlements and establish private transactional mechanisms (also referred to as private orderings). Therefore in a CRO, members, not courts, set the price of the technologies.³¹ Compared to compulsory licensing, CROs present two distinct advantages: “expert tailoring and reduced political economy problems.”³² But in order to be efficient, the CRO approach needs a repeat-play bargaining scheme.³³ Another strategy relevant in enhancing access to proprietary technologies is the establishment of patent pools, a form of CRO where “multiple patent holders assign or license their individual rights to a central entity, which in turn exploits the collective rights by licensing, manufacturing, or both.”³⁴ In a patent pool, access to technologies can be free³⁵ or at a price set by the pool. Patent pools

26. Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1308–17 (1996).

27. *Id.* at 1295. On compulsory licensing and energy technologies see, e.g., MATTHEW RIMMER, *INTELLECTUAL PROPERTY AND CLIMATE CHANGE: INVENTING CLEAN TECHNOLOGIES* 236–71 (2011).

28. See, e.g., Richard Li-Dar Wang, *Reflections on a Second Thought*, in *THE ENFORCEMENT OF PATENTS* 61, 61–64 (Kung-Chung Liu & Reto M. Hilty eds., 2011); CYNTHIA M. HO, *ACCESS TO MEDICINE IN THE GLOBAL ECONOMY: INTERNATIONAL AGREEMENTS ON PATENTS AND RELATED RIGHTS* 125–222 (2011).

29. Merges, *supra* note 26, at 1295–96, 1299, 1307–17.

30. See, e.g., *id.* at 1295.

31. *Id.* at 1328.

32. *Id.* at 1295.

33. *Id.* at 1296.

34. *Id.* at 1340.

35. One example of a pool where patented technologies are available without royalties is the Eco-Patent Commons. See *Eco-Patent Commons*, WORLD BUS. COUNCIL FOR SUSTAINABLE DEV.

are often very efficient in lowering transaction costs but they may also be used in order to implement cartels, and therefore, should be taken with caution.³⁶ Although it is outside of the scope of the present paper to analyze further the approaches mentioned, it is important to acknowledge that there are many factors and strategies that enhance innovation and diffusion of technologies.

As demonstrated earlier, licensing operations support technology diffusion because they allow for substantial technological information to be exchanged and ultimately disseminated. From a diffusion perspective, licensing should therefore be encouraged. However, licensing activities are often difficult to set and require for certain conditions to be met. In particular, licensors and licensees must be able to agree on licensing terms, and, to do so, they need to find a forum where they can exchange information and negotiate. Nevertheless, the reality of intellectual property licensing is quite complicated as licensing transactions are often anything but transparent. Licensors fear infringements and abuses and do not trust the available judicial options as efficient guarantees. Rather than valuing their intellectual property assets by licensing them, they therefore commonly underexploit them. On the other hand, licensees frequently lack leverage in negotiations and thus either fail to obtain licensing rights altogether or acquire rights but fail to achieve efficient and fair licensing terms. Licensing deals further take a long time to negotiate and are thus quite costly for all parties.

Based on this assessment, the main issues with respect to licensing opportunities appear to be: a) lack of transparency in the agreement processes, b) leverage concerns, c) lack of time efficiency and the fact that licensing processes are lawyer-intensive, and d) general dissatisfaction with the available legal framework. Because of these weaknesses, and in the absence of efficient forum, licensors and licensees miss important opportunities in valuing intellectual property assets and diffusing technology. In Section IV of this article, I will assess whether patent markets could be relevant in tackling some of the identified issues.

B. Standard Setting and FRAND Terms

In the 1800s, the need for standardized time so that trains could run on schedule was met by railroads that began adopting standard time in both Great Britain (1840) and the U.S. (1883).³⁷ Today, in an interconnected society ruled by technology intensive devices, standards, SSOs, as well as standard-

(WBCSD), <http://www.wbcd.org/work-program/capacity-building/eco-patent-commons.aspx> (last visited Mar. 2, 2014).

36. See, e.g., *Merges*, *supra* note 26, at 1340.

37. HESSE, *supra* note 11, at 3–4.

developing organizations (SDOs) have become increasingly important. Standardization may take numerous organizational forms.³⁸ While some standards are mandatory because they represent legal requirements (*de jure* standards),³⁹ most standards are only voluntary. SSOs and SDOs can moreover be international,⁴⁰ regional,⁴¹ or national;⁴² and can be governmental,⁴³ quasi-governmental, or non-governmental entities.⁴⁴ Private SSOs and SDOs are bodies composed of markets and other actors who collaborate in order to establish uniform technical specifications for particular industries. My analysis focuses on standards voluntarily set by these private industry groups.

The establishment of standards presents numerous benefits.⁴⁵ As described by the District Court in *Motion v. Motorola*,

Standards are important for several reasons. First, they facilitate the adoption and advancement of technology as well as the development of products that can interoperate with one another. Standards also lower costs by increasing product manufacturing volume, and they increase

38. On the organizational forms of standardization, *see, e.g.*, Lemley, *supra* note 4, at 1898–1901.

39. For example, minimum standards can be compulsory in implementing health or environmental statutes.

40. The International Organization for Standardization (ISO), founded in 1947, is the world's largest developer of voluntary International Standards. ISO is a network of national standards bodies that make up the ISO membership and represent ISO in their country. As an illustration, ISO's most popular standards are ISO 9000 (quality management), ISO 14000 (environmental management), ISO 26000 (social responsibility), ISO 50001 (energy management), ISO 31000 (risk management) and ISO 22000 (food safety management). *See* INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, <http://www.iso.org/iso/home.htm> (last visited Mar. 8, 2013). Another important international organization is the International Telecommunication Union (ITU), the United Nations' specialized agency for information and communication technologies. ITU was founded in 1865 as the International Telegraph Union and in 1947 it became a specialized agency of the United Nations. In addition to ITU's 193 Member States, ITU membership includes ICT regulators, leading academic institutions and some 700 private companies. *See* INTERNATIONAL TELECOMMUNICATION UNION, <http://www.itu.int/en/Pages/default.aspx> (last visited Aug. 2, 2013).

41. *See, e.g.*, the Pan American Standards Commission, COPANT, <http://www.copant.org/> (last visited Aug. 2, 2013); the European Committee for Standardization, CEN, <http://www.cen.eu/cen/pages/default.aspx> (last visited Aug. 2, 2013); the Pacific Area Standards Congress, PACIFIC AREA STANDARDS CONGRESS, <http://www.pascnet.org/> (last visited Aug. 2, 2013); and the African Organization for Standardisation, AFRICAN ORGANIZATION FOR STANDARDISATION, <http://www.arso-oran.org/> (last visited Aug. 2, 2013).

42. In the U.S., the national standards body is the American National Standards Institute (ANSI), founded in 1918. *See* AMERICAN NATIONAL STANDARDS INSTITUTE, <http://www.ansi.org/> (last visited Aug. 2, 2013).

43. *Id.*

44. *See, e.g.*, The World Wide Web Consortium (W3C). W3C, <http://www.w3.org/> (last visited Aug. 2, 2013).

45. For a detailed analysis of the value of standardization, *see, e.g.*, Lemley, *supra* note 4, at 1896–98.

price competition by eliminating “switching costs” for consumers who desire to switch from products manufactured by one firm to those manufactured by another. They also lead to earlier adoption of new technology.⁴⁶

Standards are thus set to ensure products and services are safe, interoperable, and competitive, which protect and benefit consumers. Standards also benefit technology producers, as they provide baselines for R&D and hence reduce the cost and risk in R&D.⁴⁷ As put forth by the Third Circuit in *Broadcom*, “[t]he adoption of a standard does not eliminate competition among producers but, rather, moves the focus away from the development of potential standards and toward the development of means for implementing the chosen standard.”⁴⁸ These benefits have been reiterated in the recent opinion by Judge Robart in the Western District of Washington regarding smart phone patents in the *Microsoft v. Motorola* case.⁴⁹ Because of these positive features, standard setting should be encouraged.

Nevertheless, standards can have dangerous and sometimes illegal anticompetitive effects by excluding a competitor from a market or obtaining an unjustifiably higher price for a technology. In the words of Judge Posner, “once a patent becomes essential to a standard, the patentee’s bargaining power surges because a prospective licensee has no alternative to licensing the patent; he is at the patentee’s mercy.”⁵⁰ The phenomenon is often referred to as ‘patent hold-up’ and identifies situations where, after a standard has been set, a patent owner benefits from a strong reduction in rivalry and thus gains consequent but illegitimate leverage in licensing processes because its patent has become key to the new standard.⁵¹ Indeed, in cases of unreasonable bargaining power and undue leverage in negotiations, “the connection between the value of an invention and its reward—a connection that is the cornerstone of the patent system”⁵² is broken.

46. *Research in Motion Ltd. v. Motorola, Inc.*, 644 F. Supp. 2d 788, 790 (N.D. Tex. 2008).

47. On the benefits of standards *see, e.g.*, Patrick Curran, *Standard-Setting Organizations: Patents, Price Fixing, and Per Se Legality*, 70 U. CHI. L. REV. 983, 985, 989 (2003).

48. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 309 (3d Cir. 2007).

49. *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, ¶¶ 12, 13, 51, 70 (W.D. Wash. Apr. 25, 2013).

50. *Apple, Inc. v. Motorola, Inc.*, 896 F. Supp. 2d 901, 913 (N.D. Ill.2012).

51. On the economics of patents and opportunism, *see, e.g.*, Farrell et al., *supra* note 4, at 610, 647. On patent hold-up and royalties *see* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Staking*, 85 TEX. L. REV. 1991 (2007).

52. Brief for the Federal Trade Commission as Amicus Curiae Supporting Neither Party, at 5, *Apple Inc. v. Motorola Inc.*, 896 F. Supp. 2d 901, 913 (N.D. Ill.2012) (Nos. 2012-1548, 2012-1549 (Fed. Cir. Dec. 14, 2012), 2012 WL 6655899 [hereinafter Brief of Amicus Curiae FTC]). On July 24, 2013, the FTC finalized the settlement in the Google Motorola mobility case. The Final Order requires

If monopoly power and anticompetitive conduct is established, patent hold-up may be illegal under Section 2 of the Sherman Antitrust Act prohibiting monopolization of or attempt to monopolize trade or commerce.⁵³ Patent hold-up may equally be illegal under Section 5 of the Federal Trade Commission Act.⁵⁴ In *Allied Tube*, the Supreme Court therefore recognized the anticompetitive character of conduct that undermines the precompetitive benefits of private standards.⁵⁵ Moreover, patent hold-ups threaten the acknowledged benefits of standardization and hurt competitors in the participating industries, as well as innovation in general and downstream customers.⁵⁶

To bar owners of essential patents from abusing their undue market power, SSOs have adopted rules, policies, and procedures that control the disclosure and licensing of essential patents.⁵⁷ Notably, when a member of a SSO holds a patent covering a potential standard, such patent must be disclosed to all the members (disclosure obligation).⁵⁸ Moreover, owners of essential patents must often commit to licensing the relevant technology on FRAND terms (licensing rule).⁵⁹ SSOs hence have rules dictating the behavior of patent owners before an organization agrees on a standard (*ex ante* obligations),⁶⁰ as well as rules

Google to abide by its commitments to license its standard-essential patents on FRAND terms, alleging that Google had reneged on these commitments and pursued – or threatened to pursue – injunctions and exclusion orders against firms that needed to use standard-essential patents held by Google’s subsidiary, Motorola, and were willing to license these patents on FRAND terms. The Commission vote approving the final order was 2-1-1. *See* Motorola Mobility LLC and Google Inc., No. 1210120 2013 WL 3944149 (F.T.C. July 23, 2013), *available at* <http://ftc.gov/os/caselist/1210120/130724.googlemotorolado.pdf>.

53. Sherman Antitrust Act (Sherman Act) of 1890, 15 U.S.C. § 2 (2006). On monopoly power and anticompetitive conduct, *see* the Third Circuit’s analysis in *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 306–14 (3d Cir. 2007). On the refusing to license essential patents on FRAND terms *see, e.g.*, Robert A. Matthews, Jr., 5 ANNOTATED PATENT DIGEST § 34:53.50 (updated Feb. 2013) (Refusing to license an “essential” patent on FRAND terms).

54. Federal Trade Commission Act (FTC Act) of 1914, 15 U.S.C. § 45 (2006). On standard setting and hold-up under § 5 of the Federal Trade Commission Act. *See, e.g.*, Alden F. Abbott & Nicholas J. Kim, *Standard Setting and Hold-Ups under Section 5 of the Federal Trade Commission Act*, in *INTELLECTUAL PROPERTY AND COMPETITION LAW: NEW FRONTIERS*, 325, 325–54 (Steven Anderman & Ariel Ezrachi eds., 2011).

55. *Allied Tube & Conduit Corp. v. Indian Head, Inc.*, 486 U.S. 492, 499–500 (1988).

56. *See, e.g.*, Brief of Amicus Curiae FTC, *supra* note 52, at 16. On standards hold-up as a competition problem *see also* Farrell et al., *supra* note 4, at 644.

57. *See, e.g.*, Lemley, *supra* note 4, at 1903–08. *See also*, *Research In Motion Ltd. v. Motorola, Inc.*, 644 F. Supp. 2d 788, 791 (N.D. Tex. 2008).

58. *See, e.g.*, Farrell et al., *supra*, note 4, at 624.

59. On FRAND terms *see, generally*, Abbott & Kim, *supra* note 4; Carrier, *supra* note 4; Chappatte & Walker, *supra* note 4; Brooks & Geradin, *supra* note 4; and Layne-Farrar et al., *supra* note 6, at 671.

60. On what SSOs can do *ex ante* to prevent patent hold up, *see* Mark A. Lemley, *Ten Things To Do About Patent Holdup of Standards (And One Not To)*, 48 B.C. L. REV. 149, 158 (2007).

governing licensing processes and other negotiations after a standard has been set (*ex post* obligations).⁶¹

FRAND licensing rules designate the terms under which the patent asset will be licensed but do not specify any monetary terms. As stated by distinguished commentators, “[f]air,’ ‘reasonable,’ and ‘non-discriminatory’ are an interesting collection of commonly used, but emotion-laden words that become even more emotionally charged when strung together.”⁶² FRAND terms are hence nebulous but have never been defined by SSOs. Interestingly, some commentators argue that SSOs leave FRAND language “intentionally vague in order to avoid liability for price fixing.”⁶³ Some go even further and state that “generally prevailing policies of [SSOs] enable and indeed affirmatively facilitate ‘gaming the system.’”⁶⁴ Interestingly, the American National Standards Institute (ANSI)’s Patent Policy say nothing about the *ex ante* determination of FRAND licensing terms, but the Guidelines for Implementation of the Policy declare:

It should be reiterated, however, that the determination of specific license terms and conditions, and the evaluation of whether such license terms and conditions are reasonable and demonstrably free of unfair discrimination, are not matters that are properly the subject of discussion or debate at a development meeting.⁶⁵

Doug Lichtman has offered four economic reasons explaining the use of FRAND commitments as opposed to price setting within SSOs: (1) “negotiations over patent validity and value would take enormous amounts of time,” (2) standard-setting is a process run by engineers rather than lawyers, (3) new technologies have uncertain value, and (4) FRAND commitments allow implementing firms to wait for additional information before agreeing on royalties.⁶⁶ In general, it seems that limiting the agreement to FRAND commitment allows SSOs to avoid a feared liability for concerted exercise of

61. On *ex ante* and *ex post* negotiations, see Farrell et al., *supra*, note 4, at 630.

62. Layne-Farrar et al., *supra* note 6, at 671.

63. Curran, *supra* note 47, at 992.

64. Robert A. Skitol, *Concerted Buying Power: Its Potential for Addressing the Patent Holdup Problem in Standard Setting*, 72 ANTITRUST L.J. 727, 728 (2005).

65. AMERICAN NATIONAL STANDARDS INSTITUTE, GUIDELINES FOR THE IMPLEMENTATION OF THE ANSI PATENT POLICY, 7 (Oct. 2012) available at <http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/ANSI%20Patent%20Policy%20Guidelines%202012%20final.pdf>.

66. Doug Lichtman, *Seventh Annual Baker Botts Lecture: Understanding the RAND Commitment*, 47 HOUS. L. REV. 1023, 1028–29 (2010–2011). On SSOs and the pricing dilemma, see also Devlin, *supra* note 4, at 232–43.

pricing power, as well as allows thorough examinations of possibly relevant patents. As put forth by Lichtman, the result of the adoption of a FRAND approach is that it “separates the negotiation over the details of a technology from the negotiation over its costs.”⁶⁷

In the same line, it is interesting to note that, contrary to many patent pools, most SSOs do not provide for control or arbitration once a standard has been adopted.⁶⁸ However, two exceptions should be flagged here. First, the Institute of Electrical and Electronics Engineers (IEEE) requires compulsory *ex ante* licensing disclosures, a feature that has been praised by the U.S. Antitrust Division but that remains almost unique in the industry.⁶⁹ Second, VITA, an international trade association that develops standards for modular embedded computing systems, has created “an arbitration procedure to resolve disputes over members’ compliance with patent policy.”⁷⁰ Here too, VITA’s initiative is quite unique in the SSOs field.⁷¹ For these reasons, once a standard has been accepted, FRAND commitments are difficult to police and implement in the absence of right holders’ good faith. However, as stated by Mark Lemley, “SSO [intellectual property] rules have legal significance only to the extent they are enforceable.”⁷²

Still, patent holders abusing their *ex post* position are not free from liability, and many antitrust claims have thus been brought against firms violating FRAND terms commitments.⁷³ Opportunism in licensing after standardization has first been reviewed in the now famous 1996 FTC *Dell Computer* case.⁷⁴ Since then, disputes have become increasingly frequent, both in front of the FTC and in front of courts.⁷⁵ For example, in 2007, royalties requested by Qualcomm for its standard-essential UMTS patents were, successfully attacked by Broadcom and other competitors for violating Qualcomm’s FRAND

67. Lichtman, *supra* note 66; see also Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-in: RAND Licensing and the Theory of the Firm*, 40 IND. L. REV. 351, 364–67 (2007).

68. HESSE, *supra* note 11, at 10.

69. *Id.* at 8. See also IEE STANDARDS ASSOCIATION, <http://standards.ieee.org/> (last visited Aug. 2, 2013).

70. See HESSE, *supra* note 11, at 10. See also, VITA: OPEN STANDARDS OPEN MARKETS, <http://www.vita.com/> (last visited Aug. 2, 2013).

71. HESSE, *supra* note 11, at 8, 10.

72. Lemley, *supra* note 4, at 1909.

73. On the refusing to license essential patents on FRAND terms see, e.g., Matthews, *supra* note 54 (updated Feb. 2013) (refusing to license an “essential” patent on FRAND terms). On the antitrust theories of liability see, e.g., Lemley, *supra* note 4, at 1927–36.

74. *In re Dell Computer Corp.*, 121 F.T.C. 616, 618 (1996).

75. For a more recent milestone FTC case see *Rambus, Inc.*, 142 F.T.C. No. 9302, at 4, 2006-2 Trade Cases P. 75364 (F.T.C.), 2006 WL 2330117, 2 (2006), where the FTC held that deceptive conduct of the type alleged in *Dell Computer* and *Union Oil* constituted “exclusionary conduct” under § 2 of the Sherman Act as well as unlawful monopolization under § 5 of the FTC Act.

licensing terms commitment.⁷⁶ As previously stated, the FRAND standard is nevertheless ambiguous and has not been expressly defined either by SSOs or by courts, although the Western District of Washington rendered the first judicial determination of a RAND royalty rate in April 2013 in the now famous *Microsoft v. Motorola* case.⁷⁷ In that opinion, Judge Robart adopted a hypothetical bilateral negotiation approach to determine a reasonable and nondiscriminatory royalty rate for Motorola's patented technologies, and applied the *GeorgiaPacific* framework and its fifteen factors in the FRAND context.⁷⁸ In doing so, Judge Robart noted that a "judicial simulation of a hypothetical, bilateral negotiation under the RAND obligation logically will lead to a royalty rate that both parties would have found to be reasonable."⁷⁹ However, the opinion modifies the *GeorgiaPacific* factors to take into account public interest considerations with respect to patent hold-ups, stacking concerns, as well as relative values of patented technologies.⁸⁰ The *Microsoft v. Motorola* opinion is hence a big step in setting legal criteria to judicially determine FRAND and RAND commitments. Aside from the Western District of Washington's opinion, FRAND claims have nevertheless often questioned the ability of courts to judicially establish FRAND terms. This questioned capacity coupled with the lack of substantial regulation by SSOs has consequently limited courts in interpreting and enforcing the content of FRAND licensing terms.⁸¹ Litigation with respect to FRAND terms is moreover long and costly for all sides. These conclusions flag a phenomenon already identified by Robert Merges in 1996: "[intellectual property] law has grown increasingly resistant to one of its traditional pathogens, the antitrust laws."⁸² Although FRAND licensing commitments appear central to the policing of standard setting, practice hence shows that they have been very difficult to implement and enforce. For these reasons, patent markets could be relevant in establishing the content of FRAND terms outside of courts, or as criteria for the court when interpreting FRAND terms (provided that we accept the premise that market price is fair and reasonable). I will come back to the relevance of patent markets as tools in establishing FRAND terms in section

76. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 305–06, 323 (3d Cir. 2007). *See also*, *Qualcomm Inc. v. Broadcom Corp.*, 539 F. Supp. 2d 1214, 1248 (S.D. Cal. 2007) (characterizing such conduct as an attempt at "holding hostage the entire industry desiring to practice the . . . standard").

77. *Microsoft Corp. v. Motorola, Inc.*, No. C10–1823JLR, 2013 WL 2111217 (W.D. Wash., 2013).

78. *Id.* ¶ 87.

79. *Id.* ¶ 91.

80. *Id.* ¶¶ 111–13.

81. On courts' options for defining FRAND terms, *see, e.g.*, Layne-Farrar et al., *supra* note 6, at 679–85.

82. Merges, *supra* note 26, at 1294.

IV of this article.

II. THE EMERGENCE OF A PATENTS MARKET

The patents market's emerging process is difficult to map and analyze, as there are no official surveys documenting the content and evolution of the market. Nevertheless, as the market grows in importance, some studies make it easier to grasp the essential information. First, it seems that the market emerged in the United States (U.S.) and remains particularly attached to the U.S. territory. Indeed, as noted by a commentator, "the sheer size of the technology markets in the U.S., and the specificities of the U.S. regulatory and legal environment, make it the ideal place for the development of a patent market."⁸³ Unsurprisingly, the patents market is, for the moment, particularly strong in California and in Silicon Valley but the emergence of patent intermediaries such as IPXI has the potential to expand the phenomenon worldwide. As for what triggered the emergence of a patents market, specialists point to the establishment of the Court of Appeals for the Federal Circuit in 1982, as well as to the incentives brought by a new monetization strategy for patents and other intellectual property rights.⁸⁴ Litigation threats that stem from increasingly patent-sensitive products, a growing need for defensive patents, the inadequacy of the available legal solutions, and a strategic necessity to avoid expensive and lengthy litigations are additional reasons that explain the emergence of an intellectual property market.⁸⁵ One landmark event in this evolution is the private auction forum created by Ocean Tomo in 2005 where a patent portfolio was sold "out of bankruptcy for \$15 million in 65 days."⁸⁶ Following this success, Ocean Tomo held a live auction in April, 2006, where 1,200 patents were sold for about \$8.5 million.⁸⁷ Interestingly, "one-half of the patents were sold 'off the floor,'" *i.e.* after the auction once reserves had been reduced.⁸⁸ The new market seemed to have had a quick effect. A subsequent live auction followed, including copyrights and domain names, and met with even bigger success, with cumulative transactions of \$23.9 million.⁸⁹ In

83. Ashby H. B. Monk, *The emerging market for intellectual property: drivers, restrainers, and implications*, 9(4) J. ECON. GEOGRAPHY 469, 473 (2009).

84. *Id.* at 474. See also James E. Malackowski et al., *The Intellectual Property Marketplace: Emerging Transaction and Investment Vehicles*, 27(2) LICENSING J. 1, 2 (Feb. 2007). (James Malackowski is IPXI Holdings' Co-Chairman and Ocean Tomo's Chairman and Chief Executive Officer). For an introduction on the Federal Circuit see, *e.g.*, Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1, 25–26 (1989).

85. Monk, *supra* note 83, at 474–75.

86. Malackowski et al., *supra* note 84, at 3.

87. *Id.*

88. *Id.*

89. *Id.*

response to the encouraging results of these live auctions, Ocean Tomo launched in 2006, in partnership with the American Stock Exchange, the Ocean Tomo 300® Patent Index (OTPAT). OTPAT is the first index based on the value of patent assets⁹⁰ and representing a diversified portfolio of 300 top companies.⁹¹ In 2007, Ocean Tomo also launched the US China IP 200™ Index, the world's first index based on the value of both U.S. and Chinese intellectual property.⁹² The Index comprises the top 100 companies that own the most valuable U.S. patents relative to their book value and the 100 companies that have the most valuable Chinese patents. Another famous example of patent auctioning is Zoltar Satellite Alarm Systems (Zoltar)'s in October 2009 by Pluritas, a patent broker based in San Francisco.⁹³ Zoltar held the patents for a personal alarm device that used GPS technology and navigational receivers. After suing for infringement and settling with Qualcomm in 2001 and Motorola in 2005, Zoltar decided to avoid further legal fees and sold its patents in an auction "hoping for faster, simpler and less risky payoff."⁹⁴ Through increasing patent auctions, a market for patent assets emerged. As stated by James Malackowski, IPXI Holdings' Co-Chairman and Ocean Tomo's Chairman and Chief Executive Officer, "[t]he true success of the auctions has been the effect on the emerging market for IP."⁹⁵ Because of these market evolutions, patent brokers and intermediaries became increasingly important actors in the intellectual property landscape. In the copyright industry, platforms like the Creative Commons (a nonprofit organization that enables the diffusion of copyrights through standardized copyright licenses) also participated in the creation of an intellectual property market.⁹⁶ Altogether, these developments created the perfect conditions for the launching of intellectual property exchange platforms where buyers can purchase licenses according to rules and values established by the market. With respect to patent assets, two important market platforms are worth mentioning as milestones in the intellectual property market creation process: the GreenXchange and IPXI.

GreenXchange is a nonprofit web-based marketplace launched in Davos,

90. See OCEAN TOMO: INTELLECTUAL CAPITAL EQUITY, <http://www.oceantomo.com/productsandservices/investments/indexes/ot300> (last visited Aug. 2, 2013).

91. On the design of the index see, e.g., Malackowski et al., *supra* note 84, at 4–8.

92. See *US China IP 200™ Index*, OCEAN TOMO: INTELLECTUAL CAPITAL EQUITY, <http://www.oceantomo.com/productsandservices/investments/us-china-ip-200> (last visited Aug. 2, 2013).

93. For the whole story, see Steve Lohr, *Patent Auctions Offer Protections to Inventors*, N.Y. TIMES, Sept. 21, 2009, at B1.

94. *Id.*

95. McClure & Malackowski, *supra* note 17, at 33.

96. For more information on the Creative Commons, see *About*, CREATIVE COMMONS, <http://creativecommons.org/about>.

Switzerland, during the World Economic Forum in January 2010, by Nike, Creative Commons and Best Buy. It provides a standardized license structure whereby intellectual property holders can control the level at which and to whom their intellectual assets are available.⁹⁷ Intellectual property holders can thus retain the rights they believe to be critical to maintaining their competitive advantage, and licensing agreements are especially designed to allow the necessary flexibility. As noted by Eric Lane, intellectual property lawyer and patent attorney specialized in green patents, “the GreenXchange platform enables the patent owner to make its proprietary green technologies available for transfer without compromising competitiveness.”⁹⁸ This feature should encourage the contribution of more valuable patents. Three years after its launch, more than 400 patents are available through the GreenXchange licensing platform⁹⁹ including Nike’s environmentally preferred rubber.¹⁰⁰ In addition to the standardized patent-licensing platform, GreenXchange provides partners with collaborations that offer technical assistance to companies licensing through the GreenXchange.¹⁰¹ Arguably, the platform does not meet all the conditions of a free market because it allows rights holders to retain certain rights and to arbitrarily choose which party they enter into an agreement with. These features, moreover, go against a maximized diffusion of technologies. The GreenXchange is nevertheless an interesting illustration of a patents market especially created in order to enhance diffusion of technology, environmental technologies *in casu*.

IPXI is a financial exchange launched in 2012 that allows for non-exclusive licensing and trading of intellectual property rights with market-based pricing and standardized terms through Unit License Rights contracts. It was conceived of and founded by Ocean Tomo, LLC and already carries 55,000 patents from Ford, Sony America, Philips, Com-Pac, MetaPower, Hewlett-Packard, Panasonic or the University of South California. In May of 2012, IPXI adopted its Exchange Rulebook¹⁰² and the platform is expected to

97. *See About The Greenxchange*, GREENXCHANGE <http://greenxchange.cc/info/about>.

98. ERIC L. LANE, *CLEAN TECH INTELLECTUAL PROPERTY: ECO-MARKS, GREEN PATENTS, AND GREEN INNOVATION 212* (Oxford University Press, 2011).

99. The breakdown of the 400 patents is: 237 apparel patents, 167 devices patents, 17 materials patents and 17 method patents. *See* GREENXCHANGE, *supra* note 97.

100. *See 463 Assets*, GREENXCHANGE, <http://greenxchange.cc/info/release/1-23-2011> (last visited Aug. 2, 2013).

101. For example, on “January 11, 2011 the GreenXchange held an in-person Collaboratory that included attendance by Brooks, Nike, New Balance, Oregon based non-profits, the University of Oregon, University of Washington, and the U.S. Environmental Protection Agency. The focus of the meeting was on providing technical assistance to footwear companies licensing the environmentally preferred rubber (EPR) patent offered through the GreenXchange.” *See 463 Assets*, *supra* note 100.

102. *See Company Updates*, IPXI TRADING INNOVATION, <http://www.ipxi.com/news-events/news/company-updates/100-ipxi-releases-updated-market-rulebook.html> (last visited Aug. 2,

officially launch in the summer of 2013. IPXI is certainly one of the most sophisticated patent markets at present and analysis with respect to legal opportunities offered by intellectual property markets will hence focus on IPXI as an illustration. The upcoming section will thus introduce IPXI's main features.

III. A MARKET ILLUSTRATION: IPXI AND UNIT LICENSE RIGHTS¹⁰³

IPXI is a financial exchange that allows for non-exclusive licensing and trading of intellectual property rights on standardized terms. In its own words, IPXI aspires to act as “a neutral transaction facilitator”¹⁰⁴ in the financial exchange of intellectual property rights. IPXI is membership-based, and entities that are eligible for membership are corporations, universities and laboratories. To date, IPXI is certainly one of the most sophisticated patent markets and its approach to licensing has been quite singular. The present section will thus introduce IPXI, IPXI's functions, and its most unique feature: the Unit License Rights.

For an intellectual property asset to be traded on its platform, IPXI must first enter into an agreement with the intellectual property owner. The owner will either sell its rights to IPXI or license its rights through an exclusive master license.¹⁰⁵ The latter option gives IPXI the authority to sublicense rights and enforce traded rights. Singularly, IPXI's marketplace functions through the introduction of Unit License Rights (ULR) contracts: exchange-traded non-exclusive license right products, offered on a non-discriminatory basis and on standard terms. ULR contracts will be priced and sold on a standardized technology-unit basis. Each unit-base will be uniquely determined by IPXI according to the underlying technology and each unit-base will be a measurement of the patented technology. ULR contracts therefore transform traditional private licensing of technology into tradable products. Contracts can be based on or include a patent issued in any jurisdiction and all patents included in a ULR contract are publically disclosed. Each ULR contract gives the buyer the right to use the asset offered for a pre-established number of instances in the manufacturing and/or sale of a product or use of a process. For example, if a buyer wishes to produce 1,000 solar panels using a patented

2013).

103. Unless otherwise specified, all the information in this section comes from IPXI's website. *See Fact Sheet*, IPXI, <http://www.ipxi.com/public-files/IPXI-fact-sheet.pdf>; IPXI, <http://www.ipxi.com/>.

104. *Frequently Asked Questions*, IPXI TRADING INNOVATION, <http://www.ipxi.com/inside-ipxi/faq.html> (last visited Aug. 2, 2013) (hereinafter FAQs IPXI).

105. Cameron Gray, *A New Era in IP Licensing: The Unit License Right™ Program*, 28(10) LICENSING J. 27, 29 (Nov./Dec. 2008).

device available through IPXI in the form of a ULR, the buyer will thus purchase 1,000 ULRs. Interestingly, IPXI requires that all patented technologies or applications held by the intellectual property owner, at the time of issuance or later developed, must be included in the ULR contract if they are essential to the unit-base. In fact, an entire patent pool can be the subject of a single ULR issuance! IPXI will require that the right holder obtain an independent expert opinion on the question of essential patents.¹⁰⁶ Although it is still unclear what IPXI will consider ‘essential,’ the opportunities offered by the ULR approach are very interesting. Nevertheless, it seems that it will not be compulsory for intellectual property owners to include rights to related know-how, even though IPXI offers the possibility to do so through the establishment of a Know-How Warrant.

To ensure the offer of high quality intellectual property products, each potential ULR is assessed. IPXI vets ULR contract opportunities based on quality standards determined from an abstract of the technology, business opportunities, the identity of the full portfolio as well as of any core patents within the portfolio, market identifications (such as identification of prospective licensees), and identification of any encumbrances (including most favored licensees obligations). After the assessment, ULR contract offerings will take place under two possible mechanisms: a sealed bid auction with an undisclosed minimum price, or customized offerings to ensure demand-based pricing. Offerings will be subject to price banding so that market prices reflect actual rates of technology. It will nevertheless be necessary to wait until the platform is operational to assess whether the pricing mechanism offered by IPXI will be truly market-based. Interestingly, sales will be limited to entities that certify that they are buying for their own use and/or for qualified institutional buyers. The agreement between IPXI and the ULR purchaser will furthermore carry an obligation to report consumption of the acquired ULR(s). ULR contracts being tradable units, a secondary market will allow purchasers to resell unused units. Revenues from ULR sales will be “divided with IPXI typically retaining 20 percent.”¹⁰⁷

According to IPXI, its objectives include efficient technology transfer, reasonable market-based pricing, mitigation of intellectual property-related price risk, enhanced transparency in the intellectual property marketplace, and valuation of intellectual property assets. In a statement presenting enforcement intentions regarding the planned exchange of ULRs, the Antitrust Division of

106. Letter from William J. Baer, Assistant Attorney General, Antitrust Division, U.S. Department of Justice, to Garrard R. Beene, Sullivan & Cromwell, at 4 (Mar. 26, 2013) (IPXI, Inc. Business Review Request).

107. *Id.* at 5.

the U.S. Department of Justice noted that: “IPXI’s proposed exchange potentially could generate efficiencies for the IP marketplace and encourage innovation through increased licensing efficiency, sublicense transferability, and greater transparency.”¹⁰⁸ Nevertheless, the statement also warned that the IPXI platform could raise antitrust issues, including “the pooling of patents from multiple patent holders, the listing of competing ULRs, and the sharing of competitively sensitive information.”¹⁰⁹ In an amended submission, IPXI stated that it “will not permit competing ULR offerings on the exchange.”¹¹⁰ It will however be necessary to wait until the platform is operational to see whether the competitive issues raised by the Antitrust Division materialize or not.

The ULR contract mechanism should allow for standard licensing terms, regardless of company size, market position, or relationship with the ULR contract owner. IPXI advocates that its market-based pricing allows for FRAND licensing.¹¹¹ In May 2012, IPXI adopted its Exchange Rulebook,¹¹² and the platform officially launched in June 2013, with two offerings: a stored value card technology held by patentee JPMorgan Chase, and an OLED technology for display screens held by patentee Philips.¹¹³ “The OLED ULR contract offering will be issued in three tranches: Tranche A; Tranche B; and Tranche C.”¹¹⁴ The fair market price of the OLED ULR contract, estimated by IPXI, is forty-five dollars for five square meters of OLED display per ULR contract.¹¹⁵ “The Tranche A OLED ULR contract price is \$36.00 per ULR contract. The Tranche C price will be the fair market price.”¹¹⁶ Therefore, except for Tranche C, the pricing mechanism is not fully market-based, but already offers great opportunities in terms of fairness, as it allows for all participants to have access to technologies at the same price.¹¹⁷ In particular, this is important for small market participants such as start-ups, universities,

108. *Id.* at 6. (The statement was undertaken pursuant to the Department of Justice’s Business Review Procedure, 28 C.F.R. § 50.6 (2012)).

109. *Id.* at 8.

110. *Id.* at 4.

111. See FAQs IPXI, *supra* note 104.

112. See *Press Releases*, IPXI (May 4, 2013), available at <http://www.ipxi.com/media/newsreleases/Intellectual-Property-Exchange-International-Announces-Exchange-Rules> (last visited April 15, 2014).

113. See *URL Contracts Overview*, IPXI available at <http://www.ipxi.com/offerings/ulr-contracts.html> (last visited April 15, 2014).

114. *Preliminary Offering Memorandum ULR Contracts, Series OLED*, IPXI 7 (June 5, 2013) http://72775af0e87bf6ae26d0-9bfc6ca5134d5b990b8db1540dcc115b.r43.cf1.rackcdn.com/uploads/offering_memorandum/document/2676/Offering_Memorandum_-_Series_OLED.pdf.

115. See *id.*

116. *Id.*

117. *Id.*

and actors in developing countries who do not enjoy favorable leverage in negotiations.¹¹⁸ In the upcoming section, I will assess whether patent markets such as IPXI can be a relevant incentive to enhanced technology diffusion as well as an appropriate tool to establish and fulfill FRAND licensing terms.

IV. PATENT MARKETS: TOOLS TOWARDS ENHANCED TECHNOLOGY DIFFUSION AND FULFILLMENT OF FRAND LICENSING COMMITMENTS?

We saw that technology diffusion and FRAND licensing commitments are necessary to enhance innovation, meet global challenges, and develop sound standards. In this section I will thus identify and assess which patent markets' features favor technology diffusion, as well as the possibility of using patent markets in order to interpret and implement FRAND licensing commitments.

A. Features Favoring Technology Diffusion

Intellectual property markets seem to present many advantages in favor of technology diffusion. As stated by a commentator reacting to the launching of the IPXI platform, “[t]his is simpler, faster and cheaper than the lawyer-intensive process of negotiating bilateral licenses for intellectual property, the high cost of which discriminates against small companies, leaves patents unused on the shelf and hampers innovation.”¹¹⁹ In making technologies more accessible, intellectual property markets should trigger enhanced technology diffusion. I will now briefly present five features that appear relevant in enhancing technology diffusion.

1. Time Efficiency

Licensing intellectual property rights takes a lot of time. As stated by a specialist in the field, “licensing remains highly inefficient, it often take 6 to 18 months to complete a deal, and this comes at a significant costs.”¹²⁰ With the help of intellectual property market platforms, it is or will be possible to purchase intellectual property rights or enter into licensing agreements within days or weeks. In a time when technologies are often outdated after a few months, it seems absolutely necessary to be able to conclude licensing agreements or purchase intellectual property rights very rapidly. Time efficiency is also important because it strongly decreases the legal costs of transactions. The adoption of a time efficient approach to intellectual property licensing and trading should thus enhance technology diffusion by offering

118. *Id.*

119. *An intellectual property exchange marketplace of ideas*, ECONOMIST, May 12, 2012, available at <http://www.economist.com/node/21554540>.

120. Malackowski et al., *supra* note 84, at 3.

quicker and cheaper access to technologies, benefiting buyers and sellers as well as licensors and licensees, and, ultimately, final consumers.

2. Transparent Access

Intellectual property markets are usually transparent platforms. In the IPXI system, ULR prices are for example publicly available. Transparency is very important as a factor enhancing technology diffusion because it builds trust among participants and thus encourages licensing and intellectual property trading. Transparency also leads to adequate price discovery. This is particularly relevant for small actors such as start-ups, university laboratories, and research centers that do not enjoy leverage in negotiations. As stated by commentators, publication of patent assignment and license terms “will help rationalize patent transaction, turning them from secret, one-off negotiations into a real, working market for patents.”¹²¹ In the same line, IPXI’s obligation to purchase for oneself and to use purchased ULRs within one-year aims at avoiding patent trolls and enhancing the platform’s transparency. It is expected that the availability of a transparent market will encourage actors to enter into more frequent licensing agreements and ultimately foster more innovative R&D schemes.

3. Equitable and Non-Exclusive Access to Technologies

Intellectual property rights holders have the right to refuse licenses on any terms.¹²² As a rule, firms tend therefore to avoid entering into licensing agreements with competitors. However, we saw with post-standard licensing commitment violations, and notably the *Broadcom* case illustration,¹²³ that defensive behaviors by firms are detrimental to innovation and technology diffusion, and sometimes anticompetitive under the Sherman Act. Small actors in particular are prevented from having access to necessary technologies in order to develop innovative products. At the international level, discriminatory licensing strategies with respect to pharmaceutical, agrochemical, and environmental technologies have put a heavy burden on developing countries. Often discriminatory licensing prevents developing countries from gaining

121. Mark A. Lemley & Nathan Myhrvold, *How to Make a Patent Market*, 38 HOFSTRA L. REV. 257, 258 (2007) available at http://scholarlycommons.law.hofstra.edu/cgi/viewcontent.cgi?article=2304&context=hlr&sei-redir=1&referer=http%3A%2F%2Fscholar.google.com%2Fscholar%3Fhl%3Den%26q%3DHOW%2BTO%2BMAKE%2BA%2BPATENT%2BMARKET%26btnG%3D%26as_sdt%3D1%252C50%26as_sdt%3D#search=%22HOW%20MAKE%20PATENT%20MARKET%22.

122. 35 U.S.C. § 271(d) (2006). See generally *United States v. Gen. Elec. Co.*, 272 U.S. 476 (1926); *Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 429–30 (1908).

123. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 305–6, 323 (3d Cir. 2007).

access to technologies necessary to their development.¹²⁴ By providing non-discriminatory and non-exclusive access to intellectual property assets, intellectual property markets such as IPXI ensure that all interested actors can have access to technologies, while allowing for revenue maximization for rights holders. However, it should be flagged that patent markets' relevance is limited to the assets included in the market, and that therefore it will always be necessary for those acquiring rights through a market to make sure that the technology they wish to produce is not covered by intellectual property rights outside of the market.

4. Fair Pricing and Reduction of Legal Costs in Licensing Process

It is still unsure how patent markets will handle the pricing of patents. As discussed in Section III, in the IPXI system ULR contract offerings will take place under two possible mechanisms: a sealed bid auction with an undisclosed minimum price, or customized offerings to ensure demand-based pricing, after an initial assessment by IPXI. It will therefore be necessary to wait until the platform is operational to assess whether the pricing mechanism offered by IPXI will be a truly market-based and to thus assess the opportunities presented with respect to fair pricing. Nevertheless, potential for market-determined price is an important feature of patent markets. It would allow for an industry as whole to ultimately agree on what price they are ready to pay for a given technology. But the pricing mechanism, even as presented now, already offers great opportunities in terms of fairness as it allows for all participants to have access to technologies at the same price. In particular, this is important for small market participants such as start-ups and universities who do not enjoy favorable leverage in negotiations. As underlined by a specialist in the field, "many small to mid-cap companies refrain from open innovation policies because licenses are unilaterally determined by [intellectual property] owners with stronger bargaining positions."¹²⁵ In a market approach however, all actors should be equal in their capacity to gain access to technologies. With

124. India for example has had tremendous difficulties in entering into licensing agreements with respect to chlorofluorocarbon substitutes after its ratification of the Montreal Protocol. See notably U.N. DEV. PROGRAMME, HUMAN DEVELOPMENT REPORT 2001 – MAKING NEW TECHNOLOGIES WORK FOR HUMAN DEVELOPMENT, at 109 (Oxford University Press 2001), available at <http://hdr.undp.org/en/content/human-development-report-2001>; Jayashree Watal, *Case Study 3* India: The Issue of Technology Transfer in the Context of the Montreal Protocol*, United Nations Conference on Trade and Development, *Achieving Objectives of Multilateral Environmental Agreements: A Package of Trade Measures and Positive Measures*, at 45-46, UNCTAD/ITCD/TED/6 (Veena Jha & Ulrich Hoffman eds.).

125. Matthew F. Jones, *IP Lawyer Finds Opportunity in New Industry: The Intellectual Property Exchange*, 58 THE FED. LAWYER, 16, 17 (Jan. 2011) (interviewing Ian McClure, an intellectual property transactional associate at IPXI).

respect to IPXI for example, all participants can acquire ULR contracts on an as-needed basis and on standardized terms. Patent markets hence appear as an answer to the fundamental issue of leverage in licensing and trading negotiations, and the emergence of these markets will undoubtedly give new actors access to technology. For sure, market-determined prices are not free, and in instances such as the licensing of medicines or environmental technologies, may be still considered too high. For this reason, patent markets should not be seen as an alternative to national and international negotiations on differentiated licensing regimes for technologies that are vital to human health or to the mitigation of climate change. Because market prices are also interesting for rights holders in maximizing their revenues, the market approach furthermore ensures that competitive products will be offered.

5. Inclusion of Patented Technology or Application Necessary to a Unit in ULR Contracts

In the IPXI system, ULR contracts require that all patented technologies or applications held by rights' holders, at the time of issuance or later developed, which are essential to a unit-base must be included in the ULR contract.¹²⁶ Rights holders also have the possibility to add a voluntary Know-How Warrant. In the absence of more details on these features, it will be necessary to wait and see how the inclusion obligation will be implemented and what will be considered as an 'essential' technology. The inclusion of patented technologies or applications necessary to licensed rights is fundamental from a technology diffusion perspective because it allows for technologies to be properly understood and therefore used to their full extent. One can therefore hope that the inclusion obligation will be strictly implemented and efficiently supervised. With respect to the definition of 'essential,' it seems that IPXI will have to find a working balance between licensors' and licensees' interests.

This brief overview demonstrates that there are many intellectual property market features that are relevant tools in encouraging enhanced technology diffusion. As stated by a specialist in the field, "the provision of efficient outlets for monetizing IP simultaneously facilitates the transfer of technology and accelerates innovation."¹²⁷ Of the four issues identified in section I.A., intellectual property markets address three, such as the lack of transparency in the agreement processes, leverage concerns, as well as efficiency issues. In its statement presenting enforcement intentions regarding the planned exchange of IPXI's ULRs, the Antitrust Division of the U.S. Department of Justice flagged that "IPXI's proposal has the potential to facilitate more efficient licensing by

126. FAQs IPXI, *supra* note 104.

127. McClure & Malackowski, *supra* note 17, at 1.

increasing transparency regarding the patents in a ULR and obviating the need for costly bilateral negotiations.”¹²⁸ The statement further recognized that these benefits might ultimately profit downstream consumers.¹²⁹

From the point of view of right holders, the incentive to join patent markets first comes from lower transaction and enforcement costs.¹³⁰ Second, it is fair to assume that right holders join patent markets because they are equally interested in purchasing and entering into agreements with other right holders. Third, patent markets offer a responsive valuation mechanism, a “fundamental earmark of a viable private transactional institution.”¹³¹ The success of the IPXI platform proves that there is a strong incentive for right holders to join and participate in patents markets. IPXI’s Founding Members include Com-Pac International, Ford Global Technologies LLC, Hewlett-Packard Company, Philips Electronics, Sony Corporation of America, Columbia University Technology Ventures, and the University of Southern California.¹³² These “Founding Members have committed to sponsor offerings on the Exchange with an aggregate target market value in excess of \$750 million.”¹³³

However, and as previously discussed, patent and other intellectual property markets will not be the ultimate solution to all the challenges facing intellectual property regimes nowadays. It is therefore doubtful that intellectual property markets can fully address the industry’s general dissatisfaction with the available legal framework. Furthermore, it cannot be guaranteed that patent markets will carry all or most of the necessary, edge-cutting technologies. Arguably, patent markets may appear more or less relevant depending on the industry concerned.¹³⁴ Finally, patent markets do not address issues of free licensing and may be ill suited to trade technologies that are vital to human health or to the mitigation of climate change. But patent markets are certainly a material step in enhancing technology diffusion while bringing appropriate answers to legal challenges such as issues of discrimination in licensing. I will

128. Letter from William J. Baer, *supra* note 106, at 6–7.

129. *Id.* at 7.

130. On the incentive to join collective intellectual property rights institutions *see, e.g.*, Merges, *supra* note 26, at 1324–27. This was also recognized in the Antitrust Division of the U.S. Department of Justice’s statement, which noted that “efficiencies may also benefit rights’ holders who currently expend resources to establish a licensing program.” Letter from William J. Baer, *supra* note 106, at 7.

131. Merges, *supra* note 26, at 1311.

132. *See Founding Members*, IPXI TRADING INNOVATION, <http://www.ipxi.com/inside-ipxi/founding-members.html> (last visited Aug. 2, 2013).

133. *See U.S. Department of Justice Concludes Eight-Month Review of IPXI Licensing Model*, IPXI TRADING INNOVATION, <http://www.ipxi.com/component/content/article/12-news/press-releases/90-doj-concludes-review-of-ipxi.html> (last visited Aug. 2, 2013).

134. If we look at IPXI’s members, we nevertheless see that they cover a very broad range of industries. *See FAQs IPXI*, *supra* note 104.

now assess the relevance of market-established patent licensing prices as criteria in interpreting FRAND licensing terms in, and outside of, courts.

B. Market-Established Prices as Criteria in Interpreting FRAND Licensing Terms

We saw in section I.B. that although FRAND licensing commitments appear central to the policing of standard setting, practice has shown that they have been very difficult to implement and enforce. More than fifteen years ago, the FTC, followed by courts, started to sanction patent hold-up conduct and interpret FRAND licensing commitments. But it has been a difficult task for both the FTC and courts,¹³⁵ leading some commentators to argue that these institutions were ill-suited to interpret FRAND terms. For example, Professor Merges stated that “[i]n the intellectual property field, . . . the assumption of court valuation is unrealistic.”¹³⁶ Provided that we accept the premise that market price is fair and reasonable, patent markets seem relevant as a tool to interpret and fulfill FRAND licensing commitments. Moreover, they appear useful in providing non-discriminatory access to licensing agreements.

In *Broadcom*, the Third Circuit concluded that Broadcom had stated claims for monopolization and attempted monopolization under § 2 of the Sherman Act, reversing in part the District Court’s dismissal of the case for failure to state a claim.¹³⁷ Qualcomm had promised to license its patents on FRAND terms but had reneged on those promises after it succeeded in having its technology included in a standard. Nevertheless, the District Court held that Qualcomm enjoyed a legally sanctioned monopoly in the patented technology.¹³⁸ In reversing in part and remanding the case for further proceedings consistent with its opinion, the Third Circuit recognized and sanctioned Qualcomm’s anticompetitive conduct. However, it fell short of interpreting the content of Qualcomm’s FRAND licensing commitment. In 2009, Qualcomm and Broadcom reached settlement and entered into mutual licensing agreements.¹³⁹ “Under the agreement, the companies have granted certain rights to each other under their respective patent portfolios.”¹⁴⁰ After

135. As flagged in section I.B., a notable exception to that respect is the recent opinion in the *Microsoft Corp. v. Motorola* case. *Microsoft Corp. v. Motorola, Inc.*, No. C10–1823JLR, 2013 WL 2111217 (W.D. Wash., 2013).

136. Merges, *supra* note 26, at 1308.

137. *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 305-17, 323 (3d Cir. 2007).

138. *Broadcom Corp. v. Qualcomm Inc.*, No05–3350 (MLC), 2006 WL 2528545, at 5–12. (D.N.J., 2006).

139. See Press Release, Broadcom, Qualcomm and Broadcom Reach Settlement and Patent Agreement, available at <http://www.broadcom.com/press/release.php?id=s379764> (last visited Aug. 2, 2013).

140. *Id.*

years of costly judicial proceedings, the parties decided to settle their dispute outside of courts.

The Third Circuit acknowledged the existence of a FRAND licensing obligation in *Broadcom*, but without giving substance to the obligation we can wonder how holdings on FRAND licensing commitments can succeed in ensuring that deceived competitors will actually gain fair, reasonable, and non-discriminatory access to technologies included in standards. Courts' behaviors can nevertheless be explained by the lack of transparency in the licensing industry. Indeed, courts and experts may well be unable to assess and establish fair and reasonable licensing terms for that only few private actors know what these terms should be and have no interest in disclosing them. However, it seems necessary to reach more satisfactory outcomes.

As presented in section I.B., and as underlined by the FTC in its statement before the United States Senate Committee on the Judiciary in July 2012, remedies that reduce the chance of patent hold-up can encourage innovation by increasing certainty for firms investing in standard-compliant products and complementary technologies. Reducing hold-up also better aligns the reward from innovation with its true value to consumers.¹⁴¹ The possibility of developing a market/efficiency-based framework for evaluating FRAND licensing terms has been suggested by Daniel Swanson and William Baumol.¹⁴² Building upon their approach, I propose that patent markets appear relevant in assisting courts when establishing FRAND licensing terms or in fulfilling these terms outside of courts. Actually, IPXI advocates that its “market-based pricing allows for [FRAND] licensing.”¹⁴³

There are three cumulative elements in FRAND terms: fairness, reasonableness, as well as non-discrimination. Patent markets can fulfill these elements. First, we saw in section IV.A. that most markets have taken a non-discriminatory as well as non-exclusive approach to trading and licensing. This is notably the case of IPXI. Intellectual property market platforms could hence be used in order for competitors to have access to necessary intellectual property assets once a standard has been set. Second, to the extent that market-established pricing is ensured, such prices seem fair in the sense that all actors, regardless of their leverage power, will benefit from the same price for a given intellectual property asset. Third, market-established prices should appear reasonable in the sense that they will be established by the purchasing industry itself. In its statement presenting enforcement intentions regarding the planned

141. *Oversight of the Impact on Competition of Exclusion Orders to Enforce Standard-Essential Patents: Hearing Before the S. Comm. on the Judiciary*, *supra* note 3, at 9–10.

142. Daniel G. Swanson & William J. Baumol, *Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power*, 73 ANTITRUST L.J. 1 (2006).

143. See FAQs IPXI, *supra* note 104.

exchange of IPXI's ULRs, the Antitrust Division of the U.S. Department of Justice noted that "[i]f IPXI's model can facilitate and advance F/RAND licensing, it may generate significant efficiencies."¹⁴⁴ This statement establishes that the application of patent markets to the implementation of FRAND licensing commitments is absolutely realistic. As stated earlier, market-established prices differ from free licensing but a free licensing approach was never envisaged in FRAND licensing negotiations. Because most patent markets meet the three cumulative conditions of FRAND terms, they seem relevant in either guiding courts when interpreting FRAND commitment's content, or in implementing FRAND commitments by making the technology at stake available at fair and non-discriminatory prices. Patent markets are furthermore appropriate in the FRAND licensing scheme because they allow for quick settlement. They are hence relevant tools for SSOs, R&D actors, and courts, even if, as stated by a distinguished commentator, intellectual property assets "are more like works of art than stocks"¹⁴⁵ and will therefore always remain difficult to evaluate.

CONCLUSION

While our everyday life depends on interconnected cutting-edge technologies, many technological challenges are still awaiting. Technology diffusion and FRAND licensing commitments are necessary to enhance innovation, meet global challenges, and develop sound standards. Because the current available legal options are not sufficient in promoting technology diffusion and in implementing FRAND licensing commitments, this article suggests that emerging patent markets could be relevant tools in assisting both interests. My assessment demonstrated that patent markets can enhance technology diffusion by providing efficient, transparent, and equitable access to technologies at fair market prices. I equally suggested that patent markets such as the IPXI platform provide innovative strategies, allowing for patented technologies and other necessary applications to be included in a licensing or trading transaction. With respect to the implementation of FRAND commitments, I established that most patent markets fulfill the three cumulative conditions of FRAND terms, *i.e.* fairness, reasonableness, and non-discrimination. Patent markets therefore seem relevant in either guiding courts when interpreting the content of FRAND commitments or in implementing such commitments. For these reasons, I believe that patent markets present very interesting opportunities for both technology diffusion and for the implementation of FRAND licensing commitments. Moreover, right holders

144. Letter from William J. Baer, *supra* note 106, at 7.

145. Lohr, *supra* note 93.

equally seem to find strategic interests in the patent markets. The emerging markets are hence hopeful developments in the intellectual property world. However, it is important to underline that there will be so much the markets will be able to do and that they alone cannot be the answer to all the tremendous challenges faced by intellectual property regimes nowadays. While we can look forward to the opportunities brought by intellectual property markets, scholars, and practitioners must therefore continue to think about efficient and innovative legal developments so that intellectual property regimes meet today's society needs.