



Patent Pledges: Private Tool For Public Good

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ABSTRACT

Patent pledges are undertakings by patent owners not to enforce their rights in order to innovate around the intellectual property embodied in their patents. They are a relatively new instrument for promoting open-innovation, and have yet to be utilized widely, but they have the potential to accelerate technological progress: by pledging not to enforce a patent its owner can encourage innovation where it lacks the expertise, focus, or resources to proceed on its own. Today, however, patent pledges serve as little more than public relations tools to project the appearance of corporate philanthropy. They suffer from an uncertain legal environment that limits robust third party reliance, due to the risk of the patent owner failing to keep its pledge not to enforce. This litigation risk acts as a barrier to investment, collaboration, and market development, because there are few protections against the rescinding of patent pledge non-enforcement promises. This paper seeks to examine the current patent pledge environment, and the usefulness of patent pledges as an open-innovation strategy, and set forth a theory for how patent pledges could be enhanced to create greater value and societal benefit. The general patent landscape is examined, as well as the standardization practices that preceded patent pledges as a method of opening up patent rights. The paper then examines representative new technologies affected by patent pledges in order to establish an academic dialogue around potential policy mechanisms that might increase the effectiveness and scope of patent pledges. The research presented is designed to encourage policy solutions for promoting patent pledges as a tool for private companies to enact public benefits.

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I. Introduction

Patents play an important role in modern innovation and technological development. In the most basic sense, patents are policy tools used for the purpose of incentivizing innovation. Patent policy can be either protective or open depending on the policy goals of the governments granting patents. For both of these policies, there are underlying assumptions as to how patents encourage innovation. In a protective system patents are believed to encourage innovation through providing strong protections to original inventions, thereby encouraging new invention through maximum economic reward. In an open system moderate protection is provided to original inventors, but the primary mechanism for innovation is reducing barriers to subsequent innovation. Historically, patent policy has been oriented toward protective strategies, and open innovation policy has been more prevalent in other areas of intellectual property. Incremental and exponential innovation has occurred most notably in the open-source software movement, with moderate commercial success.

Following the lead of the open-source movement, a limited number of private companies have begun to experiment with open-patent strategies. Due to the fact that the U.S. patent system is oriented toward protective patent policy, open-patent strategies have relied on privately created contracts and legal tools. The patent pledge is an undertaking by patent owners to forego intellectual property rights in order to promote innovation. Patent holders retain ownership and make a promise not to sue the creators of subsidiary technologies for patent infringement. Other forms of open-patent legal tools include licensing agreements where patent holders charge a fee for the use of their intellectual property in subsequent inventions, and standardization agreements where patents are opened up to a limited number of parties in order to standardize a technology. The patent pledge is different from other open-patent agreements, because it is a promise to the

general public to not enforce patent rights, while simultaneously retaining the legal right to sue for patent infringement.

This hinders the patent pledge from wide spread adoption, because of a lack of legal protections against subsequent innovators. The primary legal enforcement mechanism for a party relying upon a patent pledge is promissory estoppel, because patent pledges are not contracts. Promissory estoppel is a legal theory that allows for enforcement of promises that have been unjustly relied upon. Contracts provide distinct rights and remedies that promises do not. There are very few legal right granted to the recipients of promises. Under certain circumstances promises can be enforced through the doctrine of promissory estoppel. Strengthening the general arguments for applying promissory estoppel protection to patent pledges is the key to realizing their full potential.

Innovation and investment in patent pledged technology is riskier than other forms of open-patent policy, an issue that should be remedied because there are multiple important social and economic benefits that could be obtained through the patent pledge mechanism. Many patent pledges have numerous and promising philanthropic elements. Opening up socially beneficial technology patents, societal and economic policy goals such as alternative fuel vehicle technology. Making patent pledges reliable for innovators reduces the cost of developing subsequent technologies upon existing patents, which could speed up the development timeline. Without a mechanism to protect investors and innovators, a patent pledgor can decide to enforce patent rights against subsequent inventions. While patent pledges are promises not to enforce patent rights against subsequent innovations, no strong legal mechanisms exist to ensure that pledgers keep their promises, which is the primary reason why the market is hesitant to rely on

patent pledges. Patent pledges' usefulness as economic and philanthropic tools remain unreliable until stronger protections are in place for innovators.

As a policy goal, strengthening reliance on patent pledges is the best way to encourage the use of pledges as a tool to resolve some of the underlying issues of the patent system. Open-patent strategy could have benefits for green technology, life sciences, and a myriad of other socially and environmentally beneficial technologies. No other forms of open-patent mechanisms could open up technology to a wider number of innovators as patent pledges. They have the most potential of any open-patent strategy as a tool to expedite technological development, because they open patents up to the general public rather than limited groups of subsequent innovators. Policies are needed to ensure the genuineness of publicly-stated philanthropic goals of patent pledgors are genuine. Without adequate reliance on patent pledges, companies could make disingenuous pledges for public relations purposes without effecting the purported philanthropic benefits to society. Furthermore, disingenuous patent pledges could serve to hinder the development of beneficial technologies, because of the appearance of expanded research contribution. As a consequence, this perception could then lead to real research resources being allocated away from the patent-pledged technology that would have been contributed otherwise if the true rate of development were known.

PART A: Patent Policy, Patent Pledges and Social Utility

Patent law is the body of law granting rights over technological innovation. Patents exist to encourage innovation for the public benefit.¹ However, patent policy and corporate strategy do not always encourage innovation. Patent disputes arise when the government regulation of patents conflict with the commercial usage of technology in many different ways, including both

¹ Lerner, J. (2002.) Patent policy shifts and innovation over 150 years. *American Economic Review* 92, 221-5.

malicious infringement and negligent infringement. The policy goal of patent law-- incentivizing innovation² --often seems to be subsumed by efforts to maximize the economic benefits that patents bestow. Thus, the American experience of patent protection has largely emphasized exclusivity and exclusion: the more protective patent laws are to the original inventor, the more the laws will encourage innovation.

An alternate school of thought is that patent protection works best when configured to maximize society's access to technology and innovation; overly protective laws, by this way of thinking, hinder the development of subsequent innovations by increasing the cost to enhance older technology or by completely prohibiting subsidiary works.³ This is because inventors must pay licensing royalty fees to create subsidiary works. The issue can be framed as a question of the timing of incentives along the technological development timeline. Under a protection-centric patent regime, the original innovator is encouraged at the cost of subsequent innovators.⁴ Under more open-patent policies, the market is encouraged to innovate upon older technologies, but there is less economic incentive to develop entirely new technologies due to licensing costs⁵

Patent policy is in a time of transition, as industry tries to adapt old laws to new technological realities readily seen in the software industry. Companies, such as Microsoft that once had extremely protective patent strategies have started to open up select products to open-innovation models.⁶ Patent pledges are an example of the commercial interest in open-innovation strategies taking root in other non-software industries. At the heart of the transition is a debate over the business and human implications of patent protection. While patents are

² Halpern, S. W., Port, K. L., & Seymore, S. B. (2015). *Fundamentals of United States intellectual property law: Copyright, patent, trademark*, 47-63.

³ Vasudeva, V. N. (2014). *Open-source software and intellectual property rights*, 15-19.

⁴ Id.

⁵ Id.

⁶ Microsoft (2016). Open-innovation Policy. Retrieved from <https://www.microsoft.com/en-US/openness/default.aspx#home>

designed to promote innovation through incentivizing the development of new technology, overly restrictive patent protections can limit innovation beyond the original purpose of the patent.⁷

Patent pledges have the potential of mitigating some of the costs of protective patent policy by introducing elements more attuned to a collaborative, inclusive patent regime. However, the current legal landscape of pledges produces unnecessary uncertainty and obstacles for their widespread use. There are very few legal mechanisms to protect a reliant party from being sued for patent infringement. This legal reality reduces the impact of the pledges. By recognizing their potential value and implementing policy-based solutions to their current challenges, patent pledges can play a much greater and more socially desirable role in incentivizing innovation.

PART B: American Patent Policy

It is important to understand the history of U.S. patent law in order to understand the current patent policy environment, and its implications for patent pledges. Patent pledges are largely a response to historical patent practices, and many of the limitations of patent pledges are due to antiquated policy. Patents are legal instruments derived from old European law that impact modern innovation and international relations.⁸ One of the oldest patents on record is a boat design patent from 1421.⁹ The legal logic, and to some extent the patent system, is as antiquated as property law itself.¹⁰ An important fact to understand in order to understand the modern patent system is its establishment in 1883 with the Paris Convention for the Protection of

⁷ Gilbert, R. J. & Shapiro, C. (1990). Optimal patent length and breadth. *RAND Journal of Economics* 21, 106–12.

⁸ Rader, R. R., In Iimura, T., In Reboul, Y., & In Adelman, M. J. (2015). *Law, politics and revenue extraction on intellectual property*.

⁹ Prager, F. D., & Scaglia, G. (1970). *Brunelleschi: studies of his technology and inventions*. Cambridge, Mass: MIT Press.

¹⁰ Lerner, J. (2002) Patent policy shifts and innovation over 150 years. *American Economic Review* 92, 221–5.

Industrial Property.¹¹ The policy objective behind the modern patent system was an effort to protect innovative manufacturing technology during the industrial revolution.¹² While patents had existed in various forms, the key aspect of the patent system following the convention was international recognition.

In the U.S., patents fall under the authority of the United States Patent and Trademark Office (USPTO). The USPTO grants three types of patents under Title 35 of the U.S. Code. The standard for all patents requires that the patent must be for the following: (1) process, machine, article of manufacture, or composition of matter; and (2) or something that is new, useful, and non-obvious.¹³ The office grants design patents for commercially useful designs, utility patents for novel technologies and processes, and plant patents for new plant genetics.

Patent applicants must submit applications that match the abovementioned criteria. The time from initial application to approval varies depending on the nature of the patent. The first step in the process is the filing of a provisional patent application. The point of this application is to ensure nominal protection and create a record of patent application in the event that a dispute arises over the original date of the invention's creation.¹⁴ The next step is the filing of a non-provisional patent application. The time between the filing of a provisional application and the non-provisional application must occur within 12 months. The patent prosecution occurs after the filing of the non-provisional application. Here a USPTO examiner researches the application looking for similar patents already on file as well as making a determination as to whether the application is new, useful, and non-obvious. This process can take an average of five years for completion, with some taking much longer. The end result of the patent application

¹¹ Halpern, S. W., Port, K. L., & Seymore, S. B. (2015). *Fundamentals of United States intellectual property law: Copyright, patent, trademark*, 23-57.

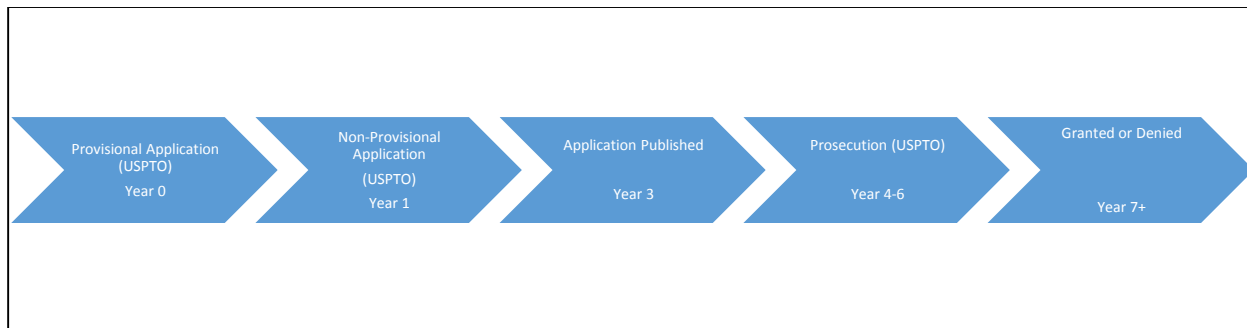
¹² Id.

¹³ Id.

¹⁴ Id.

is either a rejection of the application or a grant of patent. During the pre-approval time period the protection of “patent-pending” may be applied.¹⁵ Once a patent has been granted the holder receives patent protection for 20 years from the time of initial filing of the non-provisional application.

Figure 1. Patent Process



The long and complex patent registration process is one of the primary detriments of protective patent policy. Patent registration is costly, and investment in the process requires a risk assessment as to the ultimate revenue generating value of a technology. This is one of the deterrents to wide-spread reliance on patent pledges. The current system promotes protective strategies because of the time and cost of the patent process. There is an economic disincentive for allowing the market to freely use proprietary technology, because of the perception of lost revenue due to the expense of the patent process. Similarly, the patent process makes market reliance upon patent pledges less likely. If an inventor files for a patent on a technology derived from a patent pledge and the patent is then enforced, the inventor risks losing any revenue from the technology in litigation. In an infringement case the court may stop the production of the subsidiary product, and take any income the product generated. This risk is the central reason for the slow adoption of patent pledges. One of the key objectives of patent value is the legal

¹⁵ Id.

protection implied in patent registration. Without stronger legal protections for market reliance on patent pledges, the full commercial benefit of the device will never be realized.

PART C: International Patent Policy

International relations remain an important objective of patent law as patents become a powerful means of exercising economic power globally. Trade-Related Aspects of Intellectual Property Rights (TRIPS) took effect in 1994 through the World Trade Organization (WTO).¹⁶ The primary effect of TRIPS was to create international standards for patents based on U.S. patent law. The agreement was the beginning of the current era of patent trade relations, where the U.S. seeks to leverage beneficial patent treatment for domestic companies through trade relations. China and many countries in Southeast Asia do not recognize the TRIPS agreement, and as a result the region is the epicenter of patent infringement as defined by the U.S.

TRIPS is very similar to U.S. patent policy, and bases enforcement primarily on tariffs and trade. TRIPS provides significant potential for strengthening patent pledge enforcement internationally, resulting in increased market reliance on patent pledges. TRIPS has the effect of extending U.S. patent policy internationally, but also has many issues, including some of the same public policy issues that patent pledges are intended to address. Due to disputes, many of the U.S. patent laws are not recognized internationally, especially contractual legal instruments that are not formally registered.

The Trans Pacific Partnership (TPP) will be the next governing agreement over patent, remaining as an important data point to watch because U.S.-designed patent law will be formally

¹⁶ Maskus, K. E. (2000). *Intellectual property rights in the global economy*. Washington, D.C: Institute for International Economics.

adopted by many Southeast Asian countries and the other signatories on the agreement.¹⁷ The issue of international patent enforcement is the most important objective in U.S. patent law, due to the way in which U.S. patent law is used as a trade negotiation tool between governments. Another important consideration are the weak enforcement mechanisms in place to protect patent pledges, resulting in industry market reliance issues.

TPP stands to define the future of international patent law. In addition to the TRIPS signatory countries, TPP will bring U.S. patent standards to Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam.¹⁸ To understand the potential outcomes that relate to patents,¹⁹ a comprehension of the political dialog is necessary. The political argument for stricter patent enforcement based on U.S. guidelines is rooted in a protective strategy, focusing on prevention of patent infringement as beneficial for technological development and corporate interests. Pharmaceutical patents are one of the greatest points of contention in the international patent debate, because U.S. pharmaceutical patent holders benefit disproportionately from strong patent enforcement.²⁰ The argument for stricter patent enforcement is predicated on the idea that profits from pharmaceutical patents fund further research and development, which in turn justifies the price premium afforded by strict patent protection.²¹ The secondary argument for strict protections in smaller international markets has to do with precedent. Parties opposing strict protections, argue that the revenue generation from pharmaceutical patents in international markets is negligible

¹⁷ Lim, C. L., Elms, D. K., & Low, P. (2012). *The Trans-Pacific Partnership: A quest for a twenty-first century trade agreement*. Cambridge: Cambridge University Press.

¹⁸ World Trade Organization, (2016). Retrieved from: https://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm

¹⁹ United States Trade Representative, (2016, March 28). Retrieved from: <https://ustr.gov/about-U.S./policy-offices/press-office/blog/2015/october/what-they%E2%80%99re-saying-completion-trans-pacific>

²⁰ What Doctors Should Know, (2016). Retrieved from <https://www.mja.com.au/journal/2015/202/4/what-doctors-should-know-about-trans-pacific-partnership-agreement>

²¹ Marcellin, S. S. (2010). *The political economy of pharmaceutical patents: U.S. sectional interests and the African Group at the WTO*. Burlington, VT: Ashgate.

compared to domestic U.S. markets.²² The counter argument to implementing protective strategies, is that allowing looser patent protections in foreign markets would serve as a catalyst for degradation of domestic patent protection. There remain ongoing risks that international trade partners will eschew U.S. patent standards on the basis of humanitarian necessity.

The debate around international patent regulation brings up an overarching theme of patent policy. Patents are inherently linked to innovation for the public good, and to private profit. There is a natural connection between innovation and humanitarian needs, whereby any discussion of patent policy should mention the human impact of making ideas proprietary. The conflict can be seen readily in the case of pharmaceutical patents. The patents that protect drugs from infringement are the same legal mechanisms that in some cases make drugs unaffordable for patients that need them.²³

Similar predicaments can be seen in the automotive industry, specifically relating to alternative fuel vehicles. There are generally accepted humanitarian benefits to creating marketable alternative fuel vehicles.²⁴ Patent strategies that are overly protective threaten to hinder progress in the alternative fuel area of research, which is the reason why several automotive companies have started to open up patent portfolios around alternative fuel technology.²⁵

²² Pharmaceutical provisions, (2016). Retrieved from <https://www.americanprogress.org/issues/healthcare/news/2015/07/30/118290/pharmaceutical-provisions-of-the-trans-pacific-partnership-threaten-drug-access-and-affordability/>

²³ Marcellin, S. S. (2010). *The political economy of pharmaceutical patents: U.S. sectional interests and the African Group at the WTO*. Burlington, VT: Ashgate.

²⁴ Maxwell, T. T., & Jones, J. C. (1995). *Alternative fuels: Emissions, economics, and performance*. Warrendale, PA, USA: Society of Automotive Engineers, 122-158.

²⁵ Elon Musk, All Our Patents Are Belong to You, TESLA BLOG, (2016, March 28). Retrieved from <http://www.teslamotors.com/blog/all-our-patent-are-belong-you>

PART D: Patent Valuation as a Component of Capital Formation

Technological development is inherently linked to investment in research and development. In turn, investment in patented technology is inherently linked to market reliance on the legal rights granted by patents. In practice and due to being a component of a larger technology, the financial incentive for patented technology is not always the direct revenue that the technology can generate, but is instead the revenue the technology can generate as a component of a larger technology.²⁶ The technological development process requires capital and can only bring returns through operational revenues once development is complete. This means that investors must put money into technological research long before the investment generates any returns. There is always a chance that these investments do not generate returns, which makes investment in technology inherently speculative.

The need for investment in new technology is a critical component of the technological development process. Many investment decisions in new technologies are linked to subjective patent valuations. Due to the fact that there may be little comparable information to base technology investments on, patents provide investors with one of the only tangible assets on which to quantify investment value. Valuations of technology-based companies and new technology are heavily weighted on patent valuations.²⁷ Examination of the multiple patent valuation methodologies is important when considering how investment can be induced or hindered. Understanding valuation methodologies provides a basis for comprehending the concerns of the investor reliance on patent pledges, and where risks can occur in technology investment.

²⁶ Mansfield, E. (1986). Patents and Innovation: An Empirical Study. *Management Science*, 32(2): 173-181.

²⁷ Id.

One method of patent valuation is to base patent values on the buyer's purchase price,²⁸ a valuation methodology that only considers the value of the underlying patent, independent of the other patents the company may hold, and the role of the patent as a component in other technologies. However, the valuation methodology requires a willing buyer and seller, and it may be difficult to find either for a new technology. Due to the proprietary nature of patents, there may not be directly comparable technologies on the market upon which valuations can be based. Further compounding the situation is the fact that component technologies may have vastly different values to different market participants.²⁹ The price a buyer is willing to pay in the buyer/seller model is almost completely dependent on the assessed litigation risk, and the perceived legal protections of the patents against competitors.³⁰ This is because there is rarely an operational usage to compare the patented technology to, if there was another methodology would be used.

The second valuation model is the marginal profit model,³¹ which bases patent valuation on the product that the patent enables the company to sell. The marginal model looks at the market size, cost of production, and profitability of the patented technology. The issue with the marginal profit model is the need for historical revenue information to base profit estimates on, which often excludes early stage technology. The marginal profit model has additional complications for component technologies, where a percentage of profit must be allocated to the component. The basis for valuation is minimal other than availability of substitute technologies.

²⁸ Fish & Tsang, (2016). *Valuing Patents*. Retrieved from <http://www.fishiplaw.com/chaper-12-valuing-patents>

²⁹ Ibid.

³⁰ Ibid.

³¹ Ibid.

The third valuation model is based upon the cost of creating a substitute technology,³² functioning as a maximum value threshold. The cost of reverse engineering the technology is the maximum value that the buyer is willing to spend on the patent purchase. This methodology can create high valuations due to the time value of capital. The time value of capital is the value of an investment over time. Interest rates are a quantification of this value. Investment returns can be measured relative to comparable returns or interest rates over a comparable timeframe. In technology investment the total cost of production is compounded over development time it takes to become profitable. If the investment returns more than a benchmark rate would be over time, the investment was comparatively successful. This comparison in returns is the relative cost of capital. In fundamental valuation practices, the cost of capital is a fixed interest rate at which capital can be borrowed for investment purposes.

Patent valuations are also driven up by non-practicing entities or “patent trolls,” who purchase patents for the purpose of gaining compensation through enforcement litigation.³³ The troll model relies upon the expense of patent litigation. The patent holder can threaten possible infringers with expensive litigation and settle out of court for a relatively lower amount. The model is highly lucrative, taking much of the risk out of patent litigation due to targeting parties that can’t afford litigation costs.³⁴ On the other hand, patent protection hampers innovation, because inventors hesitate to develop existing technologies out of fear of litigation. From a valuation standpoint, trolls enhance the value of patents by inflating the litigation value of patents, but enhanced valuation is artificial when the patents are held by companies that don’t plan on using litigation tactics, and could otherwise use the patents to produce cash flow from

³² Ibid.

³³ Hall, B. H., Jaffe, A. B. and Trajtenberg, M. (2005). Market value and patent citations. *RAND Journal of Economics* 36, 16–38.

³⁴ Id.

operations. Where the operational patent may only generate (\$X) from operation, the patent and company may value the asset at (\$X+\$Y) where \$Y is the value of damages awarded through patent litigation. This strategy has been seen outside of “patent trolls.” Companies now frequently enforce patents as a means of revenue generation, while simultaneously valuing patents based on enforcement value.³⁵ Patent valuation should be viewed as a risk factor in assessing risk to an early-stage company, because patents are the primary product for early-stage companies, and may disproportionately affect them. The foundations of U.S. and international patent policy are important considerations in understanding the direction on patent strategy and policy. The usefulness of patents for investment and capital-raising purposes is dependent upon the legal protections granted to patent holders, and those protections will be subject to change as patent policy shifts toward either protective or open-patent strategies. The origins of the open-innovation movement come from the software industry but have been extended to other industries via legal mechanisms including patent pledges.³⁶ The efficacy and market reliance on open-patent strategies is rooted in the fundamental aspects of patent valuation.

³⁵ Lundqvist, B. (2014). *Standardization under EU competition rules and U.S. antitrust laws: The rise and limits of self-regulation*, 79.

³⁶ Muffatto, M. (2006). *Open-source: A multidisciplinary approach*. London: Imperial College Press.

II. Early Forms of Technology Sharing: Open Source

From a policy perspective, the best patent strategy is one that opens up the maximum number of patents or patent assets to promote the most advanced-level innovation, while protecting those patents that are critical to private industry.³⁷ One of the first examples of industry using open-patent strategies to promote innovation came during the early years of automotive technology. George Sheldon was granted a patent on one of the original gasoline engines.³⁸ Henry Ford took Sheldon to court and won the right to use the patented technology by arguing that the technology was critical to the development of the automobile.³⁹ The dispute resulted in the formation of one of the first standards associations, the Motor Vehicle Manufacturers Association, due to the need for an entity to mediate patent licensing agreements. The spirit and practices at the time lived on in the form of Standards Development Organizations (SDO), and in privately negotiated licensing agreements. However, as industry and patent law developed in the U.S., patent strategy has largely shifted toward adversarial and protective strategies.⁴⁰ The software industry is an outlier, and one worth examining in order to understand the economic objectives behind open-innovation in other industries.

In the early days of the industry, software technology was still emerging with little market demand.⁴¹ Source code would be publicly available, and user communities actively participated in the debugging and advancement of software products. Rapid advances in

³⁷ Hall, B. H., Jaffe, A. B., & Trajtenberg, M. (2005). Market value and patent citations. *RAND Journal of Economics* 36, 16–38.

³⁸ Flink, James J. (1977). *The Car Culture*. MIT Press. ISBN 0-262-56015-1.

³⁹Id at 16.

⁴⁰ Lerner, J. (2002). Patent policy shifts and innovation over 150 years. *American Economic Review* 92, 221–5.

⁴¹ Fitzgerald, B. (2006). The Transformation of Open-source Software. *MIS Quarterly*, 30(3), 587–598. Retrieved from <http://www.jstor.org/stable/25148740>, Retrieved 2016-03-21.

software technology further led to a strong market for software in the 1980's and onward.⁴²

With increasing market demand came the need for monetization, and the fear that competitors would steal software for commercial purposes.⁴³ The need for protective patent strategies came with the onset of market demand for the patented technology, an indication that protective patent strategies have much more to do with protecting monetization of stagnant innovation than they do with incentivizing further innovation.⁴⁴ In a free market, the most advanced technology would have a natural competitive advantage making the protection of patents unnecessary. The counter argument to this is that unequal capital distribution might enable a deep-pocketed infringer to beat the innovator to market, because an infringer does not have the overhead costs of technological research.⁴⁵ Patent protection is only needed for a limited period of time to provide a sufficient period for the innovator to get to market before the infringer.⁴⁶

One of the first proprietary software products was UNIX,⁴⁷ an operating software program owned by AT&T. The program had been developed through research universities in the 1970's, but was then made proprietary in the 1980's.⁴⁸ The development of what would become the open-source movement occurred during the same time of the onset of fully proprietary software. Small developer communities would share code via the internet. These programs ran the gamut of uses, with the common thread being the use of the BASIC language, and the

⁴² Id at 589.

⁴³ Deek, F. P., & McHugh, J. A. (2008). *Open-source: Technology and policy*. Cambridge: Cambridge University Press.

⁴⁴ Tiemann, Michael (2006). *History of the OSI*. Open-source Initiative.

⁴⁵ Id.

⁴⁶ Lerman, C., & Stanford Program in International Legal Studies. (2015). *Patent strategies of technology start-ups: An empirical study*, 41-163.

⁴⁷ Weber, S. (2004). *The success of open-source*. Cambridge, MA: Harvard University Press, 71-85.

⁴⁸ Id.

developer interest in maintaining the openness of the source code.⁴⁹

The open-source movement as it exists today was started by the publishing of the GNU Manifesto, and later formalized in the late 1990's with freeware stipulating licensing eliminated sales for a profit.⁵⁰ The GNU Manifesto and the GNU project was an effort to create a fully open-source operating system, which is one of the most critical components of the personal computer as it runs all the other subsidiary programs.⁵¹ By creating a free operating system the GNU project began what would become a parallel movement to the development of proprietary software. The push back against the movement was that monetization was the key to development.⁵² GNU became publicly available in 1989. The next definitive moment in the development of open-source software came in the form of Linux. In 1991, Linus Torvalds released the Linux kernel. This was the source code that would be used by open-source developers to make Linux.⁵³

As Microsoft became the predominant operating system in the software market, the software industry took a strong turn towards proprietary patent strategies.⁵⁴ The majority of large companies in the industry sought to charge for software and develop in house. The two strategic rationales for this strategy were that open-source was not a viable business model because it could not be monetized, and that monetization was required to develop the most advanced technology in the industry.

The proprietary model remained dominant until the 2000's, after which open-source saw a resurgence and Linux-based systems began to capture market share once held by proprietary software. The shift toward open-source became powerful as companies such as RedHat found

⁴⁹ Fitzgerald, B. (2006). The Transformation of Open-source Software. *MIS*.

⁵⁰ "The GNU Manifesto". Free Software Foundation. 21 July 2007. Retrieved 2015-10-08.

⁵¹ Id.

⁵² Muffatto, M. (2006). *Open-source: A multidisciplinary approach*. London: Imperial College Press, 199-217.

⁵³ Free Software Foundation (2007). The GNU Manifesto. Retrieved 2015-10-08.

⁵⁴ Weber, S. (2004). *The success of open-source*. Cambridge, MA: Harvard University Press.

ways to monetize open-source software.⁵⁵ Throughout the 2000's, the software industry shifted toward open-source resulting in companies such as Microsoft and Apple providing software for free, and opening up some of the code to developers.⁵⁶ The need for innovation was the motivation for the shift from proprietary back to open-source software. As software in enterprise systems became more complex, the development of cutting-edge technology became more expensive. By making software open-source, companies were enabled to tap into the public programmer community for development and drastically reduce research costs.⁵⁷ Google is another example of a company that capitalized on open-source technology. The android operating system is one of the leading operating systems in the mobile marketplace.⁵⁸ The system is completely open-source allowing developers to work around the source code to develop complementary applications. The android software market leadership comes from the available applications in the operating system.⁵⁹ By allowing developers to freely manipulate and develop new software compatible with the android software, Google is able to provide the widest range and the most technologically diverse access to applications.⁶⁰

The trials and tribulations of the software community are a case study in the relationship between innovation, patents, and markets. These lessons can be applied to the patent practices in multiple industries including information technology and automotive technology. The history of open-source shows U.S. that technological innovation and monetization can be maximized through a balance of both protective and open-patent strategies. On one end of the spectrum is protective strategy, which enhances monetization and can further promote innovation. However, protective strategies are not without pitfalls. Protective practices disallow subsequent

⁵⁵ RedHat About, (2016, March 28). Retrieved from <http://www.redhat.com/en/about/company>.

⁵⁶ Muffatto, M. (2006). *Open-source: A multidisciplinary approach*. London: Imperial College Press, 211-226.

⁵⁷ Weber, S. (2004). *The success of open-source*. Cambridge, MA: Harvard University Press, 71-85.

⁵⁸ Id.

⁵⁹ Mednieks, Z. R. (2014). *Enterprise Android: Programming Android database applications for the enterprise*.

⁶⁰ Android (2016). About Retrieved from <https://www.android.com/history/#/marshmallow>,

enhancement from outside sources without compensation through licensing programs. On the other end of the spectrum, open-innovation strategies allow for the rapid technological development, but make monetization much more difficult. Companies like RedHat have found a way to monetize open-source innovation by generating profits from ancillary products such as service support.⁶¹

Open-source software is often structured to be monetized through ancillary businesses by putting specific licensing requirements onto the software, so that end-users may not sell the software arising from others' work. In the patent world, there are different structures in the open-innovation movement. Harkening back to the early days of the automotive industry, the patent landscape is largely shaped by standardization. Companies work together to reach cross-licensing and open-patent agreements so that one technology may be agreed upon across manufacturers,⁶² with the goal of quickening innovation, and reducing development costs.⁶³

The cross-licensing agreement is a privately negotiated contract between two parties wishing to share a patent.⁶⁴ The holder of the patent agrees to allow another party to use the patent in exchange for consideration. One of the benefits is that it allows for multiple companies to use and innovate similar technology,⁶⁵ often times outweighed by the limited term of the contract and the disputed rights over subsidiary products. Cross-licensing agreements are a form of limited patent sharing that temporarily solves the problem of the protective patent strategies. Agreements help remove the fear of prosecution from the development process. Another form of patent agreement is an open patent agreement developed within an SDO.

⁶¹ RedHat (2016). About. Retrieved from <http://www.redhat.com/en/about/company>.

⁶² Vries, H. J. (1999). *Standardization: A business approach to the role of national standardization organizations*. Boston: Kluwer Academic, 275-302.

⁶³ Landers, Amy L. (2015). The Anti-Patent: A Proposal for Startup Immunity. *Nebraska Law Review* 93.

⁶⁴ Schlicher, J. W. (1996). *Licensing intellectual property: Legal, business, and market dynamics*. New York: Wiley, 273-279.

⁶⁵ Id.

III. Standardization Pledges

SDOs are loose partnerships of companies within an industry with a common goal of standardizing a technology. These organizations have specific bylaws and rules on how technology should be shared. The key aspects of these agreements are that the technology promotes interoperability, platform leadership, market development, voluntary restraint, and social welfare.

The need to develop innovation in a wider technological area to further the interests of individual firms is the genesis of SDOs and SDO pledges. An individual firm will gain competitive advantage primarily through the shared benefit of the members of the SDO. A key difference between SDO pledges and other patent pledges are the members of the SDO, who have all agreed upon the need for development within a specific technology.⁶⁶ Comparable to competitors using patent pledges, SDOs promote innovation in competitive technologies.

Firms very often compete to be the first to market, because being the first to market can establish a technology as a market leader. This strategy is called first-mover advantage. Looking to the history of software open-source, we can see that making a technology proprietary is not always the best method of capturing first-mover advantage. First-mover advantage may be captured simply by introducing the most advanced technology available to the market. Open-innovation strategy can assist individual firms in capturing first-mover advantage upon which a dominant market presence may be used to monetize the technology through ancillary channels. Ancillary channels include servicing the technology, as well as selling peripheral products. Protective strategies are only truly beneficial when there is limited technological development in

⁶⁶ Id.

a space, because they focus on protecting current technology rather than incentivizing new technology. When there is ample room for technological development, innovation is less costly than protective measures, but as room for innovation dwindles, it becomes more expensive to innovate than protect current technologies. During the early stages of a product cycle there are more advantages to an open-innovation strategy,⁶⁷ which may include patent pledges, cross-licensing agreements, or fair reasonable and nondiscriminatory (FRAND) agreements.

SDO pledges include both the FRAND agreement and cross-licensing agreements. One of the most famous examples of current cross-licensing agreements exists between Samsung and SanDisk.⁶⁸ This agreement is a perfect example of the modern state of both patent law and cross-licensing agreements. The Samsung and SanDisk cross-licensing agreement was born out of litigation. The two companies experienced prolonged litigation over semiconductor technology.⁶⁹ SanDisk holds many of the patents upon which the current technology was developed. This was part of a greater protective strategy to ensure that technology would be monetized directly by SanDisk. Samsung developed similar technology parallel to SanDisk. The result was ongoing litigation costing both companies millions of dollars. In 2002 and later in 2009, both companies reached a cross-licensing agreement in order to stem the loss due to litigation,⁷⁰ illustrating that cross-licensing agreements may have little to do with an innovation on new technology.

FRAND agreements are aimed at standardization, and function as a method of opening out patents without compensation to allow for the development of new technology.

⁶⁷ Id.

⁶⁸ Hall, B. H. and Ziedonis, R. H. (2001). The patent paradox revisited: an empirical study of patenting in the U.S. semiconductor industry, 1979–1995. *RAND Journal of Economics* 32, 101– 28.

⁶⁹ SanDisk (2016). Press Release Retrieved from <https://www.sandisk.com/about/media-center/press-releases/2009/2009-05-27-sandisk-and-samsung-renew-patent>

⁷⁰ Id.

Interoperability is the primary goal of FRAND agreements.⁷¹ Interoperability is a form of standardization that is designed to allow a technology to function across multiple manufacturing platforms. The SDO members commit to share patents without enforcement in exchange for the benefits of expedited development. Interoperability is important to market leadership, because it promotes market adoption of a new technology in a way the segmented market cannot. One of the important aspects of FRAND agreements from the perspective of industry usage, wherein agreements are enforceable as contracts due to the identifiable parties to the contract, and the exchange of consideration in the form of patent contribution.⁷²

There are many possible motivations for technological standardization. Companies engage in these agreements in order to promote a technology that will enhance the value of other proprietary technologies. Standardization can also provide platform leadership when there are multiple standards being sought. Where there are two competing standards, SDOs may provide platform leadership by advancing a technology as the standard rather than competitive technologies, an aspect of standardization that could provide the potential benefits sought in the open source software movement. The attribute of platform leadership could also provide compelling commercial results. Platform leadership is also a tool for philanthropic goals, as it can enable companies to promote societally beneficial technologies over technologies that are detrimental to the public. Competitive advantage that can be gained through one technology developing at a faster rate than competitors. Rapid advancement of a societally beneficial technology could lead to quicker operational viability as well.

Similar to software open-source, green technology has experienced a significant shift toward open-innovation strategies within the industry. There are several examples in this area,

⁷¹ Jay P. Kesan & Carol M. Hayes (2014). FRAND's Forever: Standards, Patent Transfers, and Licensing Commitments, 89 IND. L.J. 231

⁷² Id.

but the most notable would be within the energy industry. The National Institute for Standards and Technology (NIST) has begun working toward Smart grid technology to standardize power distribution.⁷³ One of the interesting aspects of SDO pledges dealing with green technology is the motivation for the promotion of technology to enact a public benefit. The rationale is that technology related to power distribution can reduce inefficiencies, thereby providing environmental benefits. Automotive companies have also begun to release patents around alternative fuel technology with the stated purpose of promoting technology that will reduce carbon emissions.⁷⁴

⁷³ Ekanayake, J. B., (2012). *Smart grid: Technology and applications*. Chichester, West Sussex, U.K: Wiley, 102-115

⁷⁴ Toyota (2016). Press Release. Retrieved from <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 pat

IV. Patent Pledges

PART A: Patent Pledge Background

A patent pledge is a form of non-enforcement agreement, where patent holders voluntarily give up intellectual property rights in order to promote innovation. SDO pledges are a form of patent pledge where the non-enforcement promise is made to the standard-setting community.⁷⁵ There are other forms of patent pledges that are made to the public in general rather than to an SDO. The nature of the parties involved in a non-SDO patent pledge makes enforcement a complicated legal matter. Whereas most SDO pledges have identifiable parties, a non-SDO patent pledge is between one party and many unknown parties.⁷⁶ For the sake of brevity, non-SDO patent pledges will be referred to simply as patent pledges throughout this paper, as they are the primary policy consideration.

The most important aspect of patent pledges is the incomplete relinquishment of rights. Patent holders retain ownership and make a promise not to sue the creators of subsidiary technologies for patent infringement. In contrast, under the open-source model and with most open-innovation models, there is a relinquishment of the right to enforce patent rights against subsequent innovations; a much cleaner form of open-innovation policy, as there is no opportunity for the holder to enforce patent rights against future users. While there is a promise made to not enforce patent rights, there are very few legal mechanisms by which market reliance on patent pledges can be based, thereby creating policy and valuation issues. The policy issue presented by the weak enforceability of patent pledges is that market participants can project an

⁷⁵ Damien Geradin, (2010). Reverse Hold-ups: The (Often Ignored) Risks Faced by Innovators in Standardized Area, in SWEDISH COMPETITION AUTH., THE PROS AND CONS OF STANDARD SETTING 101, 112-13

⁷⁶ Jay P. Kesan & Carol M. Hayes, (2014). FRAND's Forever: Standards, Patent Transfers, and Licensing Commitments, 89 IND. L.J. 231.

image of benevolent policy action without truly committing to that action. An example would be patent pledges to release pharmaceutical patents or green technology patents, but a failure to promote the technology due to lack of industry market reliance. The issue of investor reliance is important as the primary mechanism of effecting philanthropic goals of patent pledgors.

Understanding the different elements of patent pledges and the strengths and weaknesses of each element in the context of legal enforceability is important. The academic literature divides patent pledges into four identifiable elements.⁷⁷ These elements are inducement, collective action, voluntary restraint, and philanthropy. Inducement refers to the aspect of a patent pledge that induces the market to use the particular technology that is promoted by the pledge.⁷⁸ In its most basic form, inducement is the call to action inherent to the patent pledge, and as a call to the market to use the underlying patent. Inducement is primarily achieved through lowering the barriers to use of the underlying technology, including the cost of licensing, legal costs, or infringement liability. In a patent pledge, the pledgor is using the patent pledge to lower barriers in an effort to induce the market into usage of the underlying technology.⁷⁹ From a legal enforceability prospective, this is a very important element of the patent pledge. Inducement should be thought of both as an inducement to use the patented technology for further development, as well as an inducement for market reliance.⁸⁰ The primary legal enforcement mechanism for a party relying upon a patent pledge is promissory estoppel, because patent pledges are not contracts. Contracts provide distinct rights and remedies that promises or pledges do not. There are very few legal right granted to the recipients of promises. However, under certain circumstance promises can be enforced through the doctrine of promissory

⁷⁷Contreras, J. L. (2014). *Patent Pledges*. Available at SSRN 2525947,557-568.

⁷⁸ Id.

⁷⁹ Id at 548.

⁸⁰ Id.

estoppel. The doctrine underlying promissory estoppel is an inducement of market reliance on a promise. Therefore, in order for a patent pledge to be effective, there must be an element of inducement. The pledgor must be soliciting the market to rely on the pledge as an assurance that it is safe to create subsidiary technologies, without fear of litigation.

The second element of a patent pledge is collective action,⁸¹ which refers to the need for market action in order to effect a desired change. An example would be the need of the market to adopt green technology in order to effect the change of lower global carbon emissions. The collective action element is fundamental to patent pledges, because of it is the desired result of the inducement of market reliance upon the promise of non-enforcement. Simply put, the goal of a pledgor promising not to enforce a patent is to induce the public into collective action around the development of the patented technology. This is the reason patent pledges are made to the public rather than specific parties. The concept is that innovation will progress quicker if a large group is working on the targeted technological development, and that by opening the promise to the public, the group will be larger than if the promise were made to a discrete group. SDO patent pledges similarly seek the result of collective action toward standardization of technology. Collective action is one of the primary causes of the weak enforceability of patent pledges, because of a promise to an undefined party. The promise is made to the market in general rather than an identifiable party. The need for collective action, and the lack of legal tools to enforce promises to the market, are at the heart of the policy issue presented by patent pledges.

The third element of patent pledges is voluntary restraint,⁸² which is the need of the pledgors to voluntarily restrain themselves from suing for patent infringement on the pledged patents. The voluntary element is tied to the issue of collective action, because the promise to

⁸¹ Id.

⁸² Id

the market involves too many parties for consideration to be provided. Therefore, in order to induce collective action, the restraint of enforcement must be made voluntarily by the pledgor resulting in contractual rights not extending to the market in general. The lack of consideration eliminates the ability of reliant parties to enforce the promise under contract law, because consideration is a fundamental element of contract formation. Without consideration there is no contract, and without a contract, promissory estoppel is the only legal theory available to compel pledgers not to sue subsidiary innovators for patent infringement.

Restraint plays a role in patent pledge enforcement, because it is a benefit being promised to the market. The pledgor is promising restraint from enforcement of their patent rights, whereby market reliance on the promise is dependent on the willingness of the market to accept that the pledgor will restrain themselves from enforcement. Patent pledges will remain ineffective as long as legal tools are too weak to compel restraint. The goal of any policy action should be to compel restraint from the pledgor. This can only be achieved by strengthening the case for promissory estoppel enforcement against pledgors that go back on the promise to forgo patent rights.

The fourth and final element of patent pledges is philanthropy.⁸³ In the context of this paper, philanthropy refers to philanthropic intent as well as the appearance of philanthropic intent. The philanthropic element of patent pledges does not directly affect the legal enforceability of the pledges, but rather the motivation behind the promise to not enforce. The philanthropic element is also the primary reason why policymakers should work toward developing tools that promote patent pledges as well as strengthen enforcement. The public benefit should be enforceable because companies that make patent pledges receive the public relations benefit of being seen as philanthropic. As a result, policymakers seek to protect the

⁸³ Id at 549.

public from disingenuous patent pledges by strengthening enforcement and promoting reliable patent pledges.

The fundamental aspects of patent pledges raise numerous subsidiary issues including enforceability, as well as issues of industry usage. The uncertain legal environment for market reliance on patent pledges is the primary barrier to patent pledges, effecting their stated philanthropic goals in the current intellectual policy environment. Prior to examining industry usage and policy recommendations, it is important to consider the legal theories that are available to parties considering reliance on patent pledges.

PART B: Patent Pledge Contract Law

Commercial promises are governed by contract law. The compendium of contract law covers many different theories of promise enforcement. A contract is a promise between parties for performance of an action in exchange for consideration.⁸⁴ Contract law is the fundamental basis of commerce. Legal authority for contract enforcement comes from both statutory and common law.⁸⁵ Most commercial transactions have clearly defined contractual enforcement remedies, coming from the Uniform Commercial Code (UCC) or jurisdictional case law.⁸⁶ Patent pledges do not fit nicely into the current system of contract law, as the law has not fully adapted to make patent pledges a commercially viable legal tool.

The primary issue in patent pledge enforcement is that the pledge is made to the public, leaving the parties undefined.⁸⁷ Traditional contracts are bi-lateral agreements where both parties provide consideration, and both parties make promises to perform. Contract law has

⁸⁴ See RESTATEMENT (SECOND) OF CONTRACTS § 90(1) (1981); see also Melvin Aron Eisenberg, *The Principles of Consideration*, 67 CORNELL L. REV. 640, 658 (1982)

⁸⁵ Andrews, N. (2011). *Contract law*. Cambridge: Cambridge University Press.

⁸⁶ *Id.*

⁸⁷ Contreras, J. L. (2014), 556.

developed around this dynamic, and requires elements to be applicable in enforcement. Historically, the law has given greater weight to commercial contracts than simple promises,⁸⁸ which makes perfect sense as promises are regularly broken. The law sees a policy value in protecting promises when commercial consideration is at stake. The issue with this policy viewpoint is its failure to address unilateral commercial transactions, and other transactions where there is only one identifiable party. Similar transactions have been relegated to a level of legal enforceability, much less defined than traditional contract law. The primary mechanism available to enable enforcement is promissory estoppel.⁸⁹

The Restatement (First) of Contracts was first published in 1932, which was similarly the first time the modern doctrine of promissory estoppel was defined in legal literature.

Promissory estoppel is defined as the following:

“A promise which the promisor should reasonably expect to induce action or forbearance of a definite and substantial character on the part of the promisee and which does induce such action or forbearance is binding if injustice can be avoided only by enforcement of the promise.”⁹⁰

Promissory estoppel is available as a tool to enforce a promise, if it can be shown that an injustice was caused by relying on the promise. It also requires that the party making the promise have a reason to believe that the promise would be relied upon. Under the current legal system estoppel is the only legal tool available to industry participants that seek to rely on patent pledges.⁹¹ Risks are present in market reliance on patent pledges, and these risks counter the intended philanthropic benefits of the patent pledge, by deterring investment due to fear of being sued for infringement without a legal defense. The issue is further complicated, because the parties to a patent pledge are hard to define. The promise in a patent pledge is made to the

⁸⁸ Smits, J. M. (2014). Contract law: A comparative introduction, 141-150.

⁸⁹ Contreras, J. L. (2014), 595.

⁹⁰ RESTATEMENT (FIRST) OF CONTRACTS § 90 (1932).

⁹¹ Landers, Amy L. (2015). The Anti-Patent: A Proposal for Startup Immunity. Nebraska Law Review 93.

general public. Due to the lack of legal precedent relating directly to patent pledges, proving reasonable market reliance on a promise made to the public is difficult.

Looking at the elements of promissory estoppel is necessary to dissect its legal weaknesses in the patent pledge context. If a market participant were to rely on a patent pledge by investing in a subsidiary technology, and then the pledgor were to sue the reliant party for infringement, there would be an injustice. This scenario meets the requirements of promissory estoppel, but is weakened by the lack of commercial usage and precedent involving patent pledges. The condition of promissory estoppel, that there be an injustice or detriment to the relying party would likely be met through the lost investment in development of the subsequent technology.⁹² The issue of the degree of monetary detriment is negligible in the context of technological investment, because the risk posed by any infringement litigation would be enough to significantly deter investment.

The central issue in applying promissory estoppel protection to induce market reliance on patent pledges, is that reliance on the promise must be reasonable. The structure of the patent pledge promises to not enforce is comparable to the case law around promissory estoppel claims relating to gratuitous promises. A determination that reliance on a promise was unreasonable given the fact of the situation is enough to remove the obligation of the promisor. *Goff-Hamel v. Obstetricians & Gynecologists, P.C.*, 256 Neb. 19, 588 N.W.2d 798 (1999), is the legal precedent that creates risk in reliance on promissory estoppel as a means to protect against infringement enforcement in patent pledge uses. Patent pledges to the market are a relatively new phenomenon which is difficult for reliant parties to show that reliance is reasonable. The issue is further compounded by the perception that patent pledges may be issued for public relations

⁹² Hoffman v. Red Owl Stores, Inc., 26 Wis.2d 683, 133 N.W.2d 267 (1965).

purposes rather than with the intent to induce actual reliance.⁹³

A secondary issue with the patent pledge as a legal instrument involves the international legal landscape for such instruments. Industry is inherently international, as is U.S. patent policy. The international policy environment surrounding patents is important to the issue of promoting industry market reliance. U.S. patent law developed in order to promote innovation through domestic and international patent protections. However, in the case of patent pledges, the current system of international trade law is constructed to project U.S. patent standards, and only the most overt standards are enforced overseas.

U.S. policy became implicitly global with the enactment of the Trade and Tariff Act of 1984,⁹⁴ a trade agreement wherein the U.S. government took an active position in the global marketplace for patents. TRIPS strategically applied tariff and trade laws to compel patent compliance from other nations. Using the authority granted by the Commerce Code,⁹⁵ the U.S. legislature created a system whereby international compliance with U.S. patent policy could be compelled through economic sanctions.

Previously, patent rights were not actively protected abroad. The *Patent Rights Policy Statement* made by the Reagan administration ushered in the era of patent law being used as an international trade tool.⁹⁶ Since the issuance of the statement, patent policy largely favored strict enforcement, and registered forms of patent. The effect era in patent policy created a spectrum of enforcement very much dependent on the level of government involvement and

⁹³ Jerry Hirsch & Tiffany Hsu, *Elon Musk Opens up Tesla Patents; It 'Isn't Entirely Altruistic'*, L.A. TIMES (2016, March 28). Retrieved from <http://www.latimes.com/business/autos/la-fi-hy-elon-musk-opens-tesla-patents-20140612-story.html#page=1>;

⁹⁴ Wilkinson, D. (1985). Trade and Tariff Act of 1984: Its Impact on Developing Countries, *The. Tex. Int'l LJ*, 20, 453.

⁹⁵ *Id.*

⁹⁶ Boucher, P. M. (2012). U.S. patent law. *Phys. Today*, 65(1), 27.

registration.⁹⁷

The U.S. patent strategy of choice had become a heavily protective one based on registration and market reliance on enforcement,⁹⁸ in direct contrast to the open-source movement and the driving concept behind patent pledges. A critical part of any protective patent strategy is the documentation of the property. The most powerful tool in a protective system is having a complete record of technological development that is verified by a government body, such as the USPTO. To give an example, copyright policy is applied at the time of authorship, and requires no government registration. Due to the lack of formal registration procedure, copyright infringement is much more common internationally than patent infringement because the system of obtaining a patent is much more structured and requires government registration. Government registration with the USPTO can then be used as a base case for patent pledge enforcement actions abroad.

PART C: Patent Pledges in Industry

Patent pledges are still in very early stages of usage in commercial settings outside of SDO pledges. In the few industries where patent pledges have begun to emerge, there is minimal market reliance due to the legal enforceability issues.⁹⁹ There has usually been a public policy goal or public relations incentive for implementation,¹⁰⁰ which will continue to be the case until there are stronger enforcement mechanisms to induce market reliance. Capital investment is the driving force behind new technologies and industries. Patent pledges should be looked at from

⁹⁷ Id.

⁹⁸ Id.

⁹⁹ Contreras, Jorge L. (2015). Patent Pledges: Between the Public Domain and Market Exclusivity. *Michigan State Law Review* 2015.2: 787.

¹⁰⁰ Moritz, Manuel, et al. (2015). "Tesla Motors, Inc.: Pioneer towards a new strategic approach in the automobile industry along the open-source movement?". *Management of Engineering and Technology (PICMET)*, 2015 Portland International Conference on. IEEE.

the perspective of investors in order to truly effect the desired philanthropic results of the pledges. In order to understand what must be done to induce market reliance by the investment community, the role patents play in the investment process, and the role the investment process plays in the development of new technologies, should be examined. Technology investment can be broadly categorized as early, mid, and late stage investment.¹⁰¹ Early stage investment is the stage in the investment cycle that patent pledges are designed to impact collective action, but due to the risks present, unlikely patent pledges will be widely relied upon by operational companies or investors.

Early-stage investment is the riskiest stage of technology investment, relying heavily on research and development to yield returns, because the stage of the technology investment cycle includes both seed stage investment in new companies as well as investment in new technological research within existing companies.¹⁰² This stage in the investment cycle is most impacted by patent pledges because the development of new technology can be strongly impacted by access to prior technology.¹⁰³ The restrictiveness or openness of patent policy has a direct impact on the development of new technology. Under an open-patent system early stage investment is more efficient, because rather than a portion of the investment going to paying royalties for the right to develop upon legacy technology, it can be completely dedicated to the development of new technology.¹⁰⁴ Without patent pledges, innovation is limited to the scope of technology that researchers can afford to pay royalty fees on. Information is limited on prior research available and it reduces the return on investment in early stage technology research.

Early stage investment in new companies is largely done through self-funding and

¹⁰¹ Cumming, D. (2010). *Venture capital: Investment strategies, structures, and policies*. Hoboken, N.J: Wiley.

¹⁰² Id at 214.

¹⁰³ Id at 229-232.

¹⁰⁴ Arora, A., Fosfuri, A. and Gambardella, A. (2001). *Markets for technology: The economics of innovation and Corporate Strategy*. Cambridge, MA: MIT Press.

venture capital investment.¹⁰⁵ In both cases, valuation of investments, and investment returns is often based on patent portfolios and patent risk. As a result, patent pledges have not had a significant impact in early stage technology investment. Any patent or technology based upon patent pledged technology can be perceived as a legal risk, because there are no strong enforcement mechanisms to protect a company and its investors from the patent holder choosing to enforce their patent rights.¹⁰⁶ The same is true within existing companies working on new technologies. Companies are at risk while relying on patent pledges, because reliance could open all of the company's subsequent technology to patent infringement liability.

The automotive industry has had some of the most recent industrial uses of patent pledges beyond the SDO system. These companies have unique technological and business practices that are necessary to understand the role of participants in relation to patent pledges.¹⁰⁷ The automotive industry is divided into three primary participants. The automotive manufacturers are known as original equipment manufacturers (OEM).¹⁰⁸ The next level in the automotive supply-chain is the major component manufacturers referred to as tier 1 suppliers that generally make the majority of the components related to systems and interior. Tier 2 suppliers play a similar role as tier 1 suppliers, but make very specific components such as stereo systems. Tier 2 suppliers generally sell to tier 1 suppliers that in turn sell to OEMs.¹⁰⁹

The automotive supply chain is important to understand, because each OEM generates a component ecosystem around different vehicle designs. OEMs will often try to diversify manufacturing sources for specific components in order to prevent a collapse in the supply chain,

¹⁰⁵ Cumming, D. (2010), 113-116.

¹⁰⁶ Arora, A., Fosfuri, A. and Gambardella, A. (2001), at 272.

¹⁰⁷ Xu, Deli and Jiyue Li. (2011). *Innovative Development of New Energy Auto Industry in Changzhou High-Tech Zone - Developing Path of Strategic Emerging Industries from the Perspective of Global Value Chain*. College of Economics & Management, Changzhou Institute of Technology.

¹⁰⁸ Clark, K. B., & Fujimoto, T. (1991). *Product development performance: Strategy, organization, and management in the world auto industry*. Harvard Business Press.

¹⁰⁹ Id.

which is one of the reasons standardization is so important to the industry. A successful OEM must ensure a diverse range of suppliers, and the best way to do that is to standardize technology so that lower tier suppliers can manufacture components around the standardized technology.¹¹⁰

The patent pledge has been most readily seen in the automotive industry surrounding alternative fuel technology. Currently, the companies that hold patent pledges to the public include Tesla, Toyota, and Ford,¹¹¹ but these companies do not usually incorporate the full spectrum of the patent portfolio. However, in the case of Tesla they do. In the case of the other companies, the patent pledges are specific to their particular alternative fuel technologies. Patent pledges may only be a form of marketing and may not be readily enforceable under current legal doctrine.¹¹² This may be greenwashing or marketing, which builds good public relations but has little real world impact. This argument is largely based upon the lack of current enforceability of patent pledges.¹¹³¹¹⁴

The alternative view and the view purported by the automotive manufacture comes from patent releases considered as designed to move technology forward for the betterment of humanity and the technology in general.¹¹⁵ The argument of patent open releases for the purpose of humanitarian needs will be discussed later in this paper. The issue as to whether or not opening patents up through a patent pledge have a meaningful impact on the development of a technology is where this section will focus.

¹¹⁰ Id, at 41.

¹¹¹ Contreras, J. L. (2014), 544.

¹¹² Id.

¹¹³ Korosec, K. (2016). The One Asterisk on Tesla's Patent Giveaway, *Fortune* 2016, March 28). Retrieved from <http://fortune.com/2014/06/13/the-one-asterisk-on-teslapatent-giveaway/>

¹¹⁴ Hirsch, J. & Hsu, T. (2016). Elon Musk Opens up Tesla Patents; It 'Isn't Entirely Altruistic., *L.A. TIMES* Retrieved from <http://www.latimes.com/business/autos/la-fi-hy-elon-musk-opens-tesla-patents-20140612-story.html#page=1>;

¹¹⁵ Musk, E. (2016). All Our Patents Belong to You, *TESLA BLOG*. Retrieved from <http://www.teslamotors.com/blog/all-our-patent-are-belong-you>

Looking back at the cases of open-source software and freeware, some forms of open-patent strategy can in fact aid in the development of the new technology. During the early years of software development, the projects and technology took place in an already collaborative academic environment. In the case of alternative fuel automotive technology, the open-patent pledges occur in a very competitive and protective automotive industry environment, which leads to the question of whether or not open-innovation can actually promote development of technology in a competitive environment, or whether it will be rendered ineffective by the competitive environment?

The question of why a company would release patents in the form of patent pledges is an important issue in understanding the role patent pledges will play in the development of future technology. Historically, larger companies have opened up patents to allow for the development of emerging technologies.¹¹⁶ Competitors are opening up patents so that the technology can develop. The strategic advantage of pledges may be utilities in efforts to create a standardized platform for autonomous and alternative fuel technologies.

Patent concerns and impacts surrounding the electric vehicle industry involve battery design. NiMH battery design focuses on the hybrid electric vehicle market, where total cycle length is less important, because there is a gasoline engine to support the vehicle when the battery is not. In lithium ion batteries, the design of the battery is focused on extending total drive time between charges. Lithium ion batteries are currently used in Tesla vehicles, and are the center of the Tesla patent pledge strategy.¹¹⁷

The question should be framed as, “Which technologies are impacted by the patent

¹¹⁶ Heller, M. A. and Eisenberg, R. S. 1998. Can patents deter innovation? The anticommons in biomedical research. *Science* 280, 698–701.

¹¹⁷ Musk, E. (2016). All Our Patents Belong to You, *TESLA BLOG* (2016, March 28). Retrieved from <http://www.teslamotors.com/blog/all-our-patent-are-belong-you>

pledges, and what is the real world impact of these strategies?”.¹¹⁸ Elon Musk of Tesla has stated, “Technology leadership is not defined by patents, which history has repeatedly shown to be small protection indeed against a determined competitor, but rather by the ability of a company to attract and motivate the world’s most talented engineers. We believe that applying the open-source philosophy to our patents will strengthen rather than diminish Tesla’s position in this regard.”¹¹⁹ It remains to be determined if this will have the stated impact in the marketplace.

Toyota is the market leader in development of hydrogen fuel cell technology.¹²⁰ The company has an interest in opening up hydrogen fuel cell related patents in order to achieve first-mover advantage through standardization. The hydrogen fuel cell vehicle will require both hardware and software components, and the success of the technology will be dependent on consumer demand for the product as well as a strong manufacturing supply chain. Standardization through open-patents and patent pledges will at least enable developers to design a supply chain around the hydrogen fuel cell vehicle, which is in theory the economic motivation behind Toyota hydrogen fuel cell patent pledges.¹²¹

The efficacy of using patent pledges strategy has yet to be seen, but is promising. Hydrogen fuel cell technology is not yet in a production vehicle, leading to the consideration that in order to compete with other alternative fuel technologies, hydrogen fuel cell OEMs will need to catch up to the competition. Patent pledges offer an attractive strategy for doing this as they allow for the development of a component ecosystem prior to the vehicle entering the market. If

¹¹⁸ Id.

¹¹⁹ Id.

¹²⁰ Id.

¹²¹ . Toyota (2016). Toyota Opens the Door and Invites the Industry to the Hydrogen Future, TOYOTA USA NEWSROOM. Retrieved from <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 pat

manufacturers use the open-patents, the strategy provides an assurance of adequate component supply prior to release potentially giving hydrogen fuel cell technology an advantage over other technologies.

These advantages would likely be seen in the design choices for hydrogen fuel cell technology. Given the multiple forms of hydrogen fuel cells, there is a significant advantage to be gained by a company that develops a standardized supply chain around one specific technology. Toyota is the party most interested in the development of hydrogen fuel cell technology, whereby whichever design Toyota takes to market will be heavily influenced by the available supply chain. By releasing patents in the developmental stages of hydrogen fuel cell technology, Toyota is able to promote the development of a hydrogen fuel cell supply chain prior to taking fuel cell technology to market. Patent pledges have been used to varying effect in the life sciences and the information technology industry.¹²² There have been efforts within the life sciences industry to open up patent protections, and promote innovation after patent expiration that may offer solutions to pledge enforceability issues.

¹²² Krattiger, A. (2007). The Use of Nonassertion Covenants: A Tool to Facilitate Humanitarian Licensing, Manage Liability, & Foster Global Access, in *MIHR IP HANDBOOK OF BEST PRACTICES*, 1739

V. Policy Recommendations

PART A: Patent Pledge Registration

Using the automotive industry as an example, the potential benefit market reliance on these pledges is that global warming is reduced. The potential detriment is that the technology fails to result in the desired benefit. In contrast, the potential detriment of patent pledges without market reliance is that the market does not develop the stated technology, but the public is given the impression that the technology is being promoted. This is a significant issue. Patent pledges without market reliance may hinder the public benefits of the underlying technology by removing urgency from other more effective development incentives.

The policy issue that must be addressed in order to remedy this problem, is that patent pledges are weakened by the uncertainty of legal rights granted. Acceptance of market reliance on patent pledges could induce the stated societally beneficial goals of patent pledges, wherein mechanisms are needed to promote market reliance in order to realize these benefits. The question of protective patent protection verses open-patent policy is not at the heart of the issue. Instead, policy questions directed at the broader market are intertwined with questions of free market theory.¹²³ The focus of the policy dialog around patent pledges should be on increasing the efficacy of the instrument, rather than the validity of the open-innovation agenda. The stated philanthropic goals of patent pledgers can have no real impact without mechanisms to promote market reliance.

The issue of whether U.S. patent policy should be focused on open or protective policies

¹²³ Jaffe, A. B., Lerner, J., (2004). *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to Do About It*. Princeton University Press, Princeton, NJ.

is important, but it need not be the central issue in considering policies to strengthen the patent pledge as a legal tool for philanthropic goals. Rather the legal system is already based upon a protective system, and private companies have chosen to develop the patent pledge as a mechanism for achieving philanthropic goals.¹²⁴ Debate on whether which strategy is the most effective route is not needed. The patent pledge is a legal tool in the market place that could achieve goals for the betterment of society. If the legal system was structured so that there was a centralized government registry of pledges, the value of patent pledges could be enhanced.

A patent pledge is a promise being made to the public, and a mechanism for private contribution to the public good. Both of these attributes of patent pledges necessitate policy intervention. Policy intervention is the only means by which the benefits of patent pledges can be realized, and the public can be protected from misrepresentation. Furthermore, if patent pledges are accepted as beneficial to society, there are policy levers that could promote an increase in patent pledges at nominal cost to the public.

There are several policymakers that could effect change in the patent pledge environment. The USPTO would be best positioned to enact policy solutions through providing visibility and documentation of patent pledges. Also, if legislation were enacted that strengthened patent pledge enforcement, the USPTO would be the agency most capable of setting patent-pledge standards. Policy change could also come from the legislative branch in the form of laws defining the obligations and standards of patent pledges, as well as legislative initiatives to promote enforceable patent pledges in industries identified as critical-technological areas. The route to stronger enforcement in the U.S. is clearly through the USPTO, but U.S. recognition of patent pledges is only half of the battle given that market reliance on patent protection is heavily dependent on international enforcement. There would still be a question of

¹²⁴ Id.

whether or not industry would rely on patent pledges as a valid non-enforcement promise given that the protections of the patent pledge would not necessarily extend internationally.

Outside of the United States, international trade organizations and foreign governments could enact similar policies to strengthen patent pledges market reliance on patent pledges. The U.S. could pressure the international community into recognizing patent pledges through current trade agreements, such as TRIPS. One of the primary recommendations that has been made is that patent pledges would be strengthened by visibility and documentation,¹²⁵ achieved through the creation of a national or international registry of patent pledges. Patents are already documented in a registry by USPTO and foreign patent offices. A registry of patent pledges would be the natural extension of this regulatory mechanism. Patent pledges should be viewed as any other property, and as such would benefit greatly from documentation. The process of government documentation would serve multiple functions.

One of the primary benefits of a patent pledge registry is that it would formalize the process beyond the current framework. A general public promise is sufficient to be deemed a patent pledge,¹²⁶ as was the case with Tesla and the other automobile manufacturers that made patent pledges. Patent pledges were issued through press releases and could easily be viewed as publicity stunts given that there is no current standardized forum for the issuance of patent pledges. The formality of government registration would be a significant step in promoting public market reliance on patent pledges, as a standard by which the public could gage the commitment of a company to the patent pledge process.¹²⁷

A patent pledge registry would also promote the usefulness SDO patent pledges. Under the current system many FRAND agreements and SDO patent pledges are only accessible to

¹²⁵ Id.

¹²⁶ Contreras, J. L. (2014), 602.

¹²⁷ Contreras, J. L. (2014), 594.

members of the SDO even though the rights of enforcement have been relinquished. Non-member participants could derive significant value from the SDO patent pledges.¹²⁸ As a result of non-SDO patent pledges, technological innovation would benefit from a visible central registry of patent pledges.

There is a subsequent question of whether or not registration is a mandatory condition to patent pledge enforcement. Scholars argue that voluntary registration would not be an effective policy lever, because there would still be unrecorded patent pledges that would induce market reliance without the documentation necessary for ideal enforcement.¹²⁹ While the ideal patent pledge enforcement environment is envisioned. Patent pledges are in the most basic sense a promise to not take action. By refusing to enforce unregistered patent pledges the fundamental principles of promissory estoppel that underlie patent pledge enforcement would be significantly weakened. Under this system promissory estoppel would no longer be enforceable unless the patent pledge was registered, which would hamper industrial use of informal patent pledges, and subsequently hamper the most accessible level of open-patent mechanisms. In contrast, voluntary registration would create a tiered enforcement environment, where market forces could push patent pledgors into registration or not based on the specific needs of different industries.

PART B: Patent Pledge Incentives

Positive incentives are another tool that could be used to promote market reliance on patent pledges. Incentives could take the form of tax incentives or more general regulatory incentives. Incentives could be directed in order to induce market reliance on patent pledges, as well as increase the number of patent pledges made. The benefit of either, would be an increase

¹²⁸ Contreras, J. L. (2014), 600.

¹²⁹ Id.

in commercial usage of patent pledges. However, the greater benefit would be seen through incentives that induced reliance on patent pledges. An increase in aggregate market participant reliance on patent pledges would likely increase, establishing patent pledges as a common business practice. Without any additional policy changes increased market usage alone, would strengthen current promissory estoppel protections. One of the fundamental elements of promissory estoppel is the reasonableness of the enforcing party's reliance on the promise.¹³⁰ An increase in commercial usage of patent pledges would increase the inherent reasonableness of reliance on patent pledges, and thereby strengthen the protection provided by promissory estoppel.

Tax policy has been shown to be an effective tool in promoting policy agendas, and would likely be effective in promoting the usage of patent pledges.¹³¹ Given that patent pledges occur in a commercial setting, the use of monetary incentive would be the most direct incentive to induce reliance on patent pledges. Tax incentives for patent pledges could take the form of credits or deductions to companies relying on patent pledges in the development of new technologies.¹³² Similarly, credits or deductions could be given for registration of patent-pledged technology if a registry were enacted, which would have the dual benefit of promoting the usage of patent pledges, as well as inducing participation in the patent-pledge registry without mandating participation in the registry.

Alternatively, regulatory incentives could be used in a similar manner to induce reliance on patent pledges as well as reliance on the proposed patent-pledge registry. The life sciences

¹³⁰ Lucas, D. (1999). Unreasonably Reasonable Reliance: Prospective At-Will Employment and Promissory Estoppel in *Goff-Hamel v. Obstetricians & Gynecologists, P.C.*, 256 Neb. 19, 588 N.W.2d 798 (1999), 79 Neb. L. Rev. (2000)

¹³¹ Shah, A. (ed.), (2005). *Fiscal Incentives for Investment and Innovation*. Oxford University Press.

¹³² Bloom, N., R. Griffith and J. Van Reenen, (2002). Do R&D Tax Credits Work? Evidence from a Panel of Countries, 1979-1997. *Journal of Public Economics*, 85, pp. 1-31.

industry offers policy examples of how this can be done using government levers. One such lever employed by the FDA in promoting the production of generics in rare diseases is to offer a registration voucher.¹³³ If a company produces a critical generic drug, that company will receive a voucher to speed up the process of FDA drug approval and the same program could be used by the USPTO. Market reliance on patent pledges could be promoted through expedited patent registration for subsequent innovations, and could be implemented before the establishment of a patent registry, and would play multiple roles in validating the patent pledge as a legal tool. A voucher program would encourage innovation based upon patent pledges by providing compensation in the form of the voucher, while at the same time increasing patent approvals of patent-pledged technology.

PART C: International Incentives

Given that international intellectual property law is largely established under trade authority, incentives offer a possible solution to promoting patent pledges and open-innovation policy abroad. Under TRIPS the typical enforcement mechanisms to ensure international compliance are tariffs and penalties.¹³⁴ Where punitive actions serve to force foreign signatories into protective patent policy, incentives could be offered for countries that use approved forms of open-innovation policy such as patent pledges.¹³⁵

The policy of incentivizing patent pledges abroad would have multiple positive effects on the usefulness of patent pledges. International incentives would promote patent pledge usage in the same way as domestic incentives, by solidifying patent pledges as a standard business tool,

¹³³ Food and Drug Administration Safety and Innovation Act (FDASIA), Pub. L. 112-144, 126 Stat. 993 (2012).

¹³⁴ Lim, C. L., Elms, D. K., & Low, P. (2012). *The Trans-Pacific Partnership: A quest for a twenty-first century trade agreement*. Cambridge: Cambridge University Press.

¹³⁵ Maskus, K. E. (2000). *Intellectual property rights in the global economy*. Washington, D.C: Institute for International Economics.

thereby strengthening the case of investor reliance. International incentives would also support the spirit of open-innovation in opening up technological collaboration to the international community. Increased openness would provide a more diverse research base for technological development, and in turn could serve to expedite innovation.

One of the primary issues that has arisen in the negotiations around TPP has been the unwillingness of trade partners to accept the entirety of U.S. patent law.¹³⁶ In the case of China, substantial risks are posed to the U.S. trade relationship with China. Both countries have independent patent policy agendas. Technology plays an important role in U.S. with China due to the numerous information technology supply chain components that rely on Chinese imports and exports.¹³⁷ Economic realities are one of the reasons that the U.S. has not been able to convince the Chinese government to sign on to TPP, which is one of the reasons the U.S. has met Chinese resistance in TPP negotiations with Chinese influenced trade negotiations. Patent pledges offer a potential tool for trade negotiations with China that would provide both countries with the flexibility to allow for an open-patent tool while maintaining the current protective aspects of the U.S. patent system. Companies in countries that are U.S. trade partners, but want fewer barriers to open-patent usage, would receive incentives for promoting patent pledges domestically as an alternative to infringement. While not a trade policy panacea, patent pledge incentives in international trade could offer a much needed tool for compromise, and serve as a means of increasing patent pledge usefulness domestically and abroad.

¹³⁶ Palit, A. (2014). The Trans-Pacific Partnership, China and India: Economic and political implications.

¹³⁷ Id.

VI. Conclusion

Patent pledges are a unique legal tool created by industry to address demand for open-innovation, and have significant philanthropic potential. Philanthropic goals, or the appearance thereof, are a fundamental element of the non-SDO patent pledge.¹³⁸ If patent pledges receive increased market reliance, the stated goals of the pledges may or may not be realized, but there is little downside risk to promoting reliance as a policy agenda. If patent pledge reliance is not promoted, or patent pledges continue in their current form there is a risk that the pledges could be detrimental to the stated philanthropic goals, because of the appearance of action at the expense of legitimate innovation initiatives.

Protective patent policy is one of the most basic forms of government intervention in industry,¹³⁹ as industry has moved toward promoting philanthropic business goals. Companies looking to open-innovation strategies as a lever for expedited technological development. Now that business has started to develop policy agendas for patent policy, policymakers should at minimum work to enable philanthropic goals where they do not interfere with government policy agendas. As a voluntary relinquishment of rights, the patent pledge could enable industry to achieve policy goals through open-innovation strategies.

Investors seek to minimize risk when investing in patented technology.¹⁴⁰ The patent pledge could serve as a powerful tool to encourage investment, by accelerating technological development. However, greater legal protections for investors relying on patent pledges are

¹³⁸ Contreras, J. L. (2014), 544.

¹³⁹ Heller, M. A. and Eisenberg, R. S. (1998). Can patents deter innovation? The anticommons in biomedical research. *Science* 280, 698–701.

¹⁴⁰ Jaffe, A. B., Lerner, J., (2004). *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to Do About It*. Princeton University Press, Princeton, NJ.

required. Under the current system companies that rely on patent pledges for technological development remain open to the legal risk of infringement litigation, because there is no mechanism to ensure that patent pledges are enforced.¹⁴¹ Until the problem is solved, there will not be significant investment in patent-pledged technology, and the purported philanthropic goals of pledgors are unlikely to occur.

For each new technology, there are a myriad of patent issues. For instance, there are questions as to which alternative fuel is ideal in the automobile industry.¹⁴² The best automobile battery may be, the one that lasts the longest, or has the longest drive time, or uses the most sustainable fuel source, or perhaps the best battery is just the one that can make an individual company the most profit. Whatever the case may be there is extreme competition within developmental technologies and the battle for market leadership driven by individual motives. Patent pledges are a small part of this competitive environment, but they are a part that has the potential for public benefit. Patent pledges are fairly uncommon, and appear to diverge from the standardization type agreements seen in the past.

The discussion of patent pledges and the history and broader environment of patent law in general is important. Patents are a form of monopoly, and the use of patent strategy relies upon monopolistic tendencies.¹⁴³ Therefore, the use of patent strategy should always weigh both the costs and the benefits of monopolistic strategies. The general trend toward using patents for valuation purposes has increased due to the fact that patents are easily documented and

¹⁴¹ Contreras, Jorge L. (2015). Patent Pledges: Between the Public Domain and Market Exclusivity. *Michigan State Law Review* 2015.2: 787.

¹⁴² Moritz, Manuel, et al. (2015). "Tesla Motors, Inc.: Pioneer towards a new strategic approach in the automobile industry along the open-source movement?". *Management of Engineering and Technology (PICMET)*, 2015 Portland International Conference on. IEEE.

¹⁴³ Arora, A., Fosfuri, A. and Gambardella, A. (2001). *Markets for Technology: The Economics of Innovation and Corporate Strategy*. Cambridge, MA: MIT Press.

recorded.¹⁴⁴

FRAND agreements and standard setting organizations have shown that opening up patents can be commercially beneficial, as the arrangements prioritize innovation over proprietary interests in the near term but retain some proprietary assets in order to monetize innovation in the long term.¹⁴⁵ The key difference between patent pledges and standard setting agreements is the nature of the legal promise being made. FRAND type agreements are promises not to enforce between an individual party and multiple named parties in exchange for the benefits of standardization.¹⁴⁶ Patent pledges are a pledge to the marketplace that the patents will not be enforced.¹⁴⁷

Open-patents have strong societal and humanitarian implications. The societal repercussions of overly protective patent rights can be seen in the pharmaceutical market, but are not limited to that area.¹⁴⁸ Open-patent rights in the automotive industry could be the difference between years and decades in the development timeline of alternative fuel technologies.¹⁴⁹ What remains to be seen is whether patent pledges actually promote philanthropic goals such as alternative fuel technology, or are limited by enforceability issues.

The next step in the evolution of patent pledges will be integration by the automotive industry supply chain, because this is the industry with the most patent pledge activity. Without participation by component manufacturers there will be no way to judge the success of open-

¹⁴⁴ Arora, A., Ceccagnoli, M. and Cohen, W. (2003). R&D and the patent premium. *Working Paper* No. 9431. Cambridge, MA: NBER.

¹⁴⁵ Kanwar, S. and R. Evenson. (2003). Does Patent Protection Spur Technical Change? *Oxford Economic Papers* 55, 235-264.

¹⁴⁶ Contreras, Jorge L. (2015).

¹⁴⁷ Id.

¹⁴⁸ Marcellin, S. S. (2010). The political economy of pharmaceutical patents: U.S. sectional interests and the African Group at the WTO. Burlington, VT: Ashgate.

¹⁴⁹ Xu, Deli and Jiyue Li. (2011). *Innovative Development of New Energy Auto Industry in Changzhou High-Tech Zone - Developing Path of Strategic Emerging Industries from the Perspective of Global Value Chain*. College of Economics & Management, Changzhou Institute of Technology.

innovation in the automotive industry, or if there has been a meaningful humanitarian impact from automotive patent pledges. Tier 1 manufacturer reliance on patent pledges would be seen in manufacturers making designs that would otherwise be considered infringement. To date there have not been any manufacturers that have taken up the released patents, and as such there is no way to determine the efficacy of the patent pledges in promoting alternative fuel technology.¹⁵⁰ If the supply-chain manufacturers take meaningful steps toward using the open patents in a way that will positively impact alternative fuel technology, and would likely take the form of either ancillary products relating to the fuel system or outright replication of the fuel systems.¹⁵¹

The solutions to addressing the issue of patent pledge enforcement could take many forms and would largely be dependent on the willingness of policymakers to work toward promoting market reliance on the pledges as a goal. The biggest challenge because of the years of historical policy oriented toward protective patent strategy comes to view. The increased enforcement of patent pledges does not change the already existing protective patent laws. Patent pledges offer a tool for industry to choose open-innovation strategies in lieu of using protective strategies.

The key to market reliance on patent pledges will be strengthened legal protections for reliant parties, which come about through various policy levers. One of the simplest means to strengthen enforcement of patent pledges would be to create a registry. By creating a USPTO registry of patent pledges, the pledges would be formally documented. The effects of creating a national registry would also be seen internationally through the TRIPS agreement and other

¹⁵⁰ Contreras, Jorge L. (2015).

¹⁵¹ Xu, Deli and Jiyue Li. (2011).

patent trade agreements that extend U.S. patent law internationally.¹⁵² The registry could either require participation or be voluntary. Either option would increase the visibility of patent pledges, and subsequently the authority of the pledges.

Market reliance could be induced through incentives that promote wider adoption. Policymakers could implement tax and governmental incentives for market reliance on patent pledges. As more companies rely upon patent pledges, the device will be easier to protect under existing promissory estoppel law. Wide-spread adoption of patent pledges could be encouraged through USPTO registration voucher programs that encouraged market reliance on patent pledges, as well as tax incentives for new technologies based upon patent pledges.

¹⁵² Maskus, K. E. (2000). *Intellectual property rights in the global economy*. Washington, D.C: Institute for International Economics.

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