PATENT PLEDGES

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ABSTRACT

An increasing number of firms are making public pledges to limit the enforcement of their patents. In doing so, they are entering a little-understood middle ground between the public domain and exclusive property rights. The best-known of these patent pledges are FRAND commitments, in which patent holders commit to license their patents to manufacturers of standardized products on terms that are "fair, reasonable and non-discriminatory." But patent pledges have been appearing in settings well beyond standard-setting, including open source software, green technology and the life sciences. As a result, this increasingly prevalent private ordering mechanism is beginning to reshape the role and function of patents in the economy.

Despite their proliferation, little scholarship has explored the phenomenon of patent pledges beyond FRAND commitments and standard-setting. This article fills this gap by providing the first comprehensive descriptive account of patent pledges across the board. It offers a four-part taxonomy of patent pledges based on the factors that motivate patent holders to make them and the effect they are intended to have on other market actors. Using this classification system, it argues that pledges likely to induce reliance in other market actors should be treated as "actionable"

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and legally-enforceable, whereas others should not. And to provide the highest degree of market awareness and enforceability for actionable pledges, it calls for the creation of a state-sponsored public registry of patent pledges, accompanied by suitable governmental incentives for registration.

INTRODUCTION

In 2014, Elon Musk, the outspoken founder of Tesla Motors, surprised the automotive industry by announcing that the electric vehicle maker will no longer "initiate patent lawsuits against anyone who, in good faith, wants to use our technology."[1] Musk's announcement, which effectively slashed the value of Tesla's sizeable patent portfolio, prompted a flurry of media commentary ranging from praise to cynicism.[2] Just six months later, automotive giant Toyota followed Tesla's lead, announcing that it, too, would permit the free use of nearly 5,700 patents covering fuel cells for hydrogen-powered vehicles.[3]

Why would Tesla and Toyota, poised at opposite ends of the automotive spectrum, seemingly surrender valuable troves of hard-won patents for nothing?[4] Making pledges such as these diminishes the patent holder's

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1. Elon Musk, *All Our Patents Are Belong to You*, TESLA BLOG (June 12, 2014), http://www.teslamotors.com/blog/all-our-patent-are-belong-you; *see also infra* notes 161–166 and accompanying text.

2. Jerry Hirsch & Tiffany Hsu, *Elon Musk Opens up Tesla Patents; It 'Isn't Entirely Altruistic'*, L.A. TIMES (June 12, 2014, 3:48 PM), http://www.latimes.com/business/autos/la-fi-hy-elon-musk-opens-tesla-patents-20140612-story.html#page=1; Alexander C. Kaufman, *Tesla's Clever Patent Move Is Already Paying Off*, HUFFINGTON POST (June 18, 2014, 12:59 PM), http://www.huffingtonpost.com/2014/06/16/tesla-patent-supercharger-station_n_5500724.html; Kristen Korosec, *The One Asterisk on Tesla's Patent Giveaway*, FORTUNE (June 13, 2014, 4:37 PM), http://fortune.com/2014/06/13/the-one-asterisk-on-teslas-patent-giveaway/; *Tesla Head Elon Musk's 'High-Risk' Patent Gamble*, BBC NEWS (June 13, 2014, 1:09 PM), http://www.bbc.com/news/blogs-echochambers-27823166; Trefis Team, *What Tesla Stands to Gain from Sharing Its Patents*, FORBES (June 16, 2014, 1:39 PM), http://www.forbes.com/sites/greatspeculations/2014/06/16/what-tesla-stands-to-gain-from-sharing-its-patents/ ("This is a smart move that should not have any impact on Tesla's position as a market leader of electric vehicles.").

3. *Toyota Opens the Door and Invites the Industry to the Hydrogen Future*, TOYOTA USA NEWSROOM (Jan. 5, 2015), http://www.toyotanewsroom.com/releases/toyota+fuel+cell+patents+ces+2015.htm.

4. In May 2015, Ford Motor Company, apparently hoping to jump onto the patent pledge bandwagon, publicly offered to license 1,650 or so patents and patent applications covering electrified vehicles. *See Ford Opens Portfolio of Patented Technologies to Competitors to Accelerate Industry-Wide Electrified Vehicle Development*, FORD MEDIA CTR. (May 28, 2015), https://media.ford.com/content/fordmedia/fna/us/en/news/2015/05/28/ford-opens-portfolio-of-

otherwise unlimited right to exploit its property and seemingly flies in the face of economic logic. Yet Tesla and Toyota are far from the first firms to pledge their patents to the public. Beginning in the 1990s, large firms in the computing and software industries began to champion open source code platforms such as Linux and Android. They demonstrated that business models based on tight control over intellectual property are not the only viable pathways to innovation and product development. To support the growth of these emerging open source platforms, firms like IBM and Google each pledged not to assert hundreds of patents against open source products.[5]

Yet none of these firms has entirely forsaken the patents covering its innovations. Unlike patent holders that willingly cede their rights to the public domain, these firms retain ownership of, and the ability to exercise at least some rights in, their patents.[6] Their voluntary commitments thus occupy a largely uncharted middle ground between the full commercial exploitation of patent rights and the abandonment of those rights to the public domain.[7]

In recent years, the number of firms venturing into this middle ground has grown. For example, Monsanto, the world's leading producer of genetically-modified seeds, has publicly committed not to enforce its patents against farmers when trace amounts of patented genetic material

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patented-technologies-to-competitors-to-.html. Ford's commitment was of a different nature than Tesla's and Toyota's, however, as Ford merely offered to license its patents to others without making any commitment as to the fees that might be charged for such licenses. As such, Ford's commitment was more akin to the implicit invitation made by every university and patent holding company to potential licensees to come discuss the terms on which patents might be available for licensing.

5. *See infra* notes 23–24 and accompanying text.

6. One of the most important of these retained rights is known as "defensive suspension," in which the patent holder may suspend a license that has been granted to a licensee that brings a patent infringement suit against the patent holder. *See* ABA COMM. ON TECH. STANDARDIZATION, SECTION OF SCI. & TECHN. LAW, STANDARDS DEVELOPMENT PATENT POLICY MANUAL 62–67 (Jorge L. Contreras ed., 2007) [hereinafter ABA PATENT POLICY MANUAL].

7. Gideon Parchomovsky and Michael Mattioli propose the creation of lesser patent-like rights (semi-patents and pseudo-patents) to achieve similar ends, and observe that firms in so-called communities of innovation (patent pools and other collaborative relationships) may implement these structures through private ordering mechanisms. Gideon Parchomovsky & Michael Mattioli, *Partial Patents*, 111 COLUM. L. REV. 207, 236 (2011) ("Unbound by precedent or politics, the private contracts used by communities of innovation can be finely tuned to optimize the semi-patent and quasi-patent forms during the initial pilot phase of our proposal.").

appear in their fields by "inadvertent means."[8] And dozens of firms ranging from home-swapping website Airbnb to cloud storage giant Dropbox have committed not to enforce their software patents against businesses with twenty-five or fewer employees.[9] In fact, over the past decade, hundreds of major patent holders across a broad range of industries have made pledges limiting their ability to assert thousands of patents.

These *patent pledges* share several key characteristics: they are commitments made voluntarily by patent holders to limit the enforcement or other exploitation of their patents. They are made not to direct contractual counterparties, but to the public at large, or at least to large segments of certain markets.[10] And they are made without any direct compensation or other consideration.

The best-known category of patent pledge today is the so-called FRAND commitment, in which patent holders promise to license their patents to manufacturers of standardized products on terms that are "fair, reasonable and non-discriminatory." Patents covering well-known standards such as 4G LTE, Wi-Fi, H.264, and hundreds of others are subject to such pledges. To date, courts, governmental agencies and commentators have devoted substantial attention to FRAND commitments and the potential legal issues that they raise, resulting in the emergence of a large literature.[11] But, as

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8. *Monsanto's Commitment: Farmers and Patents*, MONSANTO, http://www.monsanto.com/newsviews/pages/commitment-farmers-patents.aspx (last visited Nov. 4, 2015).

9. THE PATENT PLEDGE, http://thepatentpledge.org/ (last visited Nov. 4, 2015) [hereinafter Software Small Business Pledge].

10. In this respect patent pledges differ from more individualized patent pool and sublicensing structures that may seek to achieve similar results. For example, the Medicines Patent Pool (MPP) is a well-known charitable enterprise that seeks licenses of pharmaceutical products from their developers and then grants low-cost sublicenses to generic drug manufacturers in the developing world. Medicines Patent Pool, *About the MPP*, http://medicinespatentpool.org/about (last visited Nov. 4, 2015). Contributions of patents to the MPP would not be considered patent pledges because the sublicenses of patents to generics manufacturers are granted on a bilateral basis pursuant to negotiated license agreements.

11. *See, e.g.*, Jorge L. Contreras, *Patents, Technical Standards and Standard-Setting Organizations: A Survey of the Empirical, Legal and Economics Literature*, *in* 2 RESEARCH HANDBOOK ON THE ECON. OF INTELLECTUAL PROP. LAW–ANALYTICAL METHODS (Peter S. Menell & David Schwartz, eds., 2016, forthcoming) [hereinafter Contreras, *Survey*] (summarizing the literature); Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603 (2007); Jay P. Kesan & Carol M. Hayes, *FRAND's Forever: Standards, Patent Transfers, and Licensing Commitments*, 89 IND. L.J. 231 (2014); Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889 (2002) [hereinafter Lemley, *Standard-Setting Organizations*]; Mark A. Lemley, *Ten Things to do About Patent Holdup of Standards (and One Not To)*, 48 B.C. L. REV. 149 (2007) [hereinafter Lemley, *Ten Things*]; Josh Lerner & Jean

noted above, patent pledges have been appearing in fields and settings well beyond technical standard-setting, and are impacting widening swaths of the global technology economy. As a result, this increasingly prevalent private ordering mechanism is reshaping conventional notions regarding the role and function of patents in the economy.[12]

This article, for the first time, widens the analytical lens to focus on patent pledges across the board. Drawing on both existing catalogs of commitments made within standards-development organizations (SDOs)[13] and a unique public database of non-SDO patent commitments,[14] it contributes to the literature a taxonomy of four fundamental categories of patent pledges. These basic categories are defined both by the motivations that drive patent holders to make them, and the effect that they are intended to have on other market actors. This taxonomy is useful, among other things, in assessing the legal enforceability of different pledges.

Tirole, *A Better Route to Tech Standards*, 343 SCI. 972 (2014); Doug Lichtman, *Understanding the RAND Commitment*, 47 HOUS. L. REV. 1023 (2010); Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 IND. L. REV. 351 (2007).

12. A small but growing literature has recently emerged debating whether standards-related patent pledges made outside the SDO setting should be afforded the same recognition as pledges made within SDOs. *See, e.g.*, Einer Elhauge, *Treating RAND Commitments Neutrally*, 11 J. COMPETITION L. ECON. 1 (2015); John D. Harkrider, *REPs Not SEPs: A Reasonable and Non-Discriminatory Approach to Licensing Commitments*, COMPETITION POL'Y INT'L ANTITRUST CHRON., Oct. 2013; Anne Layne-Farrar, *Moving Past The SEP RAND Obsession: Some Thoughts on the Economic Implications of Unilateral Commitments and the Complexities of Patent Licensing*, 21 GEO. MASON L. REV. 1093 (2014); Nadia Soboleva & Lawrence Wu, *Standard Setting: Should there be a Level Playing Field for All FRAND Commitments*?, COMPETITION POL'Y INT'L ANTITRUST CHRON., Oct. 2013.

13. *See* Jorge L. Contreras, *Technical Standards and Ex Ante Disclosure: Results and Analysis of an Empirical Study*, 53 JURIMETRICS 163, 182–83 (2013) [hereinafter Contreras, *Ex Ante*]; Lemley, *Standard-Setting Organizations*, *supra* note 11; Rudi Bekkers & Andrew Updegrove, *A Study of IPR Policies and Practices of a Representative Group of Standard Setting Organizations Worldwide*, U.S. NAT'L ACAD. OF SCI., 27–30 (Oct. 3, 2012), http://sites.nationalacademies.org/xpedio/groups/pgasite/documents/webpage/pga_072197.pdf.

14. This database is overseen by the author and maintained at American University Washington College of Law. Jorge L. Contreras, *Non-SDO Patent Statements and Commitments*, PROGRAM ON INFO. JUSTICE & INTELLUAL PROP. (June 11, 2015), http://www.pijip.org/non-sdo-patent-commitments/ [hereinafter Patent Pledge Database]. The Patent Pledge Database, which is the only public resource devoted to patent pledges made outside of SDOs, identifies each firm making a pledge, the date of the pledge, the patents, technologies and standards covered, the nature of the pledge, and its online location. As of this writing, more than 150 different non-SDO patent pledges covering thousands of patents have been cataloged in the Patent Pledge Database. *Id.*

Category 1: Inducement — lowers patent barriers to induce market participants to adopt a particular standard or technology platform that is favored by the pledgor.

Category 2: Collective Action — advances the achievement of a collective goal that is beneficial to the pledgor.

Category 3: Voluntary Restraint — restrains the pledgor's ability to assert its patents, often addressing concerns of governmental authorities.

Category 4: Philanthropic — advances a social cause or other public good with concomitant public relations benefits to the pledgor.

This article proceeds in three parts. Part I offers the first broad descriptive survey of patent pledges, including those made in the standards-development context and elsewhere. It catalogs the principal components and features of patent pledges, offering a vocabulary that is necessary to develop a systematic analytical framework. Part II establishes a four-part analytical taxonomy of patent pledges based on the economic and other motivations underlying their creation and the effect they are intended to have on other market actors. Based on this taxonomy, it argues that pledges that are intended primarily to induce reliance by others should be considered actionable or enforceable, and those that will not induce significant action or forbearance by others, should not. Part III further explores the boundaries of enforceability of patent pledges, identifying three primary pitfalls associated with such commitments: obscurity, impermanence and transfer of underlying patents. To address these issues and solidify the legal foundation for the enforcement of patent pledges, it calls for the creation of a public repository and registration system for actionable patent pledges, coupled with governmental incentives for participation in this system.

I. THE LANDSCAPE OF PATENT PLEDGES

This Part offers a comprehensive, descriptive account of patent pledges today. It identifies the industry sectors in which pledges appear, the patents that they cover, the commitments that they embody, and the forms in which they are made. This catalog of the forms and structures of patent pledges supports the development of the analytical taxonomy described in Part II.

A. Industries and Markets

Generally speaking, four broad industry categories are represented by firms making patent pledges: information and communication technology (ICT), open source software, environmental/green technologies and

biopharma, pharmaceutical and chemistry technologies (life sciences). Technical standardization occurs in each of these industries, though much more heavily in the ICT sector than the others.

1. Information and Communication Technology (ICT)

Patent pledges, particularly those associated with standards-development activities, arise frequently in the information and communication technology (ICT) sector. This broad industry sector includes markets such as wireless telecommunications, networking, computing, consumer electronics, and data exchange. Many of the product categories typically associated with patent pledges are consumer-oriented devices such as smartphones, computers, game players, and home entertainment products manufactured by multinational firms such as Intel, Apple, Samsung, Huawei, Cisco, Microsoft, Ericsson, Verizon, AT&T, IBM, Sony, and Dell. But patent pledges also appear in numerous smaller business-to-business market segments such as avionics electronics,[15] automotive engineering,[16] and semiconductor fabrication.[17] And the firms that participate in ICT standardization are not exclusively large multinationals, as they also include many small and medium businesses, as well as research institutions and government agencies.

The firms that design and manufacture ICT products often collaborate to develop technical standards within SDOs. SDOs are typically organized as non-profit trade associations or consortia, and range from small groups of firms focusing on a single product category to large, international bodies that produce standards in a broad range of industries.[18] An illustrative group of international SDOs operating in the ICT sector is listed in Table 1 below.

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15. *See, e.g.*, *VITA Standards Organization*, VMEBUS INT'L TRADE ASS'N, http://www.vita.com/Policies (last visited Nov. 9, 2015).

16. *See, e.g.*, *SAE Standards*, SAE INT'L, http://standards.sae.org/automotive (last visited Oct. 12, 2015).

17. *See, e.g.*, *Standards*, SEMI INT'L, http://www.semi.org/Standards (last visited Nov. 9, 2015).

18. *See generally* EUROPEAN COMM'N–DIRECTORATE-GENERAL FOR ENTER. AND INDUS. (2014) 917720, PATENTS AND STANDARDS: A MODERN FRAMEWORK FOR IPR-BASED STANDARDIZATION 31–33 (2014), [hereinafter EC PATENTS AND STANDARDS REPORT]; Brad Biddle, et al., *The Expanding Role and Importance of Standards in the Information and Communications Technology Industry*, 52 JURIMETRICS 177, 181–91 (2012) (describing structural variation among SDOs); Dieter Ernst, *America's Voluntary Standards System—A "Best Practice" Model for Innovation Policy?*, EAST-WEST CENTER WORKING PAPERS, ECONOMICS SERIES, No. 128 (Feb. 2012), at 12 (classifying standardization groups).

Table 1
Selected Standards-Development Organizations (SDOs)
in the ICT Sector

SDO	Area(s)	Well-known Standards
European Telecommunications Standards Institute (ETSI)	Wireless telecommunications	GSM (2G), UMTS (3G), LTE (4G)
IEEE Standards Association (formerly the Institute of Electrical and Electronics Engineers)	Networking	802.11 (Wi-Fi) Ethernet
International Organization for Standardization (ISO)	Various	ISO 9000, ISO 14000
International Telecommunications Union (ITU)	Telecommunications	H.264
Internet Engineering Task Force (IETF)	Internet	IP, TCP, HTTP
Worldwide Web Consortium (W3C)	Worldwide web	HTML, WWW, XML

Thousands of individuals from hundreds, if not thousands, of public and private sector organizations participate in each of the SDOs listed in Table 1. In addition to these large SDOs, hundreds of smaller consortia and associations actively develop and promote standards in the ICT sector.[19] Participation in these organizations can range from just a few individuals representing a handful of firms to several hundred.

2. Open Source Software

Open source software differs from typical commercial software not with respect to its technical features, but with respect to the legal rights associated with it. That is, software that is released on an open source basis is characterized by the availability, usually at no cost, of the software programmers' code (source code), and the user's right to modify that code,

19. For a catalog of standards consortia, see STANDARD SETTING ORGANIZATIONS AND STANDARDS LIST, http://www.consortiuminfo.org/links/linksall.php (last visited Nov. 9, 2015) (cataloging 935 different consortia and other standards-development organizations).

typically with no obligation to the original developer.[20] Open source code first gained a following in the early 1990s with the GNU suite of software tools, but has since come to encompass widely adopted platforms and applications including the Linux and Android operating systems, the Firefox web browser, and the Apache web server.

Patent pledges relating to open source software have become increasingly common.[21] In 2004 and 2005, a group of firms including Nokia, Novell, Sun and others publicly announced that they would not assert patents against use of the Linux operating system.[22] Around the same time, several large patent holders issued blanket assurances covering substantial portfolios of patents and products. Among these were IBM's commitment not to assert approximately 500 patents against open source software products[23] and Google's more recent "Open Patent Non-Assertion Pledge" covering 241 patents.[24] Others, under the umbrella of the non-profit

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20. *The Open Source Definition*, OPEN SOURCE INITIATIVE, http://opensource.org/docs/osd (last visited Nov. 9, 2015).

21. It is important to distinguish between patent pledges relating to open source software and open source licensing itself. Open source licenses typically cover a particular set of software code, whether a fully executable program, a subroutine, or merely a few lines of code contributed to some other work. *See generally* MICHAEL L. RUSTAD, SOFTWARE LICENSING: PRINCIPLES AND PRACTICAL STRATEGIES 366–71 (2010); Richard Stallman, *Sun's No-Op Announcement*, ZDNET (Feb. 1, 2005, 3:25 PM), http://www.zdnet.com/suns-no-op-announcement-3039186078/ (Sun's open source code license "is a license for the copyright on software, not a policy for licensing patents. It applies to specific code and nothing else."). While the copyright owner may also be required under some open source licenses to grant licenses to operate under patents that cover the code, such patent licenses are generally limited to the particular code that was originally licensed by the copyright owner. Patent pledges relating to open source code, on the other hand, generally commit the patent holder with respect to *any* open source software covered by the pledge, and are not limited to code actually developed or distributed by the patent owner. *See* RUSTAD, *supra* note 21, at 375 (noting patent licensing requirements of GPLv3 and other open source software licenses); Greg R. Vetter, *Commercial Free and Open Source Software: Knowledge Production, Hybrid Appropriability, and Patents*, 77 FORDHAM L. REV. 2087, 2101–02 (2009).

22. *See, e.g.*, Press release, Nokia Corp., Nokia's Legally Binding Commitment Not to Assert Nokia Patents against the Linux Kernel (May 25, 2005), http:// www.patent-commons.org/commons/pledgesearch.php?displaypledge=27; Press Release, Java News Desk, Sun Opens Access to 1,600 Patents (Jan. 25, 2005), http://prod.cloudexpo2008west.sys-con.com/node/47906; Novell, Inc., *Patent Policy: Novell's Statement on Patents and Open Source Software*, http://www.novell.com/company/legal/patents (last visited Nov. 5, 2015).

23. IBM Corp., *IBM Statement of Non-Assertion of Named Patents Against OSS* (Jan. 11, 2005), http://www.ibm.com/ibm/licensing/patents/pledgedpatents.pdf.

24. The Google pledge is a commitment not to assert such patents against users of "free or open source software." *Open Patent Non-Assertion Pledge*, GOOGLE, INC., http://www.google.com/patents/opnpledge/pledge/ (last visited Oct. 12, 2015).

Open Web Foundation, have committed to license patents covering a wide range of open source software interfaces, tools and specifications.[25]

In addition to these pledges, which have been made independently by patent holders,[26] more than one thousand firms participate as "licensees" in the Open Invention Network (OIN). OIN was formed in 2007 as a vehicle for the promotion of the Linux open source operating system, and has since been expanded to OpenStack and other cloud computing technologies.[27] With funds that it receives from a small group of founding members,[28] OIN acquires patents and then licenses them on a royalty-free basis to all OIN licensees.[29] Licensees, in turn, pledge not to assert their own patents against the Linux/OpenStack community.[30] As such, OIN is one of the largest patent pledge communities on record.[31]

Standardization for software products, and particularly open source products, is conducted within SDOs such as OASIS and the Worldwide Web Consortium (W3C), but also emerges organically as software developers make available application programmer interfaces (APIs) and other features that enable other products to interoperate.[32] Resulting data structures, data exchange formats and security features can emerge as standards, much like the hardware-based standards prevalent in the ICT sector.

3. Green/Clean Technology

Patent pledges have increasingly been used to promote environmentally-friendly "green/clean" technologies. While the recent pledge made by Tesla

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25. *See Some Users of OWF Agreements*, OPEN WEB FOUNDATION, http://www.openwebfoundation.org/faqs/users-of-owf-agreements (last visited Oct. 12, 2015).

26. *See infra* Section II.D.1 (discussing the distinction between community and unilateral patent pledges).

27. Press Release, Open Invention Network, Open Invention Network Extends its Linux-Protective Network to Cover OpenStack Technologies (Dec. 30, 2013), http://www.openinventionnetwork.com/pressrelease_details/?id=3.

28. As of November 1, 2014, the funding members of OIN were Google, IBM, NEC, Novell, Philips, Red Hat, and Sony. *FAQ*, OPEN INVENTION NETWORK, http://www.openinventionnetwork.com/press-room/faqs/ (last visited Sept. 23, 2015).

29. *Id.*

30. *OIN License Agreement*, OPEN INVENTION NETWORK, §§ 1.1–1.2, http://www.openinventionnetwork.com/joining-oin/oin-license-agreement (last visited Sept. 23, 2015).

31. *See infra*, Table 6.

32. *See* Vetter, *supra* note 21, at 2090.

Motors[33] may have grabbed headlines, it is by no means the first such initiative in the area of green/clean technology. The most significant green patent pledge is probably the Eco-Patent Commons, a coalition of thirteen large firms including IBM, Nokia, Sony, DuPont, Dow, HP and Xerox, that have pledged not to assert specific patents against any technology that "reduces/eliminates natural resource consumption, reduces/eliminates waste generation or pollution, or otherwise provides environmental benefit(s)."[34] The group, which is now managed by the Environmental Law Institute in Washington, D.C.,[35] reports that over one hundred "eco-friendly patents" have been pledged by its members since it was formed in 2008.[36]

While the Eco-Patent Commons does not address issues of product standardization, numerous standardization efforts do exist in the realm of green products and technologies. Notable among these is the sustainable building materials sector, which is characterized by myriad standards and certification systems for products ranging from wallboard and flooring to carpeting and office furniture.[37] While patents have not yet emerged as significant factors in the standardization of sustainable building materials, it is likely that the prominence of patents will increase as new technologies are applied to increase the efficiency and decrease the environmental impact of these materials.[38]

One green tech sector in which patent issues have begun to impact standardization, thus encouraging the emergence of patent pledges, is the electrical "smart grid," a merger of the antiquated U.S. electrical power distribution system and the latest metering, monitoring and interconnection technologies.[39] Smart grid standardization has been identified by Congress as a national priority,[40] and a broad range of standards for smart grid

33. *See* Musk, *supra* note 1 and accompanying text.

34. *Eco-Patent Commons Ground Rules* 6, WORLD BUS. COUNCIL FOR SUSTAINABLE DEV., http://www.wbcsd.org/pages/adm/download.aspx?id=314&objecttypeid=7 (last visited Nov. 9, 2015) [hereinafter *EPC Ground Rules*].

35. ELI took over as administrator of the EPC in 2013. *Welcome to the Eco-Patent Commons*, ECO-PATENT COMMONS, http://ecopatentcommons.org (last visited Nov. 9, 2015). Prior to this, the EPC was administered by the World Business Council for Sustainable Development in Geneva.

36. *Frequently Asked Questions*, ECO-PATENT COMMONS, 14, http://ecopatentcommons.org/frequently-asked-questions#QA14 (last visited Nov. 9, 2015).

37. *See* Jorge L. Contreras & Charles R. McManis, *Intellectual Property Landscape of Material Sustainability Standards*, 14 COLUM. SCI. & TECH. L. REV. 485, 485 (2013).

38. *See id.*

39. *See* EC PATENTS AND STANDARDS REPORT, *supra* note 18, at 92–107; Jorge L. Contreras, *Standards, Patents and the National Smart Grid*, 32 PACE L. REV. 641, 641 (2012).

40. The Energy Independence and Security Act of 2007 (EISA) calls for the creation of a national Smart Grid to improve the reliability, efficiency, security, and cost-effectiveness of the

technologies are currently being analyzed and recommended to the National Institute for Standards and Technology (NIST) by an independent organization called the Smart Grid Interoperability Panel (SGIP).[41] The recent nationwide interest in smart-grid technologies led to public concern over a patent application filed by Southern California Edison, an electrical power utility, broadly claiming a method of communication between a utility and its customer locations.[42] Shortly after the appearance of critical news stories discussing the patent application,[43] Edison pledged that it would grant royalty-free licenses under the patent to all who sought them.[44]

4. Life Sciences

To date, technical standardization in the life sciences has advanced largely without the patent disputes that have emerged in the ICT and software sectors.[45] Several reasons have been proposed for this divergence, including the origin of many life science standards in academic and governmental settings without a strong emphasis on patenting or strong private sector engagement.[46] However, given the commercial potential of many bioscience technologies, some commentators have cautioned participants in emerging fields such as bioinformatics and synthetic biology to take steps to mitigate potential patent issues before they arise.[47]

Outside of standard-setting, however, patent disputes in the biosciences are common. Fields such as pharmaceuticals, biotechnology and

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U.S. electrical power grid. 42 U.S.C. § 17381 (2015). Among the key provisions of EISA is a requirement that standards be developed to enable interoperability among the many different components that will be necessary to implement the Smart Grid infrastructure. *Id*. §§ 1787–88.

41. *See SGIP History and Milestones*, SMART GRID INTEROPERABILITY PANEL, http://www.sgip.org/SGIP-History (last visited Nov. 9, 2015).

42. U.S. Patent Publication No. 2008-0177678 (filed Jan. 24, 2007).

43. *See, e.g.*, Phillip Bane, *Utility Attempts to Patent Advanced Metering*, SMART GRID NEWS (Sept. 11, 2008), http://www.smartgridnews.com/story/utility-attempts-patent-advanced-metering/2008-09-11.

44. S. CAL. EDISON, SCE LICENSE AGREEMENT FOR AMI USE CASES VERSION 2.2 (2008), https://www.sce.com/NR/rdonlyres/AEDDFE2D-E032-4B5F-8889-66599515148F/0/090208_Use_Case_License_Agreement.pdf.

45. *See* NAT'L RESEARCH COUNCIL, INTELLECTUAL PROPERTY CHALLENGES FOR STANDARD-SETTING IN THE GLOBAL ECONOMY 18–19 (Keith Maskus & Stephen A. Merrill eds., 2013) [hereinafter NAS REPORT].

46. *See id.*

47. *See, e.g.*, Jorge L. Contreras, Arti K. Rai & Andrew W. Torrance, *Intellectual Property Issues and Synthetic Biology Standards*, 33 NATURE BIOTECH. 24, 24 (2015); Jorge L. Contreras, *Legal Issues for Biological Research Standards*, 26 NATURE BIOTECH. 498, 498 (2008).

agricultural technology are replete with patent litigation and major transactions. Likewise, patent pledges have begun to emerge in these fields. For example, in 2006 four major research institutions led by the Massachusetts Institute of Technology (MIT) committed not to assert patents covering certain RNA-based technology "in order to facilitate widespread distribution of an important class of research reagents."[48]

Private sector biopharma firms have also begun to make patent pledges. In the wake of several lawsuits, chemical and agricultural giant Monsanto has pledged that it will not assert its genetically-modified seed patents against farmers when trace amounts of Monsanto genetic material appear in their crops through "inadvertent means" (e.g., windborne seeds that contaminate a field).[49] And diagnostics firm Myriad Genetics, which defended its patents in a high profile Supreme Court case in 2013,[50] has pledged that it will not assert patents to "impede non-commercial, academic research."[51] These and other patent non-assertion pledges in the biosciences, especially when coupled with the green tech pledges discussed in Section I.A.3 above, suggest that the phenomenon of patent pledges has moved well beyond its roots in the ICT sector.

B. Identifying Pledged Patents

Patent pledges may cover one to hundreds or thousands of patents, depending on how the pledged patents are identified. These patents may be identified either specifically (e.g., by patent number) or non-specifically (e.g., by describing a category into which such patents fall). In either case, in order for the pledge to be meaningful, the patents subject to the pledge must be able to be identified unambiguously and without undue effort on the part of the parties relying on the pledge.

Table 2 illustrates the range of mechanisms by which patent pledges may identify the patents subject to the pledge:

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48. Anatole Krattiger, *The Use of Nonassertion Covenants: A Tool to Facilitate Humanitarian Licensing, Manage Liability, & Foster Global Access*, *in* MIHR IP HANDBOOK OF BEST PRACTICES, 1739 (Anatole Krattiger et al eds., 2007) http://www.iphandbook.org/handbook/ch07/p06/.

49. *Monsanto, supra* note 8.

50. Assn. for Molecular Pathology v. Myriad Genetics, Inc., 133 S.Ct. 2107, 2111 (2013).

51. *The Myriad Pledge*, MYRIAD GENETICS, http://www.myriad.com/myriad-cares-2/the-myriad-pledge/ (last visited Nov. 5, 2015) [hereinafter *Myriad Pledge*].

Table 2
Number and Identification of Patents Included in Patent Pledges

Patents	Example[52]
Single specified patent	Southern California Edison's pledge to grant royalty-free licenses of a single patent covering a method of communicating between a utility and its customer locations
Multiple specified patents	Google's pledge not to assert 241 listed patents against open software implementations
Unspecified patents covering a single specification or standard	Open Web Foundation's Final Specification Agreement OWFa 1.0, covering all patents reading on the DMARC specification
Unspecified patents covering multiple specifications or standards	IBM's pledge not to assert patents against 27 standard specifications related to web services, electronic forms, or open document formats when implemented in the healthcare or education sectors
Unspecified patents covering a single class of products or entities	Multiple firms commit not to assert software patents against companies having fewer than 25 employees
All standards-essential patents	Ericsson's pledge to license all standards-essential patents on FRAND terms
All patents	Cisco's pledge not to transfer patents to non-practicing entities

Though the examples offered in *Table 2* are drawn from non-SDO patent pledges, each of these means of identifying patents can also be found within SDO pledges. In smaller SDOs operating in industries that are not heavily patented, a patent pledge may cover only a single patent relevant to a standard being developed.[53] In SDOs serving more heavily-patented industries, however, the number of patents pledged by some firms can

52. All examples are taken from the Patent Pledge Database, *supra* note 14.

53. *See* Contreras, *Ex Ante*, *supra* note 13, at 173 (noting that most patent disclosures at VITA, an SDO operating in the avionics and military electronics sector, relate to a single patent).

number in the hundreds, with some standards reportedly covered by thousands of patents.[54]

C. Subject and Scope of Pledge Commitments

The crux of any patent pledge is the commitment that the patent holder makes with respect to the pledged patent(s). Pledge commitments fall into three general categories: (1) the primary commitment to license patents, either on royalty-free or FRAND terms, or not to assert patents at all (primary access commitments), (2) more detailed commitments relating to the royalty rates or other amounts that will be charged (secondary royalty commitments), and (3) non-royalty commitments. Some patent pledges may contain one, two or all three types of commitments. *Table 3* illustrates the types and frequency of patent pledges found in the Patent Pledge Database.

54. *See* KNUT BLIND ET AL., STUDY ON THE INTERPLAY BETWEEN STANDARDS AND INTELLECTUAL PROPERTY RIGHTS (IPR) 62 (2011), http://www.inno.tu-berlin.de/fileadmin/a38335100/Aktuelles/Blind_Pohlmann_et_al_interplay_of_ipr_and_standards_EU_study.pdf (reporting the numbers of patents believed to be essential to standards including WCDMA (1000 patent families), LTE (1000 patent families), MPEG-2 and MPEG-4 (800 patents in 160 patent families), optical disc drive standards (2200 patent families), and DVB-H (30 patent families)).

Table 3
Coverage of Non-SDO Patent Pledges[55]
(as of Jan. 1, 2015)

Type	Occurrences
1. Primary Access Commitments	
Non-Assertion/Royalty-Free Licensing	128
FRAND Licensing	20
2. Secondary Royalty Commitments	
Maximum Royalty/Cap	16
Royalty Calculation	10
3. Non-Royalty Commitments	
Non-injunction	10
No NPE Transfers	3
Binding Patent Transferees	3
Prior Art	4

1. Primary Access Commitments

The primary access commitment of a patent pledge is generally a broad statement indicating the nature of the access that the patent holder wishes to give the public to its patent.[56] That is, will the patent holder (a) refrain from asserting the patent against a specified class of potential infringers (i.e., manufacturers of products complying with a standard, small businesses, etc.), (b) license the patent on FRAND terms, or (c) license the patent on royalty-free terms? As among these three options, the frequency with which

55. All examples are taken from the Patent Pledge Database, *supra* note 14. While the Patent Pledge Database only catalogs pledges made outside the SDO setting, pledges made within SDOs fall into the same categories. For purposes of quantifying the occurrences of each type of pledge, each individual pledge made by a firm has been counted separately, except in the case of the Open Invention Network (OIN), which involves more than 1,000 participants. *See supra* Section I.A.2.

56. Patent pledges made within SDOs generally cover only patents that are "essential" to a particular standard. A significant literature exists regarding the determination of which patents qualify as "essential." *See, e.g.*, ABA PATENT POLICY MANUAL, *supra* note 6, at 11; Kesan & Hayes, *supra* note 11. Some commentators have argued that patents that are commercially important to a standardized technology (so-called "commercially essential" patents) may or should also be subject to FRAND commitments made with respect to technically essential patents. *See* Kesan & Hayes, *supra* note 11; Layne-Farrar, *supra* note 12, at 1101–02.

each option is selected varies according to context. For example, some SDOs require that *all* participants license their standards-essential patents on FRAND terms.[57] Others, including the Worldwide Web Consortium (W3C), require royalty-free licensing or patent-non-assertion in most cases.[58] And in some SDOs, such as the IETF, participants are free to select which primary access commitment, if any, they wish to make.[59]

2. Secondary Royalty Commitments

When a patent holder makes a FRAND commitment, it pledges that it will license the covered patents under terms that are "fair, reasonable and non-discriminatory."[60] These general descriptors, of course, do not specify royalty rates or other contractual terms, and numerous disputes have arisen over conflicting views of the level of "reasonable" royalty rates.[61] In an effort to avoid such disputes and provide greater visibility and predictability to potential manufacturers of standardized products, some firms have elected, outside the SDO process,[62] to make additional commitments regarding the royalty rates that they will charge for standards-essential patents.

a. Maximum Royalties

A number of firms have pledged that they will cap royalty rates for certain product-patent configurations. Maximum royalties may be specified

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57. *See* Kesan & Hayes, *supra* note 11, at 238.

58. W3C, *W3C Patent Policy*, Sec. 5, http://www.w3.org/Consortium/Patent-Policy-20040205/ [hereinafter *W3C Patent Policy*].

59. *See* Bekkers & Updegrove, *supra* note 13, at 18; INTERNET ENG'G TASK FORCE, RFC 3979—INTELLECTUAL PROP. RIGHTS IN IETF TECH. 8, 13 (2005), http://tools.ietf.org/pdf/rfc3979.pdf.

60. *See generally* ABA PATENT POLICY MANUAL, *supra* note 6, at 56–58; Jorge L. Contreras, *Fixing FRAND: A Pseudo-Pool Approach to Standards-Based Patent Licensing*, 79 ANTITRUST L.J. 47, 50–51 (2013) [hereinafter Contreras, *Fixing FRAND*].

61. *See, e.g.*, Microsoft Corp. v. Motorola, Inc., No. C10-1823JLR, 2013 WL 2111217, at *1–4 (W.D. Wash. Apr. 25, 2013); Apple, Inc. v. Motorola Mobility, Inc., 886 F. Supp. 2d 1061, 1087 (W.D. Wis. 2012).

62. Efforts to impose secondary royalty commitments within SDOs have had little success. On the other hand, although they do not mandate it, several SDOs, including IEEE and ETSI, permit the voluntary disclosure of maximum royalty rates. *See, e.g.*, IEEE STANDARDS ASS'N, LETTER OF ASSURANCE FOR ESSENTIAL PATENT CLAIMS, § D.1b (2012), https://development.standards.ieee.org/myproject/Public//mytools/mob/loa.pdf. However, for various reasons, the number of royalty rate disclosures made under these voluntary policies has been extremely low. *See* Contreras, *Ex Ante*, *supra* note 13, at 182 (citing number of disclosures as of 2010).

in terms of a percentage royalty rate (e.g., 2.5% of the product sales price), or a per-unit charge (e.g., $0.05 per unit). To date, such approaches have been adopted primarily in the wireless telecommunications sector. *Table 4* below illustrates a number of maximum royalty commitments that have been made and proposed in this sector.[63]

Table 4
Maximum Royalty Pledges in the Wireless Telecommunications Sector

Year	Pledge	Pledgor(s)	Maximum Royalty
2002	Cumulative Royalty for W-CDMA (Proposed)	Nokia	Cumulative cap of 5% on all royalties covering patents essential to the W-CDMA standard
2008	Framework for LTE technology IPR licensing	Alcatel-Lucent, Ericsson, NEC, NextWave, Nokia, Nokia Siemens Networks, Sony Ericsson	Handsets: single-digit percentage of the sales price Notebooks: single-digit dollar amount
2010	Licensing Policy on LTE and Service Architecture Evolution Essential Patents	Nokia	1.5% of the sales price of end-user devices that deploy LTE as the only wireless communication standard 2.0% for devices in which other standards are utilized in addition to LTE
2012	Letter to IEEE Clarifying FRAND Commitments	Motorola Mobility	2.25% of net product selling price[64]

63. *See* Layne-Farrar, *supra* note 12, at 1107–08 (describing circumstances surrounding LTE pledges).

64. Despite this commitment, Motorola and Microsoft disagreed significantly regarding the appropriate product base pricing to which this 2.25% royalty should be applied, leading to

Year	Pledge	Pledgor(s)	Maximum Royalty
2103	LTE/WiMax Pricing Statement	Qualcomm	3.25% of the wholesale sale price of devices that implement the LTE/WiMax standards, but not any 3G CDMA standards

b. Royalty Calculations

Some patent pledges, rather than establishing a maximum royalty, instead specify the methodology that the patent holder will use to calculate royalties. Such commitments often seek to clarify issues such as the royalty "base" that the patent holder intends to use to calculate royalties,[65] or the manner in which products covered by multiple patents will be addressed (i.e., the well-known issue of royalty "stacking").[66] Like maximum royalty commitments, these pledges occur most frequently in the wireless telecommunications sector. *Table 5* below illustrates selected royalty calculation pledges in this sector.

proposed royalties that differed by a factor of 1,000. *Microsoft Corp.*, No. C10-1823JLR, 2013 WL 2111217, at *1–4.

65. The royalty base is the price on which a percentage royalty is calculated. For example, if the royalty rate is 5% of net selling price, and the applicable product has a sale price of $100 (the royalty base), then the royalty would be $5. Disagreements over royalty base are not uncommon, particularly when multi-component products are involved. Thus, if a patent covers a wireless telecommunications standard and the patent holder commits to charge a royalty of 5%, a question remains whether that 5% royalty is charged on the price of a smart phone ($500), the communications chip included within the smart phone ($35), the subscriber's monthly service charges ($200/month), or some other amount. *See Microsoft Corp.*, No. C10-1823JLR, 2013 WL 2111217 (dispute regarding appropriate royalty base when two standards are incorporated into X-Box consoles and laptop computers containing thousands of components covered by many thousands of patents)*; see also* Jorge L. Contreras, *A Brief History of FRAND*, 80 ANTITRUST L.J. 39 (2015) [hereinafter Contreras, *FRAND History*] (discussing royalty base issues and disputes).

66. *See, e.g.*, Jorge L. Contreras, *Standards, Royalty Stacking and Collective Action*, 3 CPI ANTITRUST CHRON. (2015); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2033–34 (2007).

Table 5
Selected Royalty Calculation Pledges in Wireless Telecommunications Sector

Year	Pledge	Pledgor(s)	Royalty Calculation
n/d	Patent Licensing Practices for Industry Standards	Intel	Royalty base should not exceed the cost of the smallest unit that practices the standard, the technical value of the patented feature compared to alternatives available during the standard-setting process, and the overall royalty that could reasonably be charged for all patents essential to the standard
2002	Modest royalty rates for W-CDMA	NTT DoCoMo, Ericsson, Nokia, Siemens, Fujitsu, NEC, Mitsubishi Electric, Panasonic, Sony	Royalty to be proportional to the number of essential patents held by each company
2008	Framework for LTE technology IPR licensing	Alcatel-Lucent, Ericsson, NEC, NextWave, Nokia, Nokia Siemens Networks, Sony Ericsson	Each patent holder will charge a proportional share of all standard essential IPR for the relevant product category

Like maximum royalty commitments, royalty calculation pledges have largely been made outside the SDO setting. However, there have been recent initiatives within some SDOs seeking to clarify their FRAND commitments by incorporating at least some guidelines relating to royalty

calculation. IEEE, in particular, has recently adopted policies that clarify the appropriate royalty base for patents covering IEEE standards.[67]

3. Non-Royalty Commitments

In addition to pledges offering a primary access commitment or relating to the royalties that patent holders will charge, other types of patent pledges have emerged outside the SDO setting. These pledges limit the patent holder's ability to enforce and otherwise maximize rents from its patents, but in ways that are not directly tied to licensing royalties. Two principal examples of these pledges are discussed below.

a. No Injunctions

One of the most contentious issues facing participants in standard-setting activities is whether a patent holder that has made a FRAND commitment may seek an injunction preventing the use of standardized technology after the parties have failed to agree on FRAND licensing terms.[68] Commitments not to seek such injunctions have been sought and obtained by both the FTC and European Commission in actions brought against large patent holders involved in standards-development activities.[69] The question has also been considered by the U.S. federal courts[70] and the International Trade

67. IEEE-SA STANDARDS BOARD BYLAWS § 6 (IEEE STANDARDS ASS'N 2015) https://standards.ieee.org/develop/policies/bylaws/approved-changes.pdf [hereinafter IEEE BYLAWS].

68. *See, e.g.*, NAS REPORT, *supra* note 45, at 95–110; U.S. DEP'T OF JUSTICE & U.S. PATENT & TRADEMARK OFFICE, POLICY STATEMENT ON REMEDIES FOR STANDARDS-ESSENTIAL PATENTS SUBJECT TO VOLUNTARY FRAND COMMITMENTS (2013), http://www.uspto.gov/about/offices/ogc/Final_DOJ-PTO_Policy_Statement_on_FRAND_SEPs_1-8-13.pdf; Colleen V. Chien & Mark A. Lemley, *Patent Holdup, the ITC, and the Public Interest*, 98 CORNELL L. REV. 1, 2–3 (2012); BRIAN T. YEH, CONG. RESEARCH SERV. 7-5700, AVAILABILITY OF INJUNCTIVE RELIEF FOR STANDARD-ESSENTIAL PATENT HOLDERS (2012); Farrell et al., *supra* note 11, at 638; Lemley & Shapiro, *supra* note 66; Gregory J. Sidak, *The Meaning of FRAND, Part II: Injunctions*, 11 J. COMPETITION L. & ECON. 201 (2015)

69. In the Matter of Robert Bosch GmbH, FTC File No. 121-0081 (Nov. 26, 2012); In the Matter of Motorola Mobility LLC and Google Inc., FTC File No. 121-0120 (July 23, 2013); Press Release, European Comm'n, Samsung—Enforcement of ETSI Standards Essential Patents (SEPs) (Dec. 21, 2012), http://europa.eu/rapid/press-release_MEMO-12-1021_en.htm [http://perma.cc/4RML-PFHD].

70. Apple Inc. v. Motorola, Inc., 757 F.3d 1286, 1331–32 (Fed. Cir. 2014).

Commission.[71] While courts, administrative agencies, and SDOs continue to wrestle with this issue, several firms including Apple, Google, Intel, and Microsoft, have individually pledged that they will not seek to enjoin the use of standards as to which they have made FRAND commitments.[72] And at least one major SDO has recently clarified its policies to include such a requirement.[73]

b. No NPE Transfers

A small but growing number of patent pledges seek to address issues that may arise in connection with the sale or transfer of patents. First, due to the highly publicized increase in lawsuits brought by non-practicing entities (NPEs),[74] a number of firms have expressly pledged not to transfer their patents to NPEs.[75] In a similar vein, the Defensive Patent License, which does not outright prohibit the transfer of patents to NPEs, allows all DPL pledgors to terminate their licenses if such a transfer occurs.[76]

D. Form of Patent Pledges

Part I.C above discusses the content of patent pledges. This Part turns to the structural attributes of the pledges themselves. Patent pledges come in a wide variety of shapes and sizes, from uniform, check-the-box forms to free-style blog postings, press releases and oral statements. For purposes of this analysis, I divide patent pledges into two principal categories: *coordinated pledges* and *unilateral pledges*. Generally speaking, coordinated pledges are made by members of a defined group, according to some predetermined form or formula, with respect to a defined technology or set of patents. All coordinated pledges made by the members of the group need not be identical, but at least the set of pledges within any such

71. In the Matter of Certain Elec. Devices, Including Wireless Commc'n Devices, Portable Music and Data Processing Devices, and Tablet Computs., USITC Inv. No. 337-TA-794, 2013 WL 2453722 (June 4, 2013).

72. *See* Patent Pledge Database, *supra* note 14; *see also* Layne-Farrar, *supra* note 12, at 1108–09 (discussing Microsoft, Apple and Google non-injunction pledges).

73. *See* IEEE BYLAWS, *supra* note 67.

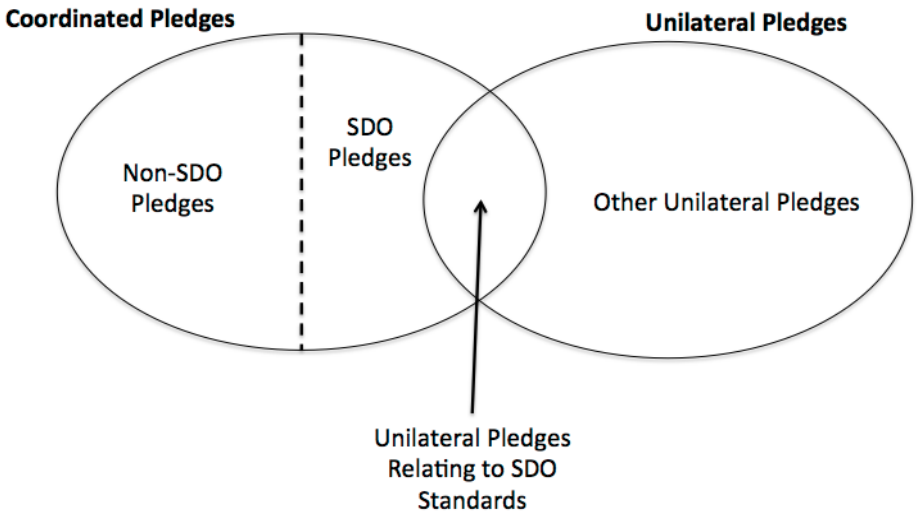
74. NPEs generally acquire patents for the primary purpose of asserting them in licensing negotiations or litigation, without producing products. They are also known as "patent assertion entities" and, more pejoratively, "patent trolls." *See, e.g.*, Colleen Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents*, 87 N.C. L. REV. 1571 (2009).

75. *See infra*, notes 107–110 and accompanying text.

76. *See infra*, notes 91–93 and accompanying text.

group share some basic characteristics. The best-known coordinated pledges are FRAND commitments made in SDOs, but several other important varieties are discussed in Section I.D.2 below. *Unilateral* pledges, on the other hand, are one-off commitments made independently and voluntarily by patent holders. Section I.D.2 attempts to impose at least some order on this inherently messy category. *Figure 1* below outlines this general framework.

Figure 1
Patent Pledge Structural Variants



1. Coordinated Patent Pledges

As noted above, *coordinated* patent pledges are made by members of a specific group according to some predetermined form or formula, usually with respect to a defined technology or set of patents. The group may be the participants in an SDO, or a less formal group of like-minded firms working toward the promotion of a common technology platform or architecture. Because much of the literature focuses on FRAND commitments made in SDOs, our discussion will begin with these and then move on to other communities in which patent pledges are made.

a. Pledges Made in Standards-Development Organizations

As noted above, the structures of SDOs are diverse, ranging from small groups of firms focusing on a single product category to international bodies that produce standards in a broad range of industries.[77] Thus, even within the SDO context, patent pledges take on a number of different formats and structures. These include the following:[78]

(1) *Contractual*: Some pledges are included in contractual documents signed by SDO participants, either among participants or between each participant and the SDO.[79]

(2) *Bylaws/Policy*: Many SDOs include patent licensing commitments in their corporate bylaws or policy documents. In some cases, participants must agree to comply with such bylaws and policies when they submit a membership application (often done online) to the SDO, or join a particular technical subgroup.[80] In other cases, the binding effect of these policies is assumed based on a participant's membership in, or engagement in activities within, the SDO.[81]

(3) *Letters of Assurance*: Some SDOs require participants to submit a written document (referred to variously as a "letter of assurance", "licensing declaration" or "written assurance") stating their intentions, if any, regarding the licensing of patents.[82] Different SDOs require such LOAs to be submitted at different times during the standardization process.[83] Often, LOAs are template documents that only permit the participant to check a box to indicate whether its licensing approach will be FRAND, royalty-free, non-assertion, or otherwise.[84] This pledge structure is relatively common among large SDOs operating in the ICT sector.[85]

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77. *See supra* note 17 and accompanying text.

78. A more detailed analysis of the different forms in which SDO patent pledges are made can be found in Jorge L. Contreras, *A Market Reliance Theory for FRAND Commitments and Other Patent Pledges*, 2015 UTAH L. REV. 479, 499–500 (2015) [hereinafter Contreras, *Market Reliance*].

79. *See* Biddle et al., *supra* note 18, at 186–87 (describing such "contractual consortia" and examples of the same).

80. *See* Bekkers & Updegrove, *supra* note 13, at 28 (noting that in such cases, the SDOs have a relatively narrow technical scope).

81. *See* ABA PATENT POLICY MANUAL, *supra* note 6, at 82.

82. *See* Bekkers & Updegrove, *supra* note 13, at 28.

83. *See, e.g.*, *id.* at 77.

84. *See id*. at 64.

85. *Id.* at 27 (noting that seven of ten SDOs studied use an LOA structure).

b. Other Pledge Communities

Not all coordinated patent pledges are made within SDOs. As noted above, a number of patent pledges relating to standardized technologies are made outside the SDO setting, and an even wider variety of pledges is made outside the standards-development framework entirely. The structures of such pledges vary, but all are characterized by two common elements: the existence of a uniform format in which pledges are made, and some organized community that supports and makes the pledge.

These communities vary in formality and degree of organization. For example, the Eco-Patent Commons (EPC) discussed in Section I.A.3 above is a relatively well-organized group administered by the Environmental Law Institute (ELI). Participants in the EPC must apply to join,[86] and members must comply with a detailed set of "Ground Rules" that includes the terms of the pledge and other details regarding membership.[87] Perhaps the largest pledge community is the Open Invention Network discussed in Section I.A.2, in which more than one thousand firms have pledged not to assert patents against open source code implementations.[88]

Less formal arrangements exist, in which standardized pledge terms are made available by organizations such the Open Web Foundation (OWF) for adoption by any group that wishes to use them. OWF publishes a Final Specification Agreement that firms involved in the development of a standard outside an SDO can use to make commitments regarding their patents.[89] This framework has been used with some success by the proponents of the DMARC specification discussed in Section II.A.2 above, as well as numerous other standards and specifications.[90]

And most recently, the non-profit DPL Foundation recently initiated the Defensive Patent License (DPL) program, in which firms are invited to publicly post a commitment to license their patents to other firms making a similar commitment.[91] The license to be granted is on standardized terms

86. *Eco-Patent Commons: Joining or submitting additional patents to the Commons*, ECO-PATENT COMMONS, http://ecopatentcommons.org/join (last visited Oct. 15, 2015).

87. *EPC Ground Rules*, *supra* note 34, at 3.

88. *See supra* notes 27–30 and accompanying text.

89. *Open Web Foundation Final Specification Agreement (OWFa 1.0) (Patent and Copyright Grants)*, OPENWEB FOUNDATION, http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0 (last visited Oct. 15, 2015).

90. *See infra* Table 6.

91. *Frequently Asked Questions*, DEFENSIVE PATENT LICENSE, http://defensivepatentlicense.org/content/frequently-asked-questions (last visited Oct. 15, 2015).

developed by the DPL Foundation, with input from various communities.[92] The purpose of the DPL is to discourage transfers of patents to non-practicing entities; and to that end permits the patent holder to revoke any DPL license if the licensee either brings a patent infringement claim against another DPL pledgor or transfers a patent to an entity that has not made the DPL pledge.[93]

At the other end of the spectrum, in 2011 a group of thirty-three web-based businesses "signed" a short statement committing them not to make "first use of software patents against companies with less than 25 people."[94] Beyond this simple statement, there are no stated rules or policies and the group appears to remain open to any additional firms that wish to join it.

Table 6 below offers examples of non-SDO coordinated patent pledges found in the Patent Pledge Database.

Table 6
Non-SDO Coordinated Patent Pledges

Name	Pledgors (Community)
Open Invention Network (OIN)	More than 1,000 firms
Eco-Patent Commons	Bosch, Dow, DuPont, Fuji-Xerox, Hitachi, HP, IBM, Nokia, Pitney Bowes, Ricoh, Sony, Taisei, Xerox
The Patent Pledge	33 firms including Airbnb and Dropbox
OWF Final Specification Agreements	
DMARC	AOL, Bank of America, Cloudmark, Comcast, eCert, Facebook, Fidelity, Linked-In, Microsoft, PayPal, ReturnPath, TrueDomain, Trusted Domain, Yahoo!
Simple Identity Cloud Management	CANAIRE, Cisco, Ping Identity, SailPoint, Salesforce.com, Technology Nexus, Unbound ID
JSON	Citizen Agency, IBM, Mozilla, StatusNet, VMWare

92. *Defensive Patent License V1.0*, WLASNOSC INTELEKTUALNA W PRAKTYCE, http://prawo-ip.blogspot.com/2014/01/defensive-patent-license-v-10.html (last visited Oct. 15, 2015).

93. *Id.* § 3(e).

94. As explained by Paul Graham, the apparent originator of the Software Small Business Pledge, the language of TPP is intentionally vague "in order to make people use common sense when interpreting it." Paul Graham, *The Patent Pledge* (Aug. 2011), http://paulgraham.com/patentpledge.html (last visited Oct. 15, 2015).

Name	Pledgors (Community)
GeoServices REST	ESRI
Leap2A	Pebble Learning
Open Compute Project Battery Cabinet Hardware	Facebook
Oauth WRAP	Facebook, Yahoo!
Motherboard hardware	Facebook
Open Graph Protocol	Facebook,
MASHSSL Core	SafeMashups
MediaRSS	Yahoo!
Wireless Industry Leaders LTE pledge	Alcatel-Lucent, Ericsson, NEC, NextWave, Nokia, Nokia Siemens Networks, Sony Ericsson
Modest Royalty Rates for W-CDMA	NTT DoCoMo, Ericsson, Nokia, Siemens, Fujitsu, NEC, Mitsubishi Electric, Panasonic, Sony
Leading Tech Companies United to Support OSGi Technology	Gatespace Telematics, IBM, Nokia, ProSyst, Samsung
Non-Assert for Tuschi I siRNA patent applications	MIT, Whitehead, U. Mass, Max Planck

2. Unilateral Patent Pledges

Unlike coordinated patent pledges, *unilateral* pledges are made by firms acting independently. They may vary in their level of formality and specificity, but in each case the firm making the pledge does so on its own terms, without the express involvement of others.

a. Unilateral Pledges in SDOs

Despite the fact that most SDOs require participants to use standardized forms when making patent pledges, some SDOs permit participants to make pledges on terms of their own choosing. The most prominent example of this pledge type arises in the Internet Engineering Task Force (IETF), which develops standards for the Internet. IETF requires that its participants disclose patents and patent applications that are likely to claim technologies implementing IETF standards and specifications.[95] However, there is no formal requirement that participants license these patents and patent applications to others on any particular terms (i.e., IETF imposes no

95. Scott Bradner, *Intellectual Property Rights in IETF Technology BCP79*, BEST CURRENT PRACTICE (March 2005), https:// tools.ietf.org/html/bcp79.

FRAND commitment). As a result, firms involved in standards development at IETF frequently make voluntary patent licensing commitments along with their patent disclosures. These commitments, which are predominantly non-assertion or royalty-free licensing commitments,[96] take a variety of forms, and each IETF participant is free to develop its own style and language for such pledges. Though IETF provides an online template on which these pledges may be made, this template only offers a "free text" box that the participant may complete however it chooses.[97] As a result, some licensing commitments made in IETF are relatively complex, with numerous caveats and conditions,[98] while others are quite brief.[99] Firms that participate in multiple SDOs often seek to achieve a level of consistency among the pledges that they make in different organizations, so some free-form pledges made at IETF utilize language similar to that prescribed by other SDOs. IETF also publishes these pledges on its web site, making them generally available and associating them with the standards to which they relate.[100]

b. Web Site Postings and Press Releases

Many unilateral patent pledges are made by firms outside the context of an organized standard-setting activity, though the pledges themselves may relate to one or more technical standards. Most such unilateral pledges are made (or at least published) through posting on corporate web sites, often accompanied by a press release or other announcement. Microsoft, for example, maintains a web site dedicated to patent pledges that it has made over the years.[101] Though Microsoft's pledges are relatively detailed and legally robust, their content is determined solely by Microsoft as the pledgor.[102] Other firms take a less formal approach, exemplified by the short pledge posted in Tesla Motors' online blog.[103]

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96. *See* Contreras, *Ex Ante*, *supra* note 12, at 178.

97. IETF DATATRACKER, https://datatracker.ietf.org (last visited Oct. 15, 2015).

98. *See, e.g.*, IETF, *QUALCOMM Incorporated's Statement about IPR related to RFC 6330* (Mar. 19, 2015), https://datatracker.ietf.org/ipr/2554/.

99. *See, e.g.*, IETF, *Huawei Technologies Co., Ltd.'s Statement about IPR related to draft-ietf-pwe3-mspw-er* (Jun. 10, 2015), https://datatracker.ietf.org/ipr/2610/ (committing to reasonable and nondiscriminatory license terms with possible royalty/fee).

100. IETF DATATRACKER, *supra* note 97.

101. *Open Specifications Dev Center*, MICROSOFT CORP., https://msdn.microsoft.com/en-us/openspecifications/default (last visited Oct. 15, 2015). *See also infra* notes 147–51 and accompanying text (discussing Microsoft pledges in greater detail).

102. Some of Microsoft's unilateral pledges, of course, have been shaped by the need to comply with judicial and agency rulings. *See infra* note 155.

103. *See* Musk, *supra* note 1.

c. Statements to Government Officials

Some patent pledges are made in the form of statements to governmental officials, which may later be memorialized in correspondence, official announcements or agency orders. The manner in which such pledges are made varies. In some cases, pledges are made during negotiations with an agency, and they are only referenced in the agency's subsequent order or announcement in the case.[104] In other instances, a patent holder may direct the agency to an existing document, whether an online statement or correspondence with an SDO, as embodying its pledge.[105] Finally, in some cases, pledges made to regulatory authorities may appear in formal consent decrees or judicial orders.[106] This last form of pledge differs in kind, however, from those that are the subject of this article, as they leave the realm of "voluntary" commitments and fit comfortably into the better-understood world of judicially-sanctioned obligations.

d. Other Public Statements

In addition to the forms described above, patent pledges can be made in a variety of less formal settings including speeches, press releases, interviews, and testimony. For example, in 2013, Mark Chandler, the General Counsel of Cisco Systems, wrote an online article in *Forbes* that criticized firms that had sold patents to non-practicing entities (so-called "patent trolls").[107] In the article, Chandler admitted that Cisco had itself sold a small number of patents to a non-practicing entity, but in the next breath pledged that the company "won't do it again."[108] Randy Milch, the General Counsel of Verizon, made a similar admission and pledge verbally during a recorded

104. *Statement of the Department of Justice's Antitrust Division on Its Decision to Close Its Investigations of Google Inc.'s Acquisition of Motorola Mobility Holdings Inc. and the Acquisitions of Certain Patents by Apple Inc., Microsoft Corp. and Research in Motion Ltd.*, U.S. DEPT. OF JUSTICE (Feb. 13, 2012), http://www.justice.gov/opa/pr/2012/February/12-at-210.html [hereinafter *DOJ 2012 Approval Statement*].

105. *Id.*

106. *See* Contreras, *FRAND History*, *supra* note 65 (detailing a long lineage of antitrust consent decrees containing patent licensing commitments).

107. Mark Chandler, *Good News for the Innovation Economy: The Tide's Turning Against Patent Trolls*, FORBES, (Oct. 20, 2013, 5:30 am), http://www.forbes.com/sites/ciocentral/2013/10/20/good-news-for-the-innovation-economy-the-tides-turning-againt-patent-trolls/.

108. *Id.*

public symposium,[109] and Yahoo! made a similar statement in testimony that it submitted to the House Committee on the Judiciary.[110]

The apparent informality of some of these statements may give one pause. Certainly, it would not be reasonable to treat every offhand comment made by a corporate official as a pledge binding the corporation, and additional work is undoubtedly required to differentiate between pledges intended to be binding and enforceable and mere statements of aspiration and opinion.[111] Nevertheless, it appears that at least some subset of these statements are intended to function as binding commitments, and should be treated as such.

II. CLASSIFYING PATENT PLEDGES: A TAXONOMY

The catalog of structural features of patent pledges presented in Part I sheds light on several important points. First, patent pledges are made in a much broader range of industries and markets than might be assumed from the prevalent literature on FRAND commitments, which are typically limited to the ICT industry. Second, there are a number of structural and functional commonalities among pledges, even when they are made by firms at opposite ends of the supply chain. These commonalities suggest that patent pledges constitute a broader phenomenon within the marketplace than an industry-by-industry analysis might indicate. The analysis of patent pledges as a general phenomenon sheds light on the patent system itself and the ways that market actors have tailored patent rights through private ordering in order to achieve commercial goals and market efficiencies.

The analysis of patent pledges as a general phenomenon requires an understanding of the rationales that motivate patent holders to give up important portions of their patent rights without consideration. Four basic

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109. Randy Milch, General Counsel, Verizon, Software Patents and Their Challenges Conference at Colorado Law: Panel 3 (October 9, 2013), http://www.youtube.com/watch?v=j_jgV6UKnp8&list=PLwFq2GL-i5UjaeZNyVOGbSKaJ5rPmvVNc&index=3 (oral statement at 41:44: "[w]e have sold patents to non-practicing entities. That's wrong. I shouldn't do it. . . . I have made it clear that we are not selling anymore to non-practicing entities.").

110. *Improving the Patent System to Promote American Innovation and Competitiveness: Hearing Before the H. Comm. on the Judiciary*, 113th Cong. 5 (2013) (testimony of Kevin T. Kramer, VP and Dep. Gen. Counsel, IP, Yahoo! Inc.) ("[W]e act responsibly when selling patents. Our policy has been to sell patents only to operating entities rather than to non-practicing entities. We do not want our patents to be obtained by a troll and irresponsibly asserted against others in the Internet industry.").

111. *See* Contreras, *Market Reliance*, *supra* note 78, at 500 (discussing degree of certainty and enforceability of pledges).

motivations emerge from the range of pledges that are made across industries and organizational structures: *inducement*, *collective action*, *voluntary restraint* and *philanthropic*. These motivations are by no means exclusive, and patent holders may seek to achieve a number of complementary goals by making particular pledges. However, the taxonomy developed in this Part serves as a useful framework for assessing the optimal legal effect of different types of pledges, and for evaluating the need for structures supporting the making and dissemination of these pledges, as discussed in Part III.

A. Four Types of Patent Pledge

1. Inducement

The most common form of patent pledge is made in order to induce other market participants to do something. The action that the pledgor seeks to induce in others can vary, but it is generally related to third parties' adoption of certain technology choices that are favored by the pledgor. There are three principal sub-categories of Inducement pledges: those intended to induce other firms to adopt and make investments in products that comply with one or more interoperability standards, those intended to induce other firms to adopt a particular technology platform favored, if not actually sold, by the pledgor, and those intended to induce market participants to adopt a broad platform technology. In each of these cases, the pledgor calculates that it is likely to derive greater benefit from the behavior that it seeks to induce in others than from using its patents to exclude others from the market.[112]

a. Interoperability

Interoperability standards such as USB, Wi-Fi, 3G/4G, DVD and HTTP enable devices manufactured by different vendors to communicate and interoperate with each other without the need for customized interfaces or

112. This motivation echoes that observed by Bar-Gill and Parchomovsky in considering why some firms publish proprietary data in lieu of maximizing patent protection. Oren Bar-Gill & Gideon Parchomovsky, *The Value of Giving Away Secrets* 14–15 (2003), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=404260 ("Recognizing the tradeoff between the current advantage of broad protection and future profits from cumulative innovation, some initial patentees should be expected voluntarily to cede some protection in order to increase their revenues from licensing.").

translation.[113] The market-wide benefits and efficiencies generated through product interoperability are known as "network effects," and often increase as the number of compatible devices in a given network grows.[114] Interoperability also opens markets for new products and services, thus fostering innovation, competition, consumer choice and economic growth.[115] The public welfare benefits of standards that enable product interoperability have been recognized widely by courts, regulators and commentators.[116]

i) Pledges Promoting Interoperability through SDO Standards

Although product interoperability is generally acknowledged as a desirable feature in technology markets, developing interoperability standards often involves collaboration among fierce competitors and can be contentious. Firms that participate in standards development are well-

113. For example, the 802.11 series of Wi-Fi standards developed at the IEEE Standards Association (IEEE) enable computers, tablets, smart phones and other devices manufactured by different vendors to communicate with each other in a manner that is essentially invisible to the end user. *See* Kathy Kowalenko, *IEEE 802 Committee Celebrates 30th Anniversary*, THE INSTITUTE (May 6, 2010), http://theinstitute.ieee.org/benefits/standards/ieee-802-committee-celebrates-30th-anniversary668. So long as two devices comply with the relevant 802.11 standard, they can communicate with minimal user intervention. *See id.*

114. *See* CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 45–46 (1999); *see also* Michael L. Katz & Carl Shapiro, *Network Externalities, Competition and Compatibility*, 75 AM. ECON. REV. 424, 424 (1985) ("There are many products for which the utility that a user derives from consumption of the good increases with the number of other agents consuming the good.").

115. *See* FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 191 (2011) [hereinafter FTC EVOLVING IP MARKETPLACE], https://www.ftc.gov/sites/default/files/documents/reports/evolving-ip-marketplace-aligning-patent-notice-and-remedies-competition-report-federal-trade/110307patentreport.pdf ("In many IT industries, interoperability among products and their components is critical to developing and introducing innovative products that satisfy a range of consumer needs."); Renata B. Hesse, Deputy Assistant Att'y Gen., Antitrust Div., U.S. Dep't of Justice, Remarks at the Global Competition Review Law Leaders Forum: IP, Antitrust and Looking Back on the Last Four Years 16 (Feb. 8, 2013), http://www.justice.gov/atr/public/speeches/292573.pdf [hereinafter Hesse, Looking Back] ("[C]ollaboratively-set industry standards . . . offer our economy great efficiencies and offer consumers and businesses new, advanced products").

116. *See* U.S. DEPT. OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROP. RIGHTS: PROMOTING INNOVATION AND COMPETITION 33 (2007), www.usdoj.gov/atr/public/hearings/ip/222655.pdf [hereinafter DOJ/FTC ANTITRUST AND IP REPORT] ("Industry standards are widely acknowledged to be one of the engines driving the modern economy. Standards can make products less costly for firms to produce and more valuable to consumers."); Herbert Hovenkamp, *Standards Ownership and Competition Policy*, 48 B.C.L. REV. 87, 90 (2007) (describing various social welfare benefits provided by standards).

situated to obtain patents covering the technologies that are the subject of standardization efforts, or to steer standards in the direction of their own patent positions. Thus, a concern has been raised by commentators, regulators, and some SDOs that opportunistic patent holders could assert patents against products complying with a standard after manufacturers have made significant investments in the standardized technology (e.g., plant, inventory, labor, product design and training). Once a manufacturer has made such investments, it is considered to be "locked-in" and cannot switch to an alternative technology without incurring a substantial cost.[117] Not surprisingly, after a manufacturer is locked-in, the patent holder would have substantial leverage in negotiating a license with the manufacturer, and could charge a super-competitive royalty based, in part, on the manufacturer's high cost of switching.[118] This phenomenon is sometimes referred to as patent "hold-up" and is discussed extensively in the literature.[119] In addition to harming potential competitors, it is theorized that patent hold-up can lead to other undesirable market effects, including raising consumer prices and stifling innovation.[120]

To alleviate the risk of hold-up, to encourage the broadest adoption of standards, and to induce manufacturers to make the investments necessary to develop and deploy standardized technologies, many SDOs have adopted policies requiring their participants to make patent pledges. One of the most common of these policies is the licensing commitment,[121] which requires

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117. *See* SHAPIRO & VARIAN, *supra* note 114, at 103–16.

118. *Id.* at 116–30.

119. *See, e.g.*, Contreras, *Survey*, *supra* note 11, at 12–13 (reviewing literature); Kai-Uwe Kühn et al., *Standard Setting Organizations Can Help Solve the Standard Essential Patents Licensing Problem*, 3 CPI ANTITRUST CHRON. (SPECIAL ISSUE) 1, 3 (Mar. 2013) ("[H]old-up occurs when the [patent] owner approaches firms practicing the standard—after those firms have invested in developing their products that depend on the standard—with an onerous licensing demand"); Farrell et al., *supra* note 11, at 616; Lemley & Shapiro, *supra* note 66, at 1993; Lichtman, *supra* note 11, at 1033.

120. *See, e.g.*, DOJ/FTC ANTITRUST AND IP REPORT, *supra* note 116, at 35–36. Several commentators take a contrary view and question whether patent hold-up presents a significant risk or exists at all. *See, e.g.*, Richard A. Epstein, F. Scott Kieff & Daniel F. Spulber, *The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination*, 8 J. COMPETITION L. & ECON. 1, 12–13 (2012); J. Gregory Sidak, *Patent Holdup and Oligopolistic Collusion in Standard-Setting Organizations*, 5 J. COMPETITION L. & ECON. 123, 128 (2009).

121. Another common, and related, SDO policy requires patent holders to disclose to the SDO and other participants any patents that may be essential to a standard. Disclosure policies often work side-by-side with licensing policies, but are not required to make licensing policies effective. *See* ABA PATENT POLICY MANUAL, *supra* note 6, at 15; Bekkers & Updegrove, *supra* note 13, at 13.

each SDO participant[122] to promise that it will not use patents to block the use of a standard. Licensing commitments come in several different flavors. Patent holders can commit to license their essential patents on terms that are "fair, reasonable and non-discriminatory" (FRAND), they can commit to license these patents on reasonable terms without a royalty, or they can commit not to enforce these patents at all (non-assertion).[123] All of these pledges share the common goal of assuring the market that standards may be incorporated into products without the risk that patent holders will emerge after lock-in and seek to block the sale of those products or charge a royalty that makes them economically infeasible.[124] Such assurances are vital in inducing market participants to adopt the standard and to make costly investments on the basis of the standardized technology.

While the market-wide benefits of patent pledges in the standardization context are relatively well-understood, the motivation for individual patent holders to make such pledges is more nuanced. Many patent holders, of course, are manufacturers of products that will benefit from standardization. These patent holders are likely to profit directly from the product interoperability afforded by standards, and may thus determine that their potential product-related profits will outweigh any loss of revenue attributable to the constraints imposed by the pledge.[125] In some cases, they

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122. Of course, patents covering standardized technology may be held both by participants and non-participants in an SDO. Nevertheless, the risk of patent hold-up posed by non-participating third parties is often viewed as less serious than the risk posed by SDO participants because participants have the ability to guide a standard toward their own patent positions (a practice sometimes referred to as "patent stuffing"), whereas non-participants do not. *See, e.g.*, Hesse, Looking Back, *supra* note 115, at 20 (describing allegations that a particular patent holder "steered" an SDO toward its own patents during the standards-development process).

123. *See* ABA PATENT POLICY MANUAL, *supra* note 6, at 23.

124. *See generally Standards Essential Patent Disputes and Antitrust Law*: *Hearing before the Subcomm. on Antitrust, Competition Policy and Consumer Rights of the S. Comm. on the Judiciary*, 113th Cong. 12 (2013) (testimony of John D. Kulick, Chair, Standards Association Board, Institute of Electrical and Electronics Engineers), http://www.judiciary.senate.gov/imo/media/doc/7-30-13KulickTestimony.pdf ("[Such commitments] help protect implementers of a standard against patent hold-up."); Contreras, *Fixing FRAND*, *supra* note 60, at 50–51; Josh Lerner & Jean Tirole, *Standard-Essential Patents*, Toulouse School of Economics Working Papers, No. IDEI-803 at *2 (Mar. 13, 2014) ("In an attempt to curb the monopoly power that they create, most SSOs require the owners of patents covered by the standard to grant licenses on fair, reasonable and nondiscriminatory (FRAND) terms"); DOJ/FTC ANTITRUST AND IP REPORT, *supra* note 116, at 46 (discussing that some SSOs use licensing rules, such as requiring IP holders to commit to licensing on FRAND terms, to mitigate holdup).

125. Recent litigation results have demonstrated that patent royalties subject to a FRAND commitment may, indeed, be far less than the patent holder initially sought or desired. *See* Contreras, *Fixing FRAND*, *supra* note 60, at 79–80.

may determine that the benefits of broad, rapidly available interoperability are so great that they prefer all participants to license their relevant patents on a royalty-free basis, thus eliminating any patent-related barrier to adoption of the standard. Such a royalty-free approach has been adopted with many prominent standards including Bluetooth,[126] most standards developed for the Worldwide Web including HTML, HTTP and XML,[127] and many Internet standards developed at the Internet Engineering Task Force (IETF).[128] But whether the patent holder's pledge is to license its patents on FRAND or royalty-free terms, its primary motivation is to induce other market participants to adopt the relevant standard and make complementary investments.[129]

The considerations become more complex, however, for participants that are primarily technology developers, or that derive a substantial portion of their revenue from technology and patent licensing, as opposed to product sales.[130] These participants are less likely to favor pledge regimes that substantially diminish the value of their patents, and are less likely to participate in SDOs that require such pledges.[131] Thus, compromises are hammered out in SDOs between these *patent-centric* and *product-centric* standards developers.[132] Often, the compromise that is reached is an SDO

126. *See* Richard J. Gilbert, *Ties That Bind: Policies to Promote (Good) Patent Pools*, 77 ANTITRUST L.J. 1, 19–20 (2010); *see also Bluetooth SIG Patent & Copyright License Agreement*, BLUETOOTH.ORG (September 5, 2015), https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=67 (granting licensees "worldwide, royalty-free license under its copyrights" in sec. 5 of the agreement).

127. *W3C Patent Policy*, *supra* note 58, § 5.

128. Although IETF has no explicit patent licensing requirement, many IETF participants voluntarily pledge not to assert their patents or to license on royalty-free terms. *See* Contreras, *Ex Ante*, *supra* note 13, at 182–83 (from 2007–10, 59% of IETF patent disclosures included non-assertion or royalty-free patent commitments).

129. *See* Harkrider, *supra* note 12, at 5. *Cf.* Gilbert, *supra* note 126, at 19 (noting that royalty-free or below-market royalty rates are used by certain patent pools to "promote the adoption of technology covered by [the] pool's patents").

130. *See, e.g.*, *LTE/WiMax Patent Licensing Statement*, QUALCOMM, INC. 1 (Dec. 2008), http://www.qualcomm.com/media/documents/files/lte-wimax-patent-licensing-statement.pdf ("Unlike vertically-integrated companies that obtain a return on their R&D investments by profits from sales of products and equipment and primarily use their patent portfolios to protect these profit-generating businesses, Qualcomm relies heavily upon licensing revenues to obtain a fair return on its enabling innovations and to fuel its industry-leading R&D investments.").

131. *See* Layne-Farrar, *supra* note 12, at 1099.

132. *See* Contreras, *Ex Ante*, *supra* note 13, at 206 n.135 (distinguishing between product-centric and patent-centric developers); DAVID J. TEECE, PETER C. GRINDLEY & EDWARD F. SHERRY, SDO IPR POLICIES IN DYNAMIC INDUSTRIES 29 (Oct. 2012) (unpublished submission in connection with the October 2012 National Academy of Sciences Symposium on RAND Patent Policies) (on file with author) ("The rules of SSOs are likely to represent a consensus among the

policy requiring participants to license their essential patents on unspecified FRAND terms, which gives patent-centric developers flexibility to negotiate and charge suitable royalties for their patents, but which nevertheless assures the market that patents will not be used to block the sale of products using a standard, or to make the manufacture of such products uneconomical.[133]

ii) Pledges Promoting Interoperability Outside of SDOs

Patent pledges pertaining to industry standards do not arise exclusively within SDO organizations. In fact, many such pledges are made outside of the SDO process, either with respect to SDO-developed standards as to which firms have elected to make supplemental pledges, or with respect to standards that were not developed within SDOs. Nevertheless, as explained below, the motivations and goals for non-SDO Interoperability pledges are nearly the same as those applicable to SDO-based Interoperability pledges.[134]

In some cases, firms may elect to make pledges with respect to interoperability standards that were developed within SDOs and as to which additional SDO-based pledges may already exist. As discussed in Part II.A.1 above, the pledges required by SDOs are usually primary access commitments,[135] in which the patent holder must commit either to license its standards-essential patents on FRAND or royalty-free terms, or not to assert those patents at all. Secondary licensing commitments, including the maximum royalty commitments and royalty calculation parameters discussed in Part I.C.2, are typically *not* required by SDOs. However, individual firms or groups of firms may sometimes wish to offer additional assurances to the market to further encourage use of the standards. For example, in 2002 NTT DoCoMo, Ericsson, Nokia, Siemens, and several Japanese manufacturers pledged that they would license their patents that were essential to the W-CDMA 3G wireless telecommunications standard at

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participants of the SSO, or (more commonly) a quasi-political compromise of the (partially similar, partially conflicting) interests of those participants.").

133. *See* Roger G. Brooks & Damien Geradin, *Interpreting and Enforcing the Voluntary FRAND Commitment*, 9 INT'L J. IT STANDARDS & STANDARDIZATION RES. 17–19 (2011) https://www.cravath.com/files/Uploads/Documents/Publications/3234075_1.pdf (describing the negotiation process at ETSI).

134. For this reason, several commentators have argued that pledges made within and outside the SDO setting should be given equal legal treatment. *See supra* note 12 and accompanying text.

135. *See supra* Section I.C.1 (discussing Primary Access Commitments).

rates proportional to the number of such patents held by each company.[136] Similar pledges have been made by these and other industry participants with respect to subsequent wireless mobile device standards.[137]

There are several reasons that firms may wish to make pledges above and beyond their SDO commitments. With respect to maximum royalty commitments (Table 5), they may wish to alleviate market concerns regarding potential patent stacking when patent-heavy technologies are concerned.[138] Likewise, royalty calculation pledges reduce uncertainty surrounding the royalty base to be used when calculating royalties for multi-component products. In both of these cases, SDOs, which can only act by consent of their membership, may be unable to achieve sufficient consensus to implement these requirements in their official policies. Thus, to the extent that individual SDO participants determine that it is in their best interest to take additional steps to induce the market to adopt a particular standard, these firms may elect to make such pledges unilaterally.

In 2011 a group of firms including Bank of America, American Greetings, Facebook, Comcast, and Google joined forces to develop a method for combatting fraudulent and "spoofed" email.[139] The group did not work through a formal SDO, but independently produced a technical specification called Domain-based Message Authentication, Reporting & Conformance (DMARC), which was released in early 2012.[140] The DMARC group operated primarily via email discussion lists and only required that its participants sign a "Contributor License Agreement" published by the Open Web Foundation (OWF).[141] The OWF pledge

136. Press Release, Nokia Corp., Industry leaders NTT DoCoMo, Ericsson, Nokia and Siemens, and Japanese manufacturers reach a mutual understanding to support modest royalty rates for the W-CDMA technology worldwide (Nov. 6, 2002), http://company.nokia.com/en/news/press-releases/2002/11/06/industry-leaders-ntt-docomo-ericsson-nokia-and-siemens-and-japanese-manufacturers-reach-a-mutual-understanding-to-support-modest-royalty-rates-for-the-w-cdma-technology-worldwide.

137. *See supra* Tables 6–7.

138. Several commentators have theorized that maximum royalty commitments of one kind or another can avert many of the potential problems inherent to patent stacking. *See* Contreras, *Fixing FRAND*, *supra* note 60, at 67; Lemley, *Ten Things*, *supra* note 11, at 152; Lerner & Tirole, *supra* note 11, at 972.

139. *See About*, DMARC, http://www.dmarc.org/about.html (last visited Oct. 8, 2015).

140. *DMARC Overview*, DMARC, http://www.dmarc.org/overview.html (last visited Sept. 21, 2015).

141. *Index of CLAs*, DMARC, https://dmarc.org/cla.html; *OWF Contributor License Agreement 1.0—Copyright and Patent*, OPENWEB FOUNDATION, http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owf-contributor-license-agreement-1-0---copyright-and-patent. Though the OWF Contributor License Agreement is styled an "agreement," it is in fact a unilateral commitment that is signed only by the contributor

prohibits each contributor from asserting its patents against any use of the DMARC specification. Though the pledge essentially nullifies the contributors' patents as they relate to DMARC, the pledge was utilized in order to achieve the widest possible adoption of the specification as quickly as possible, a result likely to benefit the contributors (online merchants and carriers) far more than any incremental value they could have obtained by seeking to license or assert their respective patents.[142] The DMARC effort exemplifies one of many community-based Interoperability pledges made outside the SDO context. Such pledges are facilitated by the existence of standardized template agreements such as those produced by OWF.[143]

b. Platform Leadership

As discussed above, interoperability considerations lead firms to make patent pledges when they wish their products to be interoperable with other products adhering to the same standard. It is often the case that no single firm controls such standards, and the pledging firm's principal benefit derives from being part of a network or ecosystem of interoperable products.

Sometimes, however, a single firm does exert control over a particular technology platform,[144] whether through ownership of proprietary interfaces

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and likely lacks the formal requirements of a contract. *See* Contreras, *Market Reliance*, *supra* note 78, at 497.

142. The DMARC specification has achieved significant success since its release, reportedly protecting more than two billion email accounts worldwide and more than eighty percent of U.S. email users, drastically reducing the number of fraudulent email messages sent to consumers. *DMARC—What is it?*, DMARC, http://www.dmarc.org (last visited Sept. 21, 2015). Since the release of the DMARC specification, the DMARC.org group has submitted the DMARC specification to IETF, the principal SDO responsible for Internet standards, for release as a formal IETF standard. *Id.*

143. *See supra* Table 6 (listing other non-SDO standardization efforts that used the OWF model).

144. Bresnahan and Greenstein define a platform as "a bundle of standard components around which buyers and sellers coordinate efforts." Timothy F. Bresnahan & Shane Greenstein, *Technological Competition and the Structure of the Computer Industry*, 47 J. INDUS. ECON., Mar. 1999 at 4. They include within this definition both single-vendor platforms such as IBM's System/360 mainframe computer, as well as decentralized, multi-vendor platforms such as the "Wintel" personal computer. *Id.* at 3–4. More recently, Gawser and Cusumano have defined external or industry platforms as assets organized in a common structure that "provide the foundation upon which outside firms can develop their own complementary products, technologies, or services." Annabelle Gawer & Michael A. Cusomano, *Industry Platforms and Ecosystem Innovation*, 31 J. PROD. INNOV. MANAGEMENT 417 (2013).

often referred to as "*de facto*" standards, or other market forces.[145] In some cases, *de facto* standards have emerged after "standards wars," such as the contest between Sony's Betamax and Matsushita's VHS video tape formats. In standards wars, the champions of competing formats generally use all weapons at their disposal, including patents, to gain market share.[146] But *de facto* standards need not emerge through warfare. They can also emerge naturally, based on the market's recognition of a particular technology's benefits and superiority over the competition.[147]

Firms that control particular *de facto* standards can gain significant market advantages if other firms develop products that operate with or depend on their technology.[148] Such "platform" technologies can become the basis for entire industries.[149] Firms thus often strive to persuade product developers, service providers and end users to adopt and develop products compatible with their proprietary technology platforms.

This is what happened in the 1980s when Philips and Sony offered attractive licenses of their new compact disc (CD) media format to both disc and player manufacturers worldwide.[150] Their openness to all potential market entrants enabled CD technology to overtake competing home audio technologies (cassette tape, 8-track tape, phonograph) within a short period of time.[151] By the same token, it has been argued that Matsushita's flexibility in licensing its VHS video cassette recorder (VCR) technology led to greater market adoption of VHS than Sony's technically superior, but

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145. ABA SECTION OF ANTITRUST LAW, HANDBOOK ON THE ANTITRUST ASPECTS OF STANDARD SETTING 6 (2d ed., 2011) [hereinafter ABA ANTITRUST MANUAL]; MICHAEL CARRIER, INNOVATION FOR THE 21ST CENTURY – HARNESSING THE POWER OF INTELLECTUAL PROPERTY AND ANTITRUST LAW 325 (2009); Timothy F. Bresnahan & Pai-Ling Yin, *Standard Setting in Markets: The Browser War*, *in* STANDARDS AND PUBLIC POLICY 18 (Shane Greenstein & Victor Stango, eds., 2007).

146. SHAPIRO & VARIAN, *supra* note 114, at 261–96 (discussing standards wars over AM radio, wireless phones, 56k modems and Internet browsers); *See generally* U.S. DEPT. OF JUST., *supra* note 116, at 34.

147. *See* SHAPIRO & VARIAN, *supra* note 114, at 261–62.

148. The owners of proprietary platforms often enable developers to create products that are compatible with or run on the platform through application programmer interfaces (APIs) and other means. *See* David S. Evans, *The Antitrust Analysis of Rules and Standards for Software Platforms*, COASE-SANDOR WORKING PAPER SERIES IN LAW AND ECONOMICS, Nov. 8, 2014, at 5–6.

149. *See id.* at 7 (collecting data on prevalence of users and applications written for particular software platforms, including Microsoft Windows (1.35 billion devices and 4 million applications) and Apple iOS (800 million devices and 1.2 million applications)).

150. *See* SHAPIRO & VARIAN, *supra* note 114, at 261–62.

151. *Id.*

more tightly controlled, Betamax technology.[152] By exercising less control over its technology than Sony, Matsushita became the undisputed platform leader in the VCR market. More recently, Sun Microsystems adopted a deliberate strategy of broadly offering Java licenses to third parties in order to achieve widespread adoption of its Java platform.[153]

Patent pledges in which the owner of a proprietary platform assures the market that it will make its patents available to those who wish to develop compatible products and services may help the patent holder achieve market acceptance of its platform.[154] These patent pledges are termed Platform Leadership pledges, as they are made to induce the market to adopt the patent holder's proprietary technology platform.

Microsoft has arguably made a number of such Platform Leadership pledges relating to its product interfaces and specifications.[155] Among the most significant of these are Microsoft's Interoperability Principles, in which it pledges to license all patents that cover certain open protocols on FRAND terms at "low" royalty rates.[156] Microsoft's Interoperability Principles cover hundreds of different standards and protocols.[157] Among

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152. *See* Bar-Gill & Parchomovsky, *supra* note 112, at 11 ("facilitating rather than excluding cumulative innovation will often be in the best interest of the initial patent holder").

153. *See* SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 303 (2004); Jimmy McGee, *Oracle and Google Fight over Java Copyright*, XDADEVELOPERS (Apr. 21, 2012), http://www.xda-developers.com/oracle-and-google-fight-over-java-copyright/.

154. *See* Layne-Farrar, *supra* note 12, at 1098 ("[V]oluntary intellectual property . . . licensing announcements offer an important tool for persuading other industry participants to buy into a firm's technology option, thereby facilitating its acceptance as a de facto standard.").

155. Some Microsoft patent pledges arose from antitrust actions brought against Microsoft by the European Commission in the early 2000s. For example, in a 2004 decision, the Commission found that Microsoft violated European law by failing to disclose certain interoperability information to vendors of work group server operating system products. Commission Decision 2007/53/EC of 24 March 2004, Art. 5. As a result, the Commission ordered Microsoft to make such interoperability information available on a FRAND basis. Microsoft's compliance with the EC's decision became the subject of subsequent litigation, leading, among other things, to the EC's imposition of fines on Microsoft in 2008 totaling nearly one billion Euro. Commission Decision of 27 February 2008 fixing the definitive amount of the periodic penalty imposed on Microsoft Corporation by Decision C (2005) 4420 final, ¶ 299. In the wake of that decision, Microsoft announced a "Patent Pledge for Implementation of Microsoft Workgroup Server Protocol Program Technical Specifications" (WSPP), in which it irrevocably committed not to assert its patents against the products that used WSPP specifications. *The Microsoft Patent Pledges for Implementations of Microsoft Workgroup Server Protocol Program Technical Specifications*, MICROSOFT CORP., https://msdn.microsoft.com/en-us/openspecifications/dn646763 (last visited Sept. 21, 2015).

156. *Interoperability Principles Program*, MICROSOFT CORP., https://msdn.microsoft.com/en-us/openspecifications/dn646764 (last visited Sept. 21, 2015).

157. *Patent Promises and Patents*, MICROSOFT CORP., https://msdn.microsoft.com/en-us/openspecifications/dn750984 (last visited Sept. 21, 2015).

these is the Microsoft Exchange ActiveSync suite of protocols, which enable the synchronization of email messages between corporate email accounts and mobile devices. Microsoft claims that ActiveSync has become "the industry standard for mobile messaging synchronization."[158] John Harkrider has argued that the emergence of ActiveSync as a *de facto* standard can be attributed, at least in part, to Microsoft's patent pledge covering the protocol. He explains, "Unlike many other *de facto* standards, which emerged solely from technical superiority or unfettered marketplace competition, Microsoft encouraged the industry to standardize on ActiveSync by promising to license its ActiveSync-essential patents on FRAND terms, at 'low royalty rates.' In doing so, Microsoft hoped both to encourage widespread implementation and, as a corollary, to discourage the development of alternative technologies."[159] This set of motivations is characteristic of Platform Leadership pledges which, as demonstrated by Philips, Microsoft and others, have at times achieved significant success in the marketplace.

c. Market Development

Market Development pledges are made to promote the broad adoption of a nascent or emerging platform technology, generally one in which the patent holder is a leader. These pledges, unlike Interoperability and Platform Leadership pledges, are generally directed to a broad technology category rather than a single standard or product. For example, a patent holder making an Interoperability pledge might commit not to assert its patents against any product implementing the Bluetooth short-range wireless networking standard, whereas a patent holder making a Market Development pledge might commit not to assert its patents against any product using short-range wireless networking. In the first instance, the pledgor wishes to promote the adoption and use of the Bluetooth standard over competing standards, whereas in the second instance, the pledgor wishes to promote the widespread use of short-range wireless networking products, more generally, over competing technologies such as in-home optical fiber.

Market Development pledges are most likely to be made when there is competition among different technology platforms, or when the backers of a

158. Julia White (Senior Director, Exchange Product Management), *Exchange ActiveSync: The Industry Standard for Mobile Messaging*, TECHNET BLOGS: THE MICROSOFT LYNC BLOG (Nov. 16, 2010, 9:12 AM), http://blogs.technet.com/b/uc/archive/2010/11/16/exchange-activesync-the-industry-standard-for-mobile-messaging.aspx.

159. Harkrider, *supra* note 12, at 8.

new technology platform seek to displace an existing platform.[160] For example, as noted in the Introduction, in 2014 Tesla Motors pledged not to assert its portfolio of more than a hundred electric vehicle power management patents against electric vehicle manufacturers.[161] Though Tesla's announcement was perplexing to some,[162] and viewed as a mere publicity stunt by others,[163] Tesla CEO Elon Musk professed a desire to create a "safe space" in which the embryonic electric vehicle industry could grow, particularly in the face of massive competition from conventional automobiles. He explained that "Tesla, other companies making electric cars, and the world would all benefit from a common, rapidly-evolving technology platform" for electric vehicles.[164]

Market Development pledges, including Tesla's, are similar to Interoperability and Platform Leadership pledges in that they seek to promote the adoption of a particular technology architecture or platform.[165] In Tesla's case, the platform is a national electric vehicle infrastructure including charging stations, parts suppliers, and automobiles, all conforming to Tesla's standards and design choices.[166] Though Tesla does not own every aspect of this infrastructure, nationwide adoption of an electric vehicle platform could yield huge dividends to Tesla as a first mover and supplier of vehicles, parts, batteries, charging stations, and the like, and could also help the fledgling electric vehicle industry to compete more effectively against conventional automobile manufacturers. Thus, the potential competitive benefit to Tesla of the development of the electric

160. *Cf*. Dorothy Gill Raymond, *Benefits and Risks of Patent Pooling for Standard-Setting Organizations*, 16 ANTITRUST 41, 45 (observing that firms forming patent pools are likely to offer royalty-free licenses only when "there is the economic expectation of opening up new markets").

161. Musk, *supra* note 1. *See also* Jorge L. Contreras, *Tesla Motors and the Rise of Non-ICT Patent Pledges*, PATENTLY-O (June 16, 2014), http://patentlyo.com/patent/2014/06/motors-patent-pledges.html.

162. *See* Ashlee Vance, *Why Elon Musk Just Opened Tesla's Patents to his Biggest Rivals*, BLOOMBERG BUSINESS (June 12, 2014), http://www.businessweek.com/articles/2014-06-12/why-elon-musk-just-opened-teslas-patents-to-his-biggest-rivals (noting Tesla's advances in battery design, software and power management).

163. *See* Paul Nunes & Joshua Bellin, *Elon Musk's Patent Decision Reflects Three Strategic Truths*, HARV. BUS. REV. BLOG NETWORK (July 1, 2014), http://blogs.hbr.org/2014/07/elon-musks-patent-decision-reflects-three-strategic-truths/ (discussing possible rationales for Tesla's pledge, including a "mere bid for publicity").

164. Musk, *supra* note 1.

165. *See supra* Section II.B.

166. *See* Nunes & Bellin, *supra* note 163.

vehicle market is significant, making the firm's Market Development pledge a rational and potentially effective tool for achieving this goal.[167]

And if further evidence of the potential impact of Tesla's pledge is needed, one need only look to the pledge made by Toyota a few months later.[168] Toyota's announcement that it would grant royalty-free licenses to nearly 5,700 patents covering automotive hydrogen fuel cells can be viewed as a direct response to Tesla's pledge. But whereas Tesla sought to clear the patent field to aid the advancement of electric vehicle technology, Toyota promotes an alternative green vehicle technology in which it is a leader: hydrogen fuel cells. Both auto makers thus seek to develop an emerging market for green vehicles in a landscape that is still up for grabs.

Market Development pledges, of course, are not new or unique to the automotive industry. For example, such pledges have been employed for years by proponents of open source software.[169] Widely available open source platforms such as the Linux and Android operating systems have led to the emergence of robust new markets for compatible software and hardware.[170] But open source products compete against proprietary software platforms such as Windows and iOS,[171] and because open source development is generally conducted in a distributed and non-commercial manner, those who produce software for open source platforms often lack the patent arsenals and legal firepower at the disposal of proprietary software vendors. Firms that wish to promote the use of open source platforms can thus make Market Development patent pledges in order to induce developers, service providers, and others to continue to write software that operates on open source platforms with a reduced threat of

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167. Not all commentators believe that Tesla's pledge is quite as generous as Mr. Musk initially implied. *See, e.g.*, Adam Mosoff, *Tesla's New Patent Policy: Long Live Patent System!*, INVESTOR'S BUSINESS DAILY (Jun. 19, 2014, 6:20 PM), http://news.investors.com/ibd-editorials-perspective/061914-705435-tesla-exercising-its-patent-rights-in-giving-away-its-patents.htm?p=2 (arguing that under its "good faith" limitation, Tesla may retain the right to assert its patents against any firm that makes a patent claim against Tesla, thus creating a traditional cross-licensing structure).

168. *See* Toyota, *supra* note 3 and accompanying text.

169. *See* Vetter, *supra* note 21, at 2100–08 (describing modes of patent licensing in open source licenses). A significant literature exists regarding the motivations and rationales leading firms to relinquish substantial copyright-based control over their software when releasing it on an open source basis. *See, e.g.*, YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006); Bar-Gill & Parchomovsky, *supra* note 112, at 12 (discussing cumulative innovation in open source markets).

170. *See, e.g.*, Evans, *supra* note 148, at 8; Elliot Maxwell, *Open Standards, Open Source, and Open Innovation: Harnessing the Benefits of Openness*, 1 INNOVATIONS: TECH., GOVERNANCE, GLOBALIZATION 119, 132–33 (2006).

171. Evans, *supra* note 148, at 8.

patent litigation. The participation by more than a thousand firms in the Open Invention Network (OIN)[172] supports the notion that large numbers of participants in the market for open source products and services are willing to forego the ability to enforce their patents against open source platforms such as Linux and OpenStack in order to support the overall marketplace, even if doing so might diminish the value of their own patent assets.[173]

In some cases, firms may seek a more direct payoff in exchange for their open source patent pledges. For example, Yochai Benkler explains IBM's support for the Linux operating system as motivated by its desire both to facilitate the development and improvement of the operating system run by its own hardware servers and to expand its own Linux-based service business.[174] He observes that "[w]ithin a span of four years, [IBM's] Linux-related services category moved from accounting for practically no revenues to providing double the revenues from all patent-related sources."[175] Similar conclusions have been drawn about Google's support for the Android mobile operating system and other corporate support for open source platforms.[176]

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172. *See supra* notes 27–31 and accompanying text.

173. *See* Parchomovsky & Mattioli, *supra* note 7, at 239–40 (discussing OIN's strategy and referring to it as a "defensive software patent sharing collective").

174. BENKLER, *supra* note 169, at 46. *See also* CYNTHIA CANNADY, TECHNOLOGY LICENSING AND DEVELOPMENT AGREEMENTS § 2.3 (Matthew Bender, rev. ed. 2015) (IBM's non-assertion pledge "is a licensing strategy to promote IBM products using Open Source . . . not an anti-IP strategy."); Robert P. Merges, Colloquium, *A New Dynamism in the Public Domain*, 71 U. CHI. L. REV. 183, 186 (2004) (analyzing IBM's Linux strategy as an essentially anti-Microsoft strategy).

175. BENKLER, *supra* note 169, at 46.

176. *See* Brian Behlendorf, *Open Source as a Business Strategy*, *in* OPEN SOURCES VOICES FROM THE OPEN SOURCE REVOLUTION 149 (Chris DiBona et al., eds. 1999); Richard Stallman, *The GNU Operating System and the Free Software Movement*, *in in* OPEN SOURCES VOICES FROM THE OPEN SOURCE REVOLUTION 53, 70 (Chris DiBona et al., eds. 1999) ("The 'Linux' magazines . . . are filled with advertisements for proprietary software that works with GNU/Linux . . . . The support of business can contribute to the community in many ways; all else being equal, it is useful."); Robert Young, *Giving it Away: How Red Hat Software Stumbled Across a New Economic Model and Helped Improve an Industry*, *in* OPEN SOURCES VOICES FROM THE OPEN SOURCE REVOLUTION 113–14 (Chris DiBona et al., eds. 1999); Bradley M. Kuhn, *The State of Free Software in Mobile Devices*, TECH. INNOVATION MGMT. REV. (Mar. 2010), http://timreview.ca/article/336 ("From Google's point of view, an easy-to-adopt, licensing-unencumbered platform will broaden their market . . . . Google wants to see Android adopted broadly in both Free Software and mixed Free/proprietary deployments.").

2. Collective Action

Markets are routinely confronted with collective action challenges in which each market participant understands that it will benefit from some action if taken by a large number of participants, but the participant itself is unwilling to incur the cost of taking the action.[177] Collective action problems often manifest themselves in the environmental arena, as all firms will likely benefit from taking measures to reduce emissions, conserve energy and use sustainable materials, but few are willing to incur substantial costs to advance these goals independently. Patent pledges made by groups of firms, such as the participants in the Eco-Patent Commons, can help to address such collective action problems and achieve common ends without excessive individual expenditures.[178]

Others have observed collective action issues in the area of patent litigation, inasmuch as firms that sell patents to non-practicing entities (NPEs) understand that by doing so they fuel potentially disruptive and costly NPE litigation, but are unwilling to forego the compensation that NPEs are willing to pay for their underutilized patents. As described in Part I.C.3.b above, a small but growing number of firms in the computing and telecommunications industries have sought to use patent pledges to stem the tide of NPE litigation.[179] Pledges not to transfer patents to NPEs, or to terminate licenses upon such transfers, are useful to the pledgor only to the extent that others make similar pledges.[180] Thus, like Inducement pledges, Collective Action pledges are made primarily in order to encourage action by others. However, the action that the pledgor seeks to induce here is not the adoption of a particular standard or technology platform, but the making of a similar patent pledge.

Coordinated pledges such as the Defensive Patent License (DPL)[181] expressly depend on the participation of multiple parties. But even individual non-NPE transfer pledges[182] derive most of their value from their ability to inspire, cajole and shame other like-minded firms and executives

177. *See, e.g.*, MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (2d ed. 1971) ("If the members of a large group rationally seek to maximize their personal welfare, they will *not* act to advance their common or group objectives unless . . . some separate incentive, distinct from the achievement of the common or group interest, is offered to members of the group individually").

178. *See supra* Section I.A.3.

179. *See supra* notes 107–109 and accompanying text.

180. When a patent holder transfers a patent to an NPE, it will typically obtain a promise from the NPE not to assert the patent against the original transferor. *See supra* Section I.C.3.b.

181. *See supra* notes 91–93 and accompanying text.

182. *See supra* notes 107–110 and accompanying text.

to make similar commitments. Thus, Collective Action pledges are made largely to induce imitative behavior by other firms in order to provide the pledgor with the benefits of a collective action.

3. Voluntary Restraint

In some cases, a patent holder may make a pledge in order to persuade the market, or particular market actors, that it will not assert its patents in a particular manner or against particular classes of infringers. In effect, the patent holder, by making the pledge, voluntarily ties its own hands to prevent itself from undertaking certain actions. This approach is often adopted when a fear exists, either across the market or among particular actors, that the patent holder is both able and likely to exert its patents in a manner that is viewed as undesirable.

The market actors to whom such pledges are often directed are governmental authorities, and the pledges are made to persuade such authorities to approve a transaction under review or to discontinue an investigation of the patent holder's activities. For example, collaborative standard setting by competitors can raise a host of antitrust concerns.[183] Patent pledges, and FRAND commitments in particular, limit the ability of firms participating in standards development to exclude competitors from the market for standardized products and to charge excessive prices for access to essential patents. As a result, antitrust and competition enforcement agencies in both the U.S. and Europe have found FRAND commitments to be one of the principal means by which firms can mitigate antitrust risk arising from collaborative standards development.[184]

While FRAND commitments, and most other forms of patent pledge, can generally be viewed as Voluntary Restraint pledges, there are more specific

183. *See* ABA ANTITRUST MANUAL, *supra* note 145, at 2 ("[U]nder certain circumstances, standards can create anticompetitive barriers to market entry, retard innovation, raise rivals' costs, facilitate collusion, and protect market position.").

184. *See In re* Certain Gaming and Entm't Consoles, Related Software, and Components Thereof, Third Party U.S. FTC's Statement on the Public Interest, Inv. No. 37-TA-752 at 3 (Jun. 6, 2012) ("RAND commitments mitigate the risk of patent hold-up, and encourage investment in the standard."); Fiona M. Scott-Morton, Deputy Assistant Att'y Gen. for Econ. Analysis, U.S. Dep't of Justice, The Role of Standards in the Current Patent Wars, Address Before the Charles River Associates Annual Brussels Conference: Economic Developments in European Competition Policy 5 (Dec. 5, 2012) (transcript available at http://www.justice.gov/atr/file/518961/download) ("FRAND commitments are designed to reduce occurrences of opportunistic or exploitative conduct in the implementation of standards. It is these commitments, along with other things, that make competition authorities more comfortable with these collective decisions.").

instances in which firms have made patent pledges to influence the decisions of antitrust enforcement agencies. For example, in early 2012, Apple, Microsoft and Google each made assurances to the U.S. Department of Justice (DOJ) that it would not seek injunctive relief against implementers of certain wireless telecommunications standards.[185] The impetus for these voluntary declarations was the pending review by the DOJ and the European Commission of three significant patent-based transactions: the $12 billion acquisition of Motorola Mobility by Google, the $4.5 billion purchase of a large patent portfolio from the estate of bankrupt Nortel Networks by Rockstar Bidco (a coalition including Microsoft, Apple, Research in Motion, Sony and Ericsson), and the acquisition by Apple of Novell's Linux patents.[186] The DOJ cited the pledges made by these three firms as key factors in its decision to approve the proposed acquisitions.[187] The European Commission, which also received such pledges, approved Google's acquisition of Motorola Mobility on the same day.[188]

Not all Voluntary Restraint pledges are made to appease enforcement agencies. In some cases, the intended audience for a Voluntary Restraint pledge may be a court. For example, Myriad Genetics recently came under intense public pressure for the pricing of its BRAC Analysis genetic diagnostic tests and threatening to assert its patents against academic institutions offering similar tests to the public.[189] Myriad's commercial practices led the American Civil Liberties Union (ACLU) to bring suit to invalidate the claims of seven Myriad patents, resulting in an unfavorable 2013 Supreme Court ruling,[190] as well as numerous legislative initiatives seeking to limit the availability or effectiveness of DNA-based patents.[191]

185. *DOJ 2012 Approval Statement*, *supra* note 104.

186. *See* Jorge L. Contreras, *The February of FRAND*, PATENTLY-O (Mar. 6, 2012), http://patentlyo.com/patent/2012/03/february-of-frand.html.

187. Joseph F. Wayland, Acting Assistant Att'y Gen., U.S. Dep't of Justice, Antitrust Policy in the Information Age: Protecting Innovation and Competition, Remarks as prepared for the Fordham Competition Law Institute 7 (Sept. 21, 2012), http://www.justice.gov/atr/file/518901/download ("The commitments made by Apple and Microsoft substantially lessened the Antitrust Division's concerns about potential anticompetitive use of FRAND-encumbered standard-essential patents."); *see also DOJ 2012 Approval Statement*, *supra* note 104.

188. Press Release, European Commission, Mergers: Commission Approves Acquisition of Motorola Mobility by Google (Feb. 13, 2012), http://europa.eu/rapid/press-release_IP-12-129_en.htm.

189. Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2114 (2013).

190. *Id.* at 2117.

191. *See, e.g.*, Genomic Research and Accessibility Act, H.R. 977, 110th Cong. (2007) (subsequent versions of this bill were introduced in several later Congresses).

Myriad's pledge not to assert its DNA patents against academic researchers,[192] a pledge that cost the firm relatively little in terms of real competitive ground, enabled it to represent to the court that it was not an aggressive enforcer of its patents, and that it broadly supported biomedical research.[193]

4. Philanthropic

Finally, a growing number of patent pledges are made with the outward goal of advancing social causes and public welfare. For example, the Eco-Patent Commons (EPC) explains that "[s]haring environmental patents can help others become more eco-efficient and operate in a more environmentally sustainable manner—enabling technology innovation to meet social innovation."[194] Likewise, numerous firms have pledged not to assert software patents against businesses having fewer than twenty-five employees in an effort to promote entrepreneurship and the growth of small businesses.[195]

All of these pledges can be characterized as supporting broad social welfare goals, either by promoting the unencumbered development of socially valuable technologies or by reducing the cost burden of patent litigation on an industry. The firms making such Philanthropic pledges are motivated by a range of factors, few of which are purely philanthropic. First, pledging firms themselves may benefit from the effects of their pledges. Thus, whether it is because the increased use of green technology will create a healthier environment and population, or because the growth of small businesses is believed to have a beneficial effect on the marketplace,

192. *Myriad Pledge*, supra note 51.

193. Brief for Respondents at 10, Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107 (2013) (No. 12-398) ("[S]ince the [Myriad] patents issued, over 18,000 researchers have conducted studies on BRCA1/2 genes, published over 8,000 papers, and conducted over 130 clinical trials. Indeed, one named plaintiff conceded that she may 'sequence the BRCA1 and BRCA2 genes for purely research purposes,' and has been doing so without impediment." (citations omitted)). Similar considerations may have motivated Monsanto to pledge not to assert patents covering its herbicide-resistant seeds against farmers onto whose fields such seeds may have been blown. *See Monsanto*, *supra* note 8; Brief for Respondents at 7 n.7, Bowman v. Monsanto Co., 134 S. Ct. 24 (2013) (No. 11-796) ("Monsanto has publicly committed not to assert its patent rights against persons who obtain its technology inadvertently.").

194. *Overview*, WORLD BUS. COUNCIL FOR SUSTAINABLE DEV., http://www.wbcsd.org/work-program/capacity-building/eco-patent-commons/overview.aspx (last visited Nov. 14, 2015) [hereinafter *EPC Overview*].

195. Software Small Business Pledge, *supra* note 9.

workforce and economy, the pledging firm may benefit directly from the collective effect of pledges supporting the same cause.[196]

Another, more direct, justification for Philanthropic pledges is the public relations (PR) benefit that often accompanies their announcement. If the value of the patents to the pledging firm is low, this PR benefit may actually exceed the value that is given up through the pledge. For example, the EPC acknowledges that the patents pledged by its members are not necessarily strategic to their primary businesses,[197] and that these firms receive positive publicity by supporting environmentally friendly initiatives.[198] In a related vein, firms that become the subject of *negative* publicity may seek to improve their public images by making pledges that seemingly benefit the public. The cost-benefit analysis in this case is relatively simple: a firm is better off pledging low-value patents in exchange for a PR benefit than allowing them to gather dust.[199]

Some pledges that fall predominantly into other categories may have some attributes of Philanthropic pledges. For example, Voluntary Restraint

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196. Note, however, that the potential to benefit from the collective effect of philanthropic pledges does not render such pledges Collective Action Pledges, as discussed in Section II.b.2, above. The difference being that the maker of a Philanthropic Pledge does not make the pledge primarily to induce other market actors to make the same pledge and thereby achieve some mutually-desired result, such as the reduction of NPE litigation.

197. In 2011, investigators studying the value of patents pledged to the Eco-Patent Commons (EPC) found that the number of patents that firms pledged to the EPC was very small in comparison to their overall patent portfolios, yet the patents did not appear to be substantially less valuable than other patents in the firms' portfolios. Bronwyn H. Hall & Christian Helmers, *Innovation and Diffusion of Clean/Green Technology: Can Patent Commons Help?*, 66 J. ENVTL. ECON. & MGT. 33, 47 (2013). However, the researchers also found that the EPC patents, on average, "tend to be more derivative of previous technologies and somewhat narrower than other patents in their class, suggesting that they are not for very radical innovations . . . and that they are less valuable." *Id.* at 48. For example, one of the patents that IBM pledged to the EPC relates to cardboard packaging inserts that are more environmentally friendly than the styrofoam packaging often used for computer products. Mary Tripsas, *Everybody in the Pool of Green Innovation*, N.Y. TIMES, (Oct. 31, 2009), http://www.nytimes.com/2009/11/01/business/01proto.html?_r=1.

198. The EPC is explicit about the PR benefits of participation, advertising that it "provides businesses with a global recognition of their leadership in contributing to sustainable development." *EPC Overview*, *supra* note 194.

199. In theory, it may also be possible to seek tax benefits from the voluntary contribution of patent rights to a public charity or tax-exempt organization. This theory has been used to great effect, though with increasing scrutiny by the U.S. Internal Revenue Service, in connection with the donation of conservation easements to charitable trusts. News Release, I.R.S., Treasury Issue Notice Regarding Improper Deductions for Charitable Contributions of Patents and other Intellectual Property (Sept. 30, 1998), https://www.irs.gov/pub/irs-news/ir-03-141.pdf; *see also* Belk v. C.I.R., 774 F.3d 221, 230 (4th Cir. 2014) (upholding I.R.S. ruling that provision within donor's conservation easement disqualified it from tax benefit).

pledges, which are primarily intended to assuage public or governmental concerns regarding the patent holders' use of patents, may also be characterized as actions taken for the public good, with concomitant PR benefits for the pledgors. The pledges made by Myriad Genetics and Monsanto likely fall into this category. While both firms cited their pledges in litigation to demonstrate voluntary limitations on their patent enforcement programs,[200] they also characterize these pledges as socially valuable on their web sites.[201]

Likewise, Inducement pledges directed toward the growth of industries perceived to promote social benefits can sometimes share attributes of Philanthropic pledges. Tesla's and Toyota's pledges, which clearly seek to promote the development of huge, new vehicle markets, can also be characterized as being made to promote environmental causes. The open source "movement" had ideological origins and has long been associated with ideals of volunteerism, transparency, sharing and openness.[202] Thus, though many patent pledges made with respect to open source code should be classified as Market Development pledges, elements of altruism and community spirit may also influence a firm's decision to make such pledges.

B. Actionable and Non-Actionable Pledges

Part II.A describes the economic and other motivations underlying four categories of patent pledges. Inducement pledges, while often differing in scope, structure and outcome, share a common goal of inducing market participants to support or adopt a particular technology platform that is beneficial, in some way, to the patent holder. The pledgor generally hopes that the pledgee will make investments based on the assurances contained in the pledge and forbear from adopting a competing technology. Voluntary Restraint pledges, while also seeking to induce action in others, generally have, as their target, governmental actors such as enforcement agencies or courts. The purpose of such pledges is not to influence technology adoption,

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200. *See supra* note 193 and accompanying text.

201. *See The Facts on Monsanto's Approach to Licensing*, MONSANTO, http://www.monsanto.com/whoweare/pages/seed-licensing.aspx (last visited Nov. 14, 2015); *Myriad Pledge*, *supra* note 51.

202. *See, e.g.*, GLYN MOODY, REBEL CODE: INSIDE LINUX AND THE OPEN SOURCE REVOLUTION 24 (2001); ERIC S. RAYMOND, THE CATHEDRAL AND THE BAZAAR 21 (Tim O'Reilly ed., rev. ed. 2001) ("[T]he Linux community seemed to resemble a great babbling bazaar of differing agendas and approaches . . . out of which a coherent and stable system could seemingly emerge only by a succession of miracles.").

but the outcome of an investigation or adjudication in a manner favorable to the patent holder. Philanthropic pledges, which promote some social good, are intended to yield some measure of benefit to the patent holder, but have less impact on the behavior of others. These characteristics are summarized in *Table 7* below.

Table 7
Actionable and Non-Actionable Patent Pledges

Type of Pledge	Motivation	Action by Others	Actionable
Inducement	Induce market to adopt a particular standard or technology platform favored by the pledgor	Invest in technology adoption, forbear from pursuing alternative technologies	Yes
Collective Action	Achieve a collective goal that is beneficial to the pledgor	Make a similar pledge	Usually
Voluntary Restraint	Persuade market/actors that pledgor will not fully assert patents	Ruling/determination in favor of pledgor	Sometimes
Philanthropic	Improve pledgor's public relations	Develop favorable impression of pledgor	Seldom

Table 7 also indicates the degree to which each type of patent pledge should be "actionable." That is, whether the pledge should be viewed and acknowledged as a binding legal obligation, all other things being equal.[203]

Historically, firms have made public pledges in a variety of contexts and for a range of purposes. Firms regularly pledge to respect the environment, to support family values, to avoid unfair labor practices, to encourage healthy eating and to assist in disaster relief activities. It is generally understood that these hortatory statements, while perhaps offering some indication of the firm's values and general commitment to the public welfare, are seldom treated as binding legal obligations. They are not actionable. Why? Because they generally do not, and are not intended to, induce action or forbearance in others.

On the other hand, some types of promises made by firms are treated as enforceable commitments. For example, corporate statements regarding the

203. In Contreras, *Market Reliance*, *supra* note 78, at 501–38, the author considers in detail a range of legal theories that have been advanced to support the enforceability of FRAND commitments and similar patent pledges. The pledges considered in that article are, by and large, those that are deemed to be "actionable" in this article.

handling of personal data are considered binding and enforceable by the Federal Trade Commission.[204] It warns that "[w]hen companies tell consumers they will safeguard their personal information, the FTC can and does take law enforcement action to make sure that companies live up [to] these promises."[205]

In order for a corporate pledge to be actionable, it should be of a type that would reasonably be assumed by the pledgor to induce action or forbearance in the pledgee. Thus, Inducement and Collective Action pledges, which are intended to induce market actors to take some affirmative action, whether investing in a particular technology in lieu of others or making a similar pledge to reduce overall NPE litigation, should be considered actionable. Likewise, a Voluntary Restraint pledge proffered to a regulatory agency to persuade it to discontinue an investigation or approve a proposed transaction should carry the weight of full legal enforceability.[206] However, Voluntary Restraint pledges that are made in the context of litigation may be less actionable, as a court would be less likely to rely on such a pledge unless it were embodied in a binding order or consent decree.[207] Finally, Philanthropic pledges, which serve primarily to portray the pledgor in a positive public light, seem to have little likelihood of inducing action, investment or forbearance in the intended audience. Thus, Philanthropic pledges should generally not be considered to be actionable.

III. A REGISTRY FOR PATENT PLEDGES

As discussed in Part II, patent pledges, in all their diversity, can support important economic and social goals. Yet if actionable patent pledges are to provide the basis for significant market activity and investment, they must to some degree be legally enforceable by the individuals and firms to whom

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204. *Enforcing Privacy Promises*, FED. TRADE COMM'N, https://www.ftc.gov/news-events/media-resources/protecting-consumer-privacy/enforcing-privacy-promises (last visited Nov. 14, 2015).

205. *Id.*

206. *See DOJ 2012 Approval Statement*, *supra* note 104 (discussing pledges made in support of *DOJ 2012 Approval Statement*).

207. Though U.S. antitrust enforcement agencies possess the authority to enter into binding consent orders with firms, this practice is not always followed, particularly in the context of merger approvals. *See* Farrell Malone & J. Gregory Sidak, *Should Antitrust Consent Decrees Regulate Post-Merger Pricing?*, 3 J. COMP. L. & ECON., 471, 475–76, (2007) (Discussing DOJ's preference for structural remedies in mergers, over types of conduct remedies embodied in consent decrees).

they are made. Several theories currently exist regarding the best means for enforcing patent pledges. These include common law contract, antitrust, promissory estoppel, equitable servitude and patent misuse.[208] But whichever theories of enforcement eventually prevail, a key factor in most, if not all, of them is the degree to which the beneficiaries of an actionable pledge were, or should have been, aware of the existence and terms of the pledge.[209]

A. The Notice Function of Patent Pledges

Recent scholarship has recognized the "notice" function of patents—a patent's public disclosure of the metes and bounds of the claimed invention—as a key feature of the patent system.[210] The argument is simple: in order for a property-based system to function efficiently, participants in the system must understand the scope of the property rights in question.[211] The recent debate over patent notice has focused largely on the perceived vagueness and indeterminacy of many patent claims,[212] but the need for

208. *See* Contreras, *Market Reliance*, *supra* note 78, at 501–38 (summarizing competing theories).

209. I have previously proposed that a market participant need not show specific reliance to enforce a patent pledge, so long as the pledge is made publicly in a market that is characterized by such commitments. Contreras, *Market Reliance*, *supra* note 78, at 542–43. But in order for reliance to be justified without specific knowledge of a pledge (what I have termed "market reliance"), pledges in the relevant technology market should be relatively common and well understood. If they are not, then market actors, in general, would be less justified in proceeding under the assumption that a particular patent were pledged (e.g., if all pledges were made behind closed doors). Thus, even under a market reliance theory, it is beneficial for pledges to be made in a public and conspicuous manner and disseminated widely.

210. *See, e.g.*, FTC EVOLVING IP MARKETPLACE, *supra* note 115, at 75–76; JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 8–11 (2008); Herbert J. Hovenkamp, *Notice and Patent Remedies*, 88 TEX. L. REV. 221, 224 (2011).

211. *See* Abraham Bell & Gideon Parchomovsky, *Of Property and Information*, __ COLUM. L. REV. __ (forthcoming 2016) ("[k]nowledge about title to property rights is crucial to enjoying their value").

212. *See, e.g.*, FTC EVOLVING IP MARKETPLACE, *supra* note 115, at 75–76; BESSEN & MEURER, *supra* note 210, at 54–61. Similar complaints have been made with respect to the vagueness of FRAND commitments and other patent pledges. *See, e.g.*, FTC EVOLVING IP MARKETPLACE, *supra* note 115, at 192 ("Panelists complained that the terms RAND and FRAND are vague and ill-defined"); Contreras, *Fixing FRAND*, *supra* note 60, at 52 ("[I]t is a common complaint that FRAND commitments are vague and offer little, if any, useful guidance"); Richard J. Gilbert, *Deal or No Deal? Licensing Negotiations in Standard-Setting Organizations*, 77 ANTITRUST L.J. 855, 859 (2011) ("[T]he 'fair and reasonable' [component] of FRAND is often inherently ambiguous"); Lemley, *Standard-Setting Organizations*, *supra* note 11, at 1964 ("[W]ithout some idea of what those terms are, reasonable and nondiscriminatory

patent-related information, such as the identity of patent owners, to be readily available to the public has also attracted attention.[213]

It is this last feature that relates most directly to patent pledges. In order for a pledge to achieve the pledgor's desired effect, whether to induce the market to adopt a particular technology platform, to endorse a particular interoperability standard or to view the pledgor in a more favorable light, broad public dissemination or "notice" of the pledge is desirable. Likewise, in order to extend the benefit of the pledge to the entire intended category of beneficiaries, whether it constitutes a promise not to enforce a patent, to charge a reasonable royalty rate or not to seek injunctive relief against infringers, broad public notice is also desirable. But despite these twin pressures toward broad dissemination and notice of pledges, many patent pledges falter as to the notice function. This Part discusses the ways that the notice function of patent pledges may fail to be achieved.

1. Obscurity: Where Are All the Pledges?

As described in Part I, patent pledges may be made in a variety of ways, from formal documents submitted to SDOs, to Congressional testimony, speeches and corporate press releases. In terms of offering broad notice to the relevant marketplace, pledges made through the formal disclosure processes of an SDO are the most likely to meet this standard. SDOs often publish patent and licensing disclosures online.[214] SDO participants should have (or should at least be deemed to have) a high degree of awareness of the patent-related disclosures made with respect to standards on which they are collaborating.

Manufacturers who intend to sell a product that will comply with a particular standard may, in some cases, have a similar level of awareness of pledges made regarding the standard. Thus, a firm that wishes to enter the

licensing loses much of its meaning."); Lichtman, *supra* note 11, at 1031 ("It is something of an outrage that the language of the RAND commitment offers so little guidance as to its proper interpretation."); Miller, *supra* note 11, at 357 (reviewing earlier literature in this vein); Deborah Platt Majoras, Chairman, Fed. Trade Comm'n, *Recognizing the Procompetitive Potential of Royalty Discussions in Standard Setting* (Sept. 23, 2005), at 5, https://www.ftc.gov/sites/default/files/documents/public_statements/recognizing-procompetitive-potential-royalty-discussions-standard-setting/050923stanford.pdf ("Experience has shown, however, that some agreements on RAND rates can be vague and may not fully protect industry participants from the risk of hold up.").

213. *See* BESSEN & MEURER, *supra* note 210, at 62–63 (criticizing patent prosecution practices that tend to hide claim language from the public for extended periods).

214. *See supra* notes 12–13 and accompanying text.

market for USB hubs might reasonably be expected to research the status of patents covering the USB standard and pledges that exist with respect to such patents. On the other hand, the manufacturer of a laptop computer that will implement more than 250 different standards[215] may not have the resources, time or personnel to undertake an equivalent search, and will likely be unaware of particular pledges made with respect to patents claiming aspects of those standards.

Outside the regime of formal standard-setting, specific awareness of patent pledges may drop off further. While a corporate press release or speech containing a patent pledge may attract significant media and industry attention when it is made, both news cycles and memories are short, and such pledges may be forgotten, or never noticed, by those who might potentially benefit. The lack of a tie to a particular technical standard may also make pledges more difficult to identify through searching. Thus, while the USB hub manufacturer wishing to find pledges relating to the USB standard could, with only modest effort, search for pledges relating to this well-known standard, the difficulty of locating relevant pledges increases dramatically when the product is a software application, a genetic test or an energy efficient vehicle.

2. Impermanence

Closely related to the problem of *finding* patent pledges is the problem of *preserving* them after they are made. Even if a pledge is initially made in a public and widely observed manner, issues can arise if it is later taken down, modified or moved to a new web address. In fact, it is nearly impossible to verify whether pledges made years ago have been altered, subtly or not, by their makers. And if pledges simply disappear from the web, what is their ongoing status? Should a patent holder be expected to honor a pledge that it took down years ago? Would it matter if the firm seeking to enforce the pledge did not exist when the pledge was made, or when it was taken down? These questions are far from hypothetical. Online content is notoriously volatile.[216] And numerous patent pledges have already

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215. *See* Brad Biddle et al., *How Many Standards in a Laptop? (And Other Empirical Questions)*, 2010 INT'L TELECOMM. UNION SEC. TELECOMM. STANDARDIZATION KALEIDOSCOPE ACAD. CONF. PROC. 123, 123 (2010), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1619440 (finding 251 standards implemented in a single laptop computer "out of the box").

216. *See* Raizel Liebler & June Liebert, *Something Rotten in the State of Legal Citation: The Life Span of A United States Supreme Court Citation Containing an Internet Link (1996–*

been affected by ambiguities arising from the disappearance of online links and content.

For example, in 2011 the Eco-Patent Commons (EPC) announced that Hitachi pledged an unidentified patent relating to parts recycling.[217] By mid-2012, however, Hitachi was no longer listed as an EPC member, and its patent was not listed in the EPC's catalog of pledged patents.[218] The Ground Rules of EPC provide that once a patent is pledged to EPC, that pledge cannot be revoked, even if the patent owner withdraws from EPC.[219] Thus, a Hitachi patent may still be pledged, but the identity of the patent and any other terms of the pledge can no longer be found. And though Web archival services such as WayBackMachine.com can help, their results are ad hoc and cannot be relied upon to provide a complete picture of the worldwide web at every moment in the past.

3. Successor Obligations

In today's dynamic technology marketplace, patents are being transferred in larger numbers and with greater rapidity than ever before.[220] Particularly in the ICT industry, patents transferred in large portfolio sales, corporate mergers and other transactions often have been subject to patent pledges. What happens to a patent pledge when the original pledgor transfers the underlying patent to a third party? Do such pledges travel with patents, binding their new owners, or are they personal commitments binding only on the original promisor?

This question was central to the FTC's 2008 action against Negotiated Data Solutions (N-Data), the successor to a patent essential to IEEE's fast Ethernet standard. Shortly after acquiring the patent, N-Data announced that

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2010), 15 YALE J.L. & TECH. 273, 273 (2013) (finding nearly one third of web links cited in Supreme Court opinions from 1996–2010 are dead).

217. Press Release, World Bus. Council for Sustainable Dev., Hitachi, Ltd. joins Eco-Patent Commons, (July 25, 2011) http://www.wbcsd.org/Pages/eNews/eNewsDetails.aspx?ID=184&NoSearchContextKey=true.

218. *E-PC ALL Pledged Patent*, ECO-PATENT COMMONS (May 2011), http://ecopatentcommons.org/sites/default/files/docs/ecopatent-database.pdf (database of all pledged patents, updated May, 2011).

219. *Frequently Asked Questions*, *supra* note 36.

220. *See* U.K. INTELL. PROP. OFF., PATENT THICKETS—AN OVERVIEW 17 (2011) (U.K.); Tom Ewing & Robin Feldman, *The Giants Among Us*, 2012 STAN. TECH. L. REV. 1 (2012); *Top 10 Patent Sales of 2012*, IDEABUYER.COM (Feb. 20, 2013), http://www.ideabuyer.com/news/top-10-patent-sales-of-2012/ (listing 2012 patent sales totaling $20 billion and encompassing thousands of patents).

it would not honor the original patent owner's commitment to license the patent to all implementers for a flat fee of $1,000.[221] The FTC alleged that N-Data's disregard for the original patent pledge amounted to an unfair method of competition in violation of the FTC Act.[222] The action was settled with N-Data agreeing to honor the original owner's patent pledge.[223]

The issue arose again in 2011, when bankrupt Nortel Networks, a major contributor to many telecommunications and computer networking standards, proposed the sale of its remaining assets, including approximately 4,000 patents, on a "free and clear" basis.[224] Several product vendors, together with IEEE, raised concerns that Nortel's "free and clear" sale could invalidate patent licensing commitments that Nortel had previously made to several SDOs.[225] Ultimately, the purchaser of the patents, a consortium including several large product vendors, agreed to abide by Nortel's prior licensing pledges.[226]

To address the transfer of patent pledges along with underlying patents, an increasing number of SDOs are requiring that purchasers of patents be bound by pledges made by prior owners. This approach has been endorsed almost universally by commentators and regulatory agencies that have considered it.[227] Nevertheless, problems can arise. Patent holders may fail to notify purchasers about long-ago pledges, or may fail to impose adequate contractual provisions binding the purchasers to abide by those pledges. Such contractual commitments may not be enforceable for one reason or another, and the original patent holder may have little incentive, if it is even still in existence, to enforce those provisions against the purchaser. In such cases, a recalcitrant purchaser is more likely to avoid a pledge obligation if it can convincingly argue that it was unaware of the pledge when it acquired the relevant patents.

Moreover, the vast majority of SDOs have not yet implemented such requirements, leaving the enforcement of patent pledges against subsequent

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221. Negotiated Data Solutions LLC, No. 051-0094, 2008 WL 4407246, at *4 (F.T.C. Sept. 22, 2008) [hereinafter N-Data Order].

222. *Id.* at *6.

223. *Id.* While N-Data acknowledged that the acquired patent was subject to a FRAND commitment, it declined to honor the original patent owner's flat license fee of $1,000. *Id.*

224. *In re* Nortel Networks Inc., No. 09-10138(KG), 2011 WL 4831218 at *6 (Bankr. D. Del., Jul. 11, 2011). Under Section 363(f) of the U.S. Bankruptcy Code, a bankruptcy trustee or debtor-in-possession may sell the bankruptcy estate's assets "free and clear of any interest in such property." *Id.* at 9.

225. *See id.* at 13.

226. *Id.* at 9.

227. *See* NAS REPORT, *supra* note 45, at 93–94; Hesse, Looking Back, *supra* note 115, at 19; Kühn, *supra* note 119 at 4; Kesan & Hayes, *supra* note 11, at 254–55.

owners determined solely as a matter of law. And despite cases such as *N-Data*, which was settled prior to adjudication, it is not clear that either common law or antitrust law definitively bind the acquirer of a patent to honor a pledge made by a previous owner.[228]

B. Considerations Regarding a Patent Pledge Registry

As observed by Abraham Bell and Gideon Parchomovsky, registries are "the most common means of conveying information about property rights."[229] Douglas Baird and Thomas Jackson outline the traditional justification for property registration systems: they increase public information about property rights and thereby enable a wide range of efficient and value-enhancing transactions to occur.[230] Bell and Parchomovsky add to this conventional account two additional functions of property registries: their tendency to frustrate illicit and non-consensual transactions in property and to give true property owners assurances regarding their title, thus enabling them to more fully enjoy their rights.[231] In view of these general benefits, it is worth considering whether the creation of a public registry of patent pledge information could help to address the challenges of enforcement, notice, permanence and transfer described in Section III.A above.

1. The Registration Regime for Patent Transfers and Licenses

Registration systems for real property transfers in the United States are generally traced to the Massachusetts Bay Colony's 1640 Recording Act,[232] though the practice of recording title deeds did not become widespread until the nineteenth century.[233] Title recording systems developed in order to create a public record of title transfers, good against both the parties to a

228. Congress, however, could impose such a requirement. For example, it could amend the Patent Act to provide that an acquirer of a patent be bound to honor any patent pledge entered in the appropriate registry prior to the acquisition. Such a requirement would do much to alleviate concerns regarding the viability of pledges following patent transfers.

229. Bell & Parchomovsky, *supra* note 211, at 10.

230. Douglas G. Baird & Thomas H. Jackson, *Information, Uncertainty, and the Transfer of Property*, 13 J. LEGAL STUD. 299 (1984).

231. Bell & Parchomovsky, *supra* note 211, at 19–23.

232. R. POWELL & P. ROHAN, 14 POWELL ON REAL PROPERTY § 82.01[1] (Michael Allan Wolf ed., 2015).

233. *See* BENITO ARRUÑADA, INSTITUTIONAL FOUNDATIONS OF IMPERSONAL EXCHANGE: THEORY AND POLICY OF CONTRACTUAL REGISTRIES 55 (2012).

transaction and third parties.[234] Similar title recording systems exist with respect to other forms of valuable personal property including automobiles, aircraft, ships and even bicycles.[235]

In many jurisdictions, the sale or other transfer of a patent must be recorded in a governmental registry in order to have legal effect.[236] Though the U.S. PTO offers a recording system for patent transfers, recording of a patent transfer is not required in order to make the transfer valid. Instead, the U.S. recording system for patent transfers is similar to so-called "notice" recording statutes for real estate, in which recording protects a purchaser against a subsequent purchaser of the same patent.[237] Section 261 of the Patent Act provides that: "an assignment, grant or conveyance shall be void as against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage."[238]

The statute thus encourages recordation of patent transfers by making unrecorded transfers vulnerable to supersedure by subsequent transfers made without notice of the prior transfer. Nevertheless, because the recording of patent transfers remains voluntary in the U.S., many patent transfers go unrecorded, creating a level of ambiguity regarding the ownership of patents.[239]

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234. *Id.*

235. *See* THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 912–17 (2d ed. 2012); Bell & Parchomovsky, *supra* note 211, at 24–25. While patents are governmental grants of rights and not personal property, per se, patents are, by statute in the U.S., treated in many respects as though they were personalty. 35 U.S.C. § 261 (2012) ("Subject to the provisions of this title, patents shall have the attributes of personal property.").

236. JAY DRATLER, JR., 2 LICENSING OF INTELLECTUAL PROPERTY § 8.02[1] n.9 (2015 update) (calling the requirement to record transfers and assignments of patents outside the U.S. "nearly universal" with multiple citations to foreign law).

237. *See* MERRILL & SMITH, *supra* note 235, at 916.

238. 35 U.S.C. § 261 (2012).

239. *See* NAS REPORT, *supra* note 45, at 90–91 (suggesting administrative changes to facilitate and encourage recording of patent transfers); Susan G.L. Glovsky, *It's Time for a Reliable System to Determine Who Owns a U.S. Patent*, PATENTLY-O (Mar. 6, 2012), http://patentlyo.com/patent/2012/03/patent-recordation.html. Similar issues exist regarding failure to record patent transfers in Europe and other jurisdictions. *See* NAS REPORT, *supra* note 45, at 116. The recordation of patent transfers is mandatory in Japan, which has led to criticism of the Japanese recording system as inefficient and detrimental to parties. Nakoho Ono, *Avoid Japanization: Lessons from Japanese Gridlock on the Patent Recordation System*, SOC. SCI. RES. NETWORK (Mar. 2, 2012), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2015119.

Like patent transfers, licenses of patent rights may be recorded in the PTO.[240] However, unlike transfers, patent licenses need not be recorded in order to survive against subsequent competing licenses.[241] Whereas an unrecorded patent transfer may not be recognized if the patent holder later transfers the patent to a buyer that lacks notice of the prior transfer, an unrecorded patent license *will* be recognized even if a later license is purported to be granted.[242] Accordingly, there are few reasons to record patent licenses,[243] and doing so may actually disadvantage the parties to the license by disclosing confidential information contained in the license.[244] Consequently, it is likely that only a small percentage of patent licenses are actually recorded at the PTO.

Given this history, it may seem that recording patent pledges, which fall even below patent licenses in terms of formality and definiteness, would be inadvisable or, at best, of little value. However, as discussed in the following section, such recording could have significant positive benefits.

2. Potential Benefits of a Patent Pledge Registry

A unified, public patent pledge registry would address many of the issues facing patent pledges described in Section III.A. First, the recording of pledges in a public registry would provide broad and accessible notice of pledges when they are made. Although some SDOs already maintain registries of patent pledges, these registries relate solely to the SDO's standards and are not generally linked to or searchable with other SDOs' records. Moreover, many SDO registries are accessible only by SDO members, limiting their usefulness to the broader market. And, most importantly, there is no registry or consolidated public record of patent pledges outside these few SDOs. The existence of a single, trusted public pledge repository could reduce the burden on SDOs to maintain public

240. USTPO, MPEP § 313 (9th ed. Mar. 2014), http://www.uspto.gov/web/offices/pac/mpep/s313.html [hereinafter MPEP].

241. *See* David J. Dykeman & Daniel W. Kopko, *Recording Patent License Agreements in the USPTO*, INTELL. PROP. TODAY, Aug. 2004, at 18, 18; DRATLER, *supra* note 236, at § 8.02[1].

242. Dykeman & Kopko, *supra* note 225, at 18 n.7 (citing Moldo v. Matsco, Inc. (*In re* Cybernetic Services, Inc.), 252 F.3d 1039 (9th Cir. 2001)).

243. According to the PTO, patent licenses are recorded "in the public interest in order to give third parties notification of equitable interests or other matters relevant to the ownership of a patent or application." MPEP, *supra* note 240, at § 313.

244. *But see* DRATLER, *supra* note 236, at § 8.02[1] ("There is no harm in recordation and perhaps some benefit from the grantee's point of view. In the event of a conflicting license or transfer, the grantee may argue that its beneficiary should have checked the public records.").

databases of their own, and would have the added benefit of imposing a needed level of consistency and convenience on disclosures that are today scattered across multiple web sites and presented in a wide range of incompatible formats.

Second, a public registry of patent pledges could strengthen legal arguments regarding the reliance of intended beneficiaries on pledges. Under the U.S. Copyright Act, recording the transfer or exclusive license of a copyright "gives all persons constructive notice of the facts stated in the recorded document."[245] While no corresponding provision exists in the U.S. Patent Act, it is arguable, certainly by analogy to copyright law and many examples from the common law of real property conveyancing,[246] that third parties operating in the relevant marketplace should be aware of pledges when they are registered.

Third, a registry of patent pledges would preserve the content of pledges against subsequent alteration and disappearance. As discussed in Section III.A.2, many patent pledges can be altered or taken down by the patent holder with ease and very few repercussions. A permanent public registry of patent pledges would create a historical record showing when pledges were made and on what terms.

Finally, a recording system could reliably notify patent acquirers of pledges made with respect to the patents they are acquiring, improving the odds that pledges will be honored by subsequent patent owners in the first instance (i.e., without litigation), and increasing the odds, should litigation occur, that the subsequent owner will be required to honor the pledge.[247]

3. Promoting the Use of a Patent Pledge Registry

The public registry proposed above would be of little value if firms failed to use it to register their patent pledges. There are three usage regimes that could be implemented with respect to such a registry system: (a) an entirely voluntary system, (b) a voluntary system with incentives to participate, and (c) a mandatory system.

a. Voluntary Registration

An entirely voluntary registration system, though probably easiest to implement, is not likely to yield significant benefits. As noted in Section

245. 17 U.S.C. § 205(c) (2012). *See also* DRATLER, *supra* note 236, at § 8.02[2] n.17.
246. *See, e.g.*, MERRILL & SMITH, *supra* note 235, at 917.
247. *See supra* note 228, and accompanying text.

III.B.1 above, the PTO's current voluntary registration system for patent licenses is seldom used.[248] Likewise, other voluntary disclosure/registration systems relating to patent pledges have had mixed success. On one hand, the IETF permits voluntary disclosure of patent licensing terms,[249] with hundreds of pledges reported in its online database.[250] On the other hand, both IEEE and ETSI offer participants a means for voluntarily disclosing licensing terms such as maximum royalty rates, but only a handful of firms have made disclosures over the past several years.[251] There are several possible reasons that firms fail to take advantage of voluntary registration systems: there is an inherent cost associated with marshaling, submitting and managing registrations; firms may prefer, for competitive reasons, to keep as much information as possible regarding their patents confidential; and firms may fail to recognize value in participating in a registration system. Accordingly, it is not likely that a purely voluntary registration system would yield significant benefits.

b. Mandatory Registration

Reporting systems that are governmentally mandated present numerous issues of implementation, administration and enforcement. Such systems require a motivated agency with adequate funding and authority to oversee the development and operation of the system and then to police compliance on an ongoing basis.[252] Moreover, mandating registration of patent pledges would necessitate the development of clear rules delineating which pledges must be registered. Drawing a clear and enforceable distinction between actionable and non-actionable pledges would present difficulties and opportunities for dispute. While none of these obstacles is insurmountable, it seems that mandating the registration of patent pledges at a governmental level might not be optimal.

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248. Unlike registration systems for patents, trademarks and copyrights, in which registration provides direct benefits to the registrant, registration of licenses currently offers no significant benefits to the licensor. *See supra* notes 241–244, and accompanying text.

249. *See supra* Section I.D.2.a (unilateral pledges in SDOs).

250. *See* IETF DATATRACKER, *supra* note 97; Contreras, *Ex Ante*, *supra* note 13, at 181.

251. Contreras, *Ex Ante*, *supra* note 13, at 206 n.134.

252. The need for a motivated agency that views the registration system as core to its mission is not to be underestimated. Mandatory registration of patent licenses with the USPTO was ordered by the court in *Rudenberg v. Clark*, 72 F. Supp. 381 (D. Mass. 1947). Based on a 2014 inspection of PTO records, it appears that no such licenses were ever recorded. *See* Contreras, *FRAND History*, *supra* note 65, at 97. *Cf.* Jeff Schwartz, *The Conflict Minerals Experiment*, 6 HARV. BUS. L. REV. _ (forthcoming 2015) (recounting the failure of the SEC's conflict mineral reporting system).

Registration of pledges in a public registry could, however, be mandated by SDOs and other private organizations. Imposing a registration obligation at the SDO level would have both advantages and disadvantages. A principal advantage of SDO-mandated registration includes the relative ease of defining which pledges to register (i.e., all pledges made with respect to the SDO's standards). In fact, as noted in Section I.A, many SDOs already require the registration and publication of pledges made with respect to SDO standards. Moving from a plethora of individual SDO repositories to a single, centrally-managed public repository would represent a change in format, but not in the basic registration requirements that already exist at these SDOs.

There are, however, disadvantages in relying on SDOs to mandate the registration of patent pledges. First, SDOs generally operate by consensus voting, and to the extent that certain SDO members opposed a registration requirement (e.g., in order to facilitate the alteration or retraction of their pledges), the requirement might not be approved. Moreover, as established at the outset of this article, patent pledges made within the context of SDOs represent only a fraction of the pledges being made in the market, and a system that fails to address the large body of non-SDO pledges will remain substantially incomplete.

c. Voluntary Registration with Encouragement

Given the weakness of both voluntary and mandatory registration systems, it is possible that the optimal means for establishing a useful and complete patent pledge registration system is through a voluntary public repository, the use of which is encouraged by affirmative governmental incentives. Such incentives might include lessening antitrust penalties for allegedly anticompetitive conduct involving pledged patents, similar to the relief from antitrust liability offered to joint ventures under the National Cooperative Research and Production Act (NCRPA).[253] For example, firms engaged in standard-setting have been charged with violations of Section 2 of the Sherman Act for allegedly engaging in exclusionary conduct through deception regarding their patents.[254] Similar claims have been brought under

253. 15 U.S.C. §§ 4301–06 (2012). The NCRPA permits firms that wish to engage in joint research or production to make a public notification listing their names and the scope of their joint activity, whereupon they are relieved of certain antitrust liability, including treble damages under the Sherman Act.

254. *See, e.g.*, Broadcom Corp. v. Qualcomm, Inc., 501 F.3d 297, 314 (3d Cir. 2007) (explaining that a patent holder's intentionally false promise to license standards-essential patents "harms the competitive process by obscuring the costs of including proprietary

Section 5 of the FTC Act, which prohibits unfair methods of competition.[255] If a patent holder made and registered a pledge to grant licenses on FRAND terms, it could be immunized from these deception-based antirust claims, while still facing potential liability under estoppel, contract and other theories. The rationale for eliminating these deception-based claims in such cases is straightforward: the public registration of patent pledges improves public notice of pledges, lessening patent holder opportunities for deception.

4. Designing the Registry

Any public registry of patent pledges would require careful planning and design. The Patent Pledge Database[256] is a first step in this direction. It was created in order to provide a publicly-accessible and stable repository of patent pledges. The database contains a PDF image of each patent pledge, made at the time the pledge was entered into the database, which provides some proof against subsequent changes.[257] This repository, however, only contains pledges that have been identified by the curators and other volunteers, and does not permit self-registration of pledges by patent holders. As such, it cannot claim to be definitive or comprehensive.

A preferable arrangement might be a truly public repository maintained by a governmental agency or a non-governmental organization (NGO). Such a repository should be open to all patent pledges and permit registration by patent holders. If the repository were hosted by a national patent office or offices, pledges could be linked directly to patent records, making them convenient to locate and providing notice to anyone reviewing the relevant patent records. The U.S. Patent and Trademark Office (PTO) and European Patent Office (EPO) already have searchable electronic databases, which could conceivably be modified to accommodate pledge information with a reasonable amount of effort. Moreover, both the PTO and EPO have already initiated programs of cooperation with leading SDOs to coordinate their efforts, including by incorporating more standards-

technology in a standard and increasing the likelihood that the patent rights will confer monopoly power on the patent holder").

255. *See, e.g.*, *In re* Rambus, Inc., F.T.C. Dkt. No. 9302 (Liability Opinion, July 31, 2006), rev'd, 522 F.3d 456 (D.C. Cir. 2008), cert. denied, 555 U.S. 1171 (2009); *In re* Dell Computer Corp., 121 F.T.C. 616 (1995).

256. *See supra* note 14, and accompanying text.

257. In the three years that the Patent Pledge Database has been operational, it has already served to preserve numerous "disappearing" pledges. *See* Patent Pledge Database, *supra* note 14.

related information into existing prior art databases.[258] As a result, patent offices such as these would be logical agencies to host and maintain such public pledge repositories.[259]

A key question to consider in the design of a public registry is the kind and quantity of information to include in it.[260] A public repository of patent pledges should, at a minimum, include information regarding the maker of the pledge, the patent(s) affected, and the features of the pledge itself. As far as format, patent holders should probably be permitted to describe their patent pledges in a manner of their choosing, but should also include some form of classification system (possibly based on the categories described in Part I) to enable efficient searching and analysis of large numbers of recorded pledges.

Once a pledge is registered, it should be date-stamped and "frozen" to avoid ambiguity regarding its scope at the time made. Of course, if a patent holder later wishes to change or retract such a pledge, the registry should not prohibit it from doing so, provided that such changes and retractions are similarly date-stamped and recorded, and all prior versions of the pledge remain publicly-accessible.[261]

CONCLUSION

Patent pledges are made in a wide variety of industries and contexts. Yet careful analysis of these pledges identifies both commonalities and differences among them. The four-part taxonomy developed in this article classifies patent pledges based on the economic and other motivations that lead patent holders to make them. Classification on this basis sheds light on the anticipated effect that these pledges have on other market actors. That is,

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258. *See* NAS REPORT, *supra* note 45, at 32.

259. Other possible hosts include the World Intellectual Property Organization (WIPO), a United Nations organization that already handles numerous international intellectual property matters, and the International Organization for Standardization (ISO). The drawback of these organizations as compared to national patent offices is the lack of a linkage to existing patent databases. Finally, a new international organization could be created to host and maintain such a repository.

260. Bell & Parchomovsky, *supra* note 211, at 47–48.

261. Of course, permitting the patent holder such flexibility should not be interpreted as allowing it to renege on pledges once made, or to circumvent SDO or other community rules prohibiting alterations or retractions. *See, e.g.*, *supra* note 219 (discussing Eco-Patent Commons rule prohibiting retraction of pledges once made). The legal effect of alterations or retractions will thus depend on numerous factors. The purpose of the registry should simply be to provide a public and reliable repository for all such changes, along with all prior versions of such pledges for evidentiary and reference purposes.

Inducement and Collective Action pledges each seek to induce market actors to adopt a particular technology platform that will benefit the pledgor, and to make investments and forego other opportunities based on that choice. As such, these pledges should be treated as legally-enforceable or "actionable" obligations. Voluntary Restraint pledges, to the extent that they are intended to influence governmental actors in approving transactions or exonerating behavior by patent holders, should also be actionable. However, Philanthropic pledges that are made primarily to achieve social ends and positive public relations benefits do not induce the same level of action or forbearance in market actors, and therefore should not be considered actionable.

In order best to avoid the pitfalls of obscurity, impermanence and transfer that may affect actionable pledges made in today's environment, this article recommends the establishment of a government-managed registry of patent pledges. While governmental mandating of registration presents numerous administrative and legal issues, and mandating registration by SDOs would address only a subset of the actionable pledges being made, a voluntary registration system coupled with governmental incentives to registration could achieve significant beneficial results.