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Meet the Patents: Fostering Innovation and Reducing Costs by Opening Patent Portfolios

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I. Introduction

On June 12, 2014, Tesla Motors announced the opening of its patent portfolios, allowing anyone to use its extensive patent collection to produce electric cars and other environmentally-friendly technology.[1] Elon Musk, CEO and product architect of Tesla Motors, announced that Tesla would not "initiate patent lawsuits against anyone who, in good faith, wants to use [Tesla's] technology."[2] This essentially opens up Tesla's expansive patent portfolio and allows a myriad of companies and inventors to use Tesla's patents in order to create their own inventions.[3] Musk believes that the world can benefit from a "common, rapidly-evolving technology platform."[4] A growing number of experts agree, arguing that the current patent system, as well as the culture surrounding it, does not promote innovation in the United States.[5]

Patent advocates contend that patents offer much-needed protection to inventors and encourage people to "invent around" existing patents in order to develop new ideas that have not yet been patented.[6] They also argue that

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1. Elon Musk, *All Our Patent Are Belong To You*, Tesla Motors (June 12, 2014), http://www.teslamotors.com/blog/all-our-patent-are-belong-you.

2. *Id.*

3. *See* Mike Ramsey, *Tesla Motors Offers Open Licenses to Its Patents*, Wall St. J. (June 12, 2014), http://www.wsj.com/articles/tesla-motors-says-it-will-allow-others-to-use-its-patents-1402594375.

4. Musk, *supra* note 1.

5. *See* Michael Boldrin & David K. Levine, *The Case Against Patents* 15 (Fed. Res. Bank of St. Louis, Working Paper No. 2012-035A, 2012) (arguing that there is "no empirical evidence that [patents] serve to increase innovation and productivity"); James Bessen & Michael J. Meurer, Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk 140–141 (2008) (suggesting that although the patent system may have been effective as an incentive for innovation in the past, empirical evidence shows that it now provides a "net disincentive for innovation").

6. Janice M. Mueller, Patent Law 27 (3d ed. 2009).

minimizing the patent system would be especially destructive for individual inventors, many of whom license their patents to larger companies for a living.[7] Furthermore, these critics contend that the opening of patent portfolios will "turn into an intellectual property land mine" and may subject companies to the risk of litigation because of the vague nature of the open-source model.[8]

On the other side, proponents of the current patent system are unable to explain why the U.S. economy has not seen a significant acceleration in the "rate of technology progress," nor an increase in the amount of money spent on research and development, despite a tremendous increase in the amount of patents registered in the past 30 years.[9] This paradox is known as the "patent puzzle."[10]

This paper argues that opening patent portfolios not only fosters innovation, but is also likely to significantly decrease litigation and transaction costs for companies.[11] These advantages are particularly valuable for startups that often lack the capital to finance lengthy and expensive litigation.[12] Furthermore, opening patent portfolios would mitigate the problems caused by patent trolls, whose frivolous lawsuits impose large litigation costs upon innovators.[13]

Part II of this comment provides a brief overview of the U.S. patent system and examines the advantages and problems associated with the modern patent system.[14] Part III demonstrates how an open source model, used most famously in the software industry, presents a useful solution to the patent puzzle.[15]

The adoption of an open-source model in cutting-edge industries will not only help in solving the patent puzzle and increasing the rate of innovation in the U.S., but will also likely lower legal costs for companies by reducing transaction costs, the risk of litigation, and the presence and power of patent trolls.[16]

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7. *See* Christopher A. Cotropia, *The Individual Inventor Motif in the Age of the Patent Troll*, 12 YALE J. L. & TECH. 52, 57–61 (2009) (arguing that proponents of the modern patent system, including the USPTO, rely on the motif of the individual inventor in their belief that one of the main goals of patents "should be to assist, and in some ways protect, the individual inventor").

8. Anna Gallegos, *With Open Source Patents, Risks Run High for Tesla and Interested Automakers*, THE LEXBLOG NETWORK (June 23, 2014), http://www.lxbn.com/2014/06/23/risks-run-high-tesla-interested-car-companies-open-source-patents/.

9. Boldrin, *supra* note 5, at 1.

10. *Id.*

11. *See infra* Part III.C, III.D.

12. Colleen Chien, *Startups and Patent Trolls*, 17 STAN. TECH. L. REV. 461, 472–485 (2014) (finding that the majority of unique defendants to patent infringement suits brought by non-practicing entities are startups and other small companies and that these suits can be "costly to resolve" and "force significant operational changes").

13. *Patent Trolls: Why No One Likes Them*, ECONOMIST (Mar. 3, 2015) http://www.economist.com/news/business-and-finance/21645604 (reporting that "patent-related lawsuits has risen more than ten-fold since 2000" and some of the patent trolls file more than one lawsuit a week).

14. *See infra* Part II.

15. *See infra* Part III.

16. *See infra* Part III.

II. Does the U.S. Patent System Truly Promote the Progress of Science and Useful Arts?

The U.S. Constitution specifically empowers Congress to issue patents in order to "promote the progress of science and useful arts."[17] Patents allow the dissemination of new technological information and are integral to the U.S. economy.[18] However, the current patent system's benefits are largely outweighed by its negative effects.[19] The U.S. patent system stunts innovation, allows patent trolls to abuse the legal system, and imposes large litigation and transactional costs on companies.[20]

A. Overview of the United States Patent System

Patent law is embedded in American society.[21] The Constitution provides that Congress shall "[secure] for limited times to authors and inventors the exclusive right to their respective writings and discoveries."[22] Patents grant the inventor a "twenty-year federally mandated monopoly" on the use of a product, process, composition of matter, or even a new variety of plant.[23] In order to successfully patent an invention, there are three general requirements: the invention must be useful, novel,[24] and non-obvious.[25] The utility asserted for an invention must be specific and substantial; a patent is "not a hunting license."[26] The novelty prong of this analysis requires that the invention be both unique and original.[27] For an invention to be non-obvious, the invention must not be the result of an "obvious

17. U.S. Const. art. I, § 8, cl. 8.

18. *See infra* Part II.B.

19. *See infra* Part II.C.

20. *Id.*

21. Adam Mossoff, *Rethinking the Development of Patents: An Intellectual History, 1550-1880*, 52 Hastings L.J. 1255, 1272 (2001) (tracing the origins of Anglo-American patent law to the 1624 Statute of Monopolies in England, which granted 14 year monopolistic patents and declared for the first time that "all disputes concerning monopoly patents will be tried at common law"); *see also* The Federalist No. 43 (James Madison) ("The utility of [the Copyright and Patent Clause] will scarcely be questioned. The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals.").

22. U.S. Const., *supra* note 17.

23. Dan Hunter, Intellectual Prop. 80 (Dennis Patterson ed. 2012).

24. 35 U.S.C. § 101 (2012) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.").

25. 35 U.S.C. § 103 (2012).

26. Brenner v. Manson, 383 U.S. 519, 536 (1966) (holding that an untested steroid that belonged to the same class of drugs known to have anti-cancer effects did not have a specific utility, but rather was attributed a general characteristic that belonged to a class of drugs as a whole).

27. Hunter, *supra* note 23, at 95 (maintaining that "the invention must not be already known, it must not have derived from another, and it must not already be subject to a patent claim by another").

modification of some other device which has already been patented or publicly disclosed."[28]

An application for a patent must also adequately disclose the nature or workings of the invention.[29] This can be achieved by including a written description in "full, clear, concise, and exact terms"[30] and describing the invention in such a manner "as to allow someone skilled in the art to make and use the invention without undue experimentation."[31]

Valid patent holders have the right to prevent or enjoin others from utilizing the patent in any way.[32] Each patent is made up of elements, that each cover the different parts of the invention. In order to be successful in a patent infringement suit, the plaintiff must show that the defendant copied "each and every element of any one claim of a patent."[33] Both monetary damages and injunctive relief are available as remedies.[34]

B. Benefits of the U.S. Patent System

Throughout history, the U.S. patent system has been praised for the "important benefits that it provides to the public."[35] For example, the adequate disclosure requirement for patents means that the specifications and inner-workings of an invention are visible to the general public.[36] Thus, the patent system facilitates the "dissemination of new technologic information."[37] While a specific invention is

28. Robert L. Shaver, *Ten Things Every Attorney Should Know about Patents*, ADVOC. IDAHO, Jun. 2005, at 11. *See* Eibel Process Co. v. Minn. & Ont. Paper Co., 261 U.S. 45, 58 (1923) (holding that a substantial elevation change in a single part in the already patented Fourdrinier paper-making machine, which allowed discharged ink to gain additional speed and keep up with the pace of the paper-making process, was not an obvious modification of the existing patent); Yamanouchi Pharm. Co. v. Danbury Pharmacal, Inc., 231 F.3d 1339, 1341 (Fed. Cir. 2000) (finding the patent for Pepcid, an antacid medicine comprised of three molecular elements already found in the prior art, valid partially because of the significant time expended in order to discover the unique combination of chemicals); *but see* Wyers v. Master Lock Co., 616 F.3d 1231, 1233 (Fed. Cir. 2010) (ruling that the combination of several prior art patents involved in a hitch pin lock used to secure trailers to vehicles was obvious because it a matter of common sense to combine those inventions).

29. 35 U.S.C. § 112 (2012).

30. *Id.*

31. HUNTER, *supra* note 23, at 104.

32. *Id.* at 111.

33. Shaver, *supra* note 28, at 12.

34. Craig J. Madson, *Patents*, *in* THE INTELLECTUAL PROP. HANDBOOK 229, 256–57(William A. Finkelstein et. al eds., 2005) (There are three main types of monetary damages: lost profits, established royalties, and reasonable royalties. Lost profits are the most likely remedy when "the patent owner was involved in sales of the patented item." Recovering lost profits require the plaintiff to "show within a reasonable probability that "but for" the infringer's improper acts, the profits would have been realized." Established royalties are generally pursued when the patent holder does not sell the invention, but licenses it. Reasonable royalties are generally rewarded "where the patent owner neither sells nor licenses the patented item in an area.").

35. MUELLER, *supra* note 6, at 26 (quoting President Abraham Lincoln, who said that the patent system "added the fuel of interest to the fire of genius").

36. *Id.*

37. *Id.*

protected under federal law, inventors may aspire to "invent around" the patent by creating a new invention that achieves similar goals through different mechanisms or processes.[38]

In addition to disseminating new technological information, patents that are utilized through manufacture, sale, or licensing have a significant impact on the domestic economy.[39] In its current state, virtually all of the U.S. economy depends on patents and other intellectual property protections.[40] The United States Patent and Trademark Office (USPTO) additionally identifies certain sectors of the economy as especially "IP-intensive."[41] USPTO claims that these industries accounted for 27.1 million American jobs, or 18.8% of all employment in 2010.[42] Furthermore, these jobs pay well compared to other areas of employment, with average weekly wages 42% higher than in non-IP intensive private industries.[43] Patents are important not only to individual workers, but to corporations themselves.[44] Many U.S. companies currently have extensive patent portfolios, which make up a substantial percentage of their overall value.[45] The destruction of a company's patent portfolio could "result in a reduction of the value of a company. . .by millions of dollars."[46]

Finally, some argue that the patent system fosters innovation.[47] For example, the USPTO maintains that when companies are "more confident that their ideas will be protected, they have the incentive to pursue advances that push efficiency forward,

38. *Id.* at 27.

39. ECON. AND STATISTICS ADMIN. & U.S. PATENT AND TRADEMARK OFFICE, INTELLECTUAL PROP. AND THE U.S. ECON.: INDUSTRIES IN FOCUS, at ii (2012) [hereinafter INDUSTRIES].

40. *Id.* at v.

41. *See id.* at 6–8 (measuring IP-intensity of industries by calculating a measure "defined as the ratio of total patents over the five years in a [North America Industry Classification System] category to the average payroll employment by industry").

42. *Id.* at 3.

43. *Id.*

44. *See* Edward J. Usalis, *A Case Study on the Importance of Patented IP*, ACCUVAL (Jan. 2012), http://www.accuval.net/insights/featuredarticle/detail.php?ID=90 (asserting that "patents are major corporate assets" that are often an integral part of transactions. Usalis demonstrates that patents can be crucial when "evaluating a potential merger or acquisition" or making valuation decisions regarding collateral for loans.).

45. *See* Vernon W. Francissen, *The All-Important Patent Portfolio*, SEATTLE BUS., (Oct. 2013), *http://www.seattlebusinessmag.com/article/legal-briefs-all-important-patent-portfolio* (finding that patents are a "core strategic asset" that can be used for a variety of functions, including creating a "period of exclusivity to exploit their research", collecting investors, and, for small companies, patents can act as the venture's main asset).

46. Shaver, *supra* note 28, at 12.

47. *See* Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1576 (2003) ("Patent law is our primary policy tool to promote innovation, encourage the development of new technologies, and increase the fund of human knowledge"); *but see* Gregory N. Mandel, *Proxy Signals: Capturing Private Information for Public Benefit*, 90 WASH. U. L. REV. 1, 8–9 (2012) (acknowledging the importance of patents affecting innovation but arguing that intellectual property protection "is a dual-edged sword" that "[limits] access to patented products, [reduces] the distribution of innovation and the potential for future technological development").

costs down, and employment up."[48] However, an increasingly vocal group of economists and legal experts have begun to question these assertions.[49]

C. Problems of the U.S. Patent System

While the modern U.S. patent system has beneficial aspects, these benefits are outweighed by the harm they cause, especially for companies involved in innovative industries. This section explores some of the most significant problems caused by the patent system. One of the most perplexing problems, known as the "patent puzzle," shows that although the numbers of registered patents have rapidly increased in recent years, empirical measures of innovation have remained stagnant.[50] The patent puzzle demonstrates how the modern patent system allows "patent trolls"–entities who hold patents but do not have the capabilities to manufacture or sell anything–to stifle innovation by forcing businesses to pay outrageously large settlements and damages awards, as well as facing permanent injunctions.[51] Finally, this section shows how problems in the patent system have caused large increases in both litigation and transaction costs.

1. The Patent Puzzle: How the Growth of the U.S. Patent System Has Stagnated Innovation

For much of modern history, patent laws have been at odds with fostering a free and innovative market.[52] One of the earliest (and most notorious) examples of this is the case of the Wright Brothers' airplane patent.[53] The airplane was a groundbreaking invention; however, it required a large amount of tinkering and subsequent inventions to develop into the modern plane.[54] This innovation was

48. INDUSTRIES, *supra* note 39, at i.

49. *See generally* Boldrin, *supra* note 5; BESSEN, *supra* note 5.

50. Boldrin, *supra* note 5, at 1.

51. *See, e.g.*, Susan Decker & Adam Satariano, *Apple Challenges $625.5 Million Mirror Worlds Verdict*, BLOOMBERG BUS. (Oct. 4, 2010), http://www.bloomberg.com/news/articles/2010-10-04/apple-challenges-625-5-million-mirror-worlds-patent-verdict (explaining a decision rewarding the plaintiff, Mirror Worlds, a $625.5 million damages jury verdict because Apple allegedly infringed on a patent involving how documents are displayed on a computer screen, although that verdict was later reversed. It is important to note that Mirror Worlds has not been capable of manufacturing or selling anything involving the patent since 2004, when it officially ceased operation). *See also* Mirror Worlds, LLC v. Apple Inc., 692 F.3d 1351, 1357 (Fed. Cir. 2012) (holding that the patents at issue were not infringed upon by Apple's technology).

52. *See* SETH SHULMAN, UNLOCKING THE SKY: GLEN HAMMOND CURTISS AND THE RACE TO INVENT THE AIRPLANE 223 (2002) (arguing that the patent battles in the early 20th century between Glenn Curtiss and the Wright brothers "pitted the virtues of open, shared access to innovation against the driving economic pressure for monopoly ownership, a debate that resonates through the years").

53. *Id.*

54. *Id.* at 214 (explaining that changes in the design of an airplane, developed by the Wright brothers, Glenn Curtiss and other inventors, were essential to creating a commercially viable aircraft capable of long distance flight and highlighting Curtiss's belief that building upon the work of those who have come before, not isolation, was the key).

hindered by conflicting patents and excessive litigation between the Wright Brothers and other inventors.[55]

Since the early 1980s, the number of patents registered with the USPTO has more than quadrupled.[56] In 1983, only 59,715 patents were issued.[57] By 2010, this number exploded to 244,341.[58] However, this growth has not coincided with any recognizable increases in the level of innovation in the U.S. economy.[59] Furthermore, funding towards research and development has remained relatively static.[60] These statistics suggest that patents have done little to foster innovation. Patent scholars Boldrin and Levine conclude that the "recent explosion of patents. . .has not brought about anything comparable in terms of useful innovation."[61]

Consequently, development of new technology is often pushed outside of the United States.[62] Since U.S. patents generally only exist within the borders of the country,[63] foreign companies can utilize patents outside of the U.S. without violating U.S. patent laws, "as long as the company uses the patent elsewhere."[64]

2. The Rise of the Patent Troll: How Non-Practicing Entities Abuse the Legal System, Increase Litigation Costs, and Slow the Rate of Innovation.

The rise of the patent troll has accompanied the massive surge in registered patents in recent decades.[65] Over the years, patent trolls have plagued corporations and court systems throughout the country. Less derogatorily known as non-practicing

55. *Id.* at 224 (observing that nine years of fruitless patent litigation drained time and resources from both sides and rendered most of the Wrights' engineering contributions totally obsolete by the end of the suit).

56. Boldrin, *supra* note 5, at 6.

57. *Id.*

58. *Id.*

59. *Id.* at 1.

60. *Id.* at 6.

61. *Id.* at 20.

62. *See* Adam Segal, Advantage: How American Innovation Can Overcome the Asian Challenge 183 (2011) (arguing that huge litigation costs in the U.S. patent system forces innovation out of the country).

63. 35 U.S.C. § 271 (defining the territorial limits of U.S. patents by indicating that direct infringement of a patent occurs only if the enumerated acts are committed within the U.S. or through importation into the U.S). *But See* Timothy R. Holbrook, *Extraterritoriality in U.S. Patent Law*, 49 Wm. & Mary 2119, 2139–2141 (2008) (finding limited exceptions to the territorial restriction of patent protection, including § 271(g), which protects products made by patented processes, even if the process is performed outside of the U.S.). Holbrook notes that the Federal Circuit often interprets restrictive meanings of these exceptions. *See* Bayer AG v. Housey Pharmaceuticals, Inc., 340 F.3d 1367, 1368 (Fed. Cir. 2003) (interpreting § 271 as only applying to physical products that are manufactured, not information).

64. Nelson Johnson, *The Foreign Use of U.S. Patents*, 30 Colum. J. Transnat'l L. 145, 145–46 (1992).

65. *See* Boldrin, *supra* note 5, at 6–7 (noting that as patent registration has exploded in the past thirty years, so has litigation that typically "involves dying firms, that have accumulated huge stockpiles of patents but are no longer able to produce marketable products." Boldrin & Levine point to Texas Instruments, a prominent calculator manufacturer that was "unable to make the transition to the PC revolution", as well as Microsoft, which has been "unable to make the leap to portable devices.").

entities ("NPEs") or patent assertion entities ("PAEs"), patent trolls are entities that hold patents and pursue infringement suits but do not have the capabilities to manufacture or sell anything. There are some NPEs, such as non-profit organizations or universities, who do not engage in malicious litigation and hold patents purely for research purposes.[66] However, the vast majority of suits brought by NPEs are from companies or individuals that fit the classic definition of a patent troll.[67] Non-practicing entities present serious danger to both innovation and litigation budgets by hording patents and demanding licensing fees while "not [providing] end products or services themselves."[68] Generally, an NPE will seek damages from patent infringements or permanent injunctions, with the latter being potentially more dangerous to a company being sued. While the severity of the patent troll threat may have been embellished by the media in recent years, evidence shows that patent trolls continue to file significant numbers of patent infringement cases.[69] Recent studies from the Executive Office of the President[70] and the Congressional Research Service[71] demonstrate that litigation initiated by NPEs costs defendant businesses "$29 billion per year in direct out-of-pocket costs," with an aggregate destruction of over $60 billion per year.[72] Furthermore, innovative firms

66. *See* Michael J. Mazzeo, Jonathan Hillel & Samantha Zyontz, *Do NPEs Matter?: Non-Practicing Entities and Patent Litigation Outcomes*, NORTHWESTERN PRITZKER SCH. L. 5 (2013), http://www.law.northwestern.edu/research-faculty/searlecenter/innovationeconomics/documents/mazzeo_hillel_zyontz_npeoutcomes_mhz.pdf (noting that while universities may not manufacture or sell products, they conduct hold patents for research purposes and "primarily seek to develop and transfer technology").

67. *See* 2011 PATENT LITIGATION STUDY: PATENT LITIGATION TRENDS AS THE "AMERICA INVENTS ACT" BECOMES LAW 33 (2011) [hereinafter LITIGATION STUDY], http://www.aipla.org/resources2/intlip/Documents/Other-International-Events/US-Bar-JPO-Liaison-Council-2012/2011-patent-litigation-study.pdf (concluding that 95% of NPE litigation involves companies or individuals).

68. John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111, 2112 (2007).

69. James Bessen, *The Evidence Is In: Patent Trolls Do Hurt Innovation*, HARV. BUS. J. (Nov. 2014), https://hbr.org/2014/07/the-evidence-is-in-patent-trolls-do-hurt-innovation/ [hereinafter *Evidence*]. *But see* Stephen Haber & Ross Levine, *The Myth of the Wicked Patent Troll*, WALL ST. J. (June 29, 2014) http://www.wsj.com/articles/stephen-haber-and-ross-levine-the-myth-of-the-wicked-patent-troll-1404085391 (arguing that an increase in patent litigation does not indicate a problem with patent trolls, but "might instead reflect a healthy, dynamic economy", spurred by rapid advances in technological progress); *see also* Nicholas Wells & Eric Chemi, *Can't Kill Off the Patent Trolls Yet*, CNBC (May 19, 2015), http://www.cnbc.com/2015/05/19/cant-kill-off-the-patent-trolls-yet.html (reporting that patent litigation rates dropped in 2014, for the first time in over 5 years).

70. EXEC. OFFICE OF THE PRESIDENT, PATENT ASSERTION AND U.S. INNOVATION, https://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf (finding that recent increases in patent litigation, as compared to the 20th century, are due to an "increasing number of computer and communications patents, whose wider breadth makes them more easily abused" and patents held by non-practicing entities, rather than manufacturers).

71. BRIAN T. YEH, CONGRESSIONAL RESEARCH SERVICE, AN OVERVIEW OF THE "PATENT TROLLS" DEBATE (2013), http://fas.org/sgp/crs/misc/R42668.pdf (explaining that "patent litigation is risky, disruptive, and expensive" and asserting that patent trolls often "set royalty demands strategically well below litigation costs to make the business decision to settle an obvious one").

72. *Evidence*, *supra* note 69.

are disproportionately affected by patent trolls.[73] Empirical analysis of patent litigation shows that as prospective defendants spend more money on research and development, they are more likely to be sued by patent trolls for infringement.[74]

One example of the financial burdens that patent trolls cause to corporations is demonstrated in the high-stakes case, *NTP, Inc. v. Research in Motion, Ltd.*[75] NTP, the owner of patents for wireless transmission of e-mails, sued Research in Motion ("RIM"), the makers of the Blackberry smart phone, for infringement.[76] NTP was a classically defined patent troll; the company had no employees, created no products, and operated purely as an "intellectual property patent licensing company."[77] Their strategy was to "[acquire] patent portfolios in order to sue deep-pocketed companies for infringement."[78] After five years of litigation and negotiations, RIM chose to settle for a handsome sum of $612.5 million in order to "avoid having a permanent injunction issued against them and having the Blackberry service shut down its 4.3 million subscribers."[79]

The United States Supreme Court substantially limited the remedies in patent infringement cases and sought to decrease the strength of patent trolls in *EBay, Inc. v. MercExchange*.[80] MercExchange held a patent for "an electronic market designed to facilitate the sale of goods between private individuals."[81] It claimed that eBay's "Buy It Now" feature, which allowed users to purchase an item from another user with one click, infringed the patent owned by MercExchange.[82] The Federal Circuit's holding prohibited eBay and its subsidiaries from using the "Buy It Now" feature due to their "general rule" to "issue permanent injunctions against patent infringe[rs] absent exception[al] circumstances."[83] On appeal, the United States Supreme Court vacated the Federal Circuit's decision and held that under the Patent Act, plaintiffs must meet the traditional four-factor framework that governs the award of injunctive relief.[84] Theoretically, this makes it much more difficult to obtain permanent injunctions. The *Ebay* decision was heralded as a victory against

73. *Id.*

74. *Id.*

75. NTP, Inc. v. Research in Motion, Ltd., No. Civ.A. 3:01CV767, 2003 WL 23100881 (E.D. Va. Aug. 5, 2003).

76. *Id.* at * 1.

77. Dana T. Blackmore, *Analyzing the Effects of American Patent Trolls in* NTP v. Research in Motion: *Was there Really a Threat of an American Blackout of the Canadian-Manufactured and Operated Blackberry?*, 16 MICH. ST. J. INT'L L. 271, 274 (2007).

78. Todd Klein, Ebay v. MercExchange and KSR Int'l Co. v. Teleflex, Inc*.: The Supreme Court Wages War Against Patent Trolls*, 112 PENN. ST. L. REV. 295, 297 (2007).

79. *Id.* at 297–98.

80. 547 U.S. 388 (2006).

81. *Id.* at 390.

82. *Id.*

83. *Id.* at 391 (citing MercExchange, L.L.C. v. eBay, Inc., 401 F.3d 1323, 1339 (Fed. Cir. 2005).

84. *Id.* at 388.

patent trolls.[85] However, patent trolls often force companies into settlements, avoiding trial and the *Ebay* standard altogether.[86] Thus, patent trolls continue to be a serious problem, and not only inhibit the growth of innovation but also create a negative effect on the United States economy at large.[87]

3. Patent Infringement Suits and the Increase in Litigation Costs

The patent puzzle reflects another concern for companies: an increase in litigation costs due to patent infringement suits.[88] Recent developments in legislation and case law suggest that litigation costs may continue to increase in the near future. The Leahy-Smith America Invents Act ("AIA") was signed into law on September 16, 2011.[89] Scholars have compared this act to a "sausage," claiming it represents a "random mixture of reforms rather than a cohesive, unified product."[90] The most prominent reform converted the U.S. Patent System from a "first to invent" system to a "first to file" system.[91] Another provision reformed the joinder rules, allowing the consolidation of cases filed against the same patent, restricting the ability of NPEs to save litigation costs by suing multiple unrelated defendants in the same infringement case.[92] However, the AIA contains no language involving the calculation of damages in patent infringement matters, unlike the proposed Patent Reform Act of 2009.[93] The absence of such language suggests that Congress "believes the subject of patent damages is best left for the courts to address and regulate."[94]

The AIA represents a recent trend of allowing more judicial discretion over damages in patent infringement cases. In 2011, the U.S. Court of Appeals for the Federal Circuit held in *Uniloc USA, Inc. v. Microsoft Corp.* that the commonly-used

85. Jessica Holzer, *Supreme Court Buries Patent Trolls*, FORBES (May 16, 2006), http://www.forbes.com/2006/05/15/ebay-scotus-patent-ruling-cx_jh_0516scotus.html.

86. Mark A. Lemley, *Missing the Forest for the Trolls*, 113 COLUMB. L. REV. 2117, 2126 (adding that a growing numbers of patent trolls are "interested in quick, low-value settlements").

87. *See* Larry Downes, *Everyone hates patent trolls, but here's the root problem with our broken system*, WASH POST. (May 4, 2015), https://www.washingtonpost.com/news/innovations/wp/2015/05/04/everyone-hates-patent-trolls-but-heres-the-root-problem-with-our-broken-system/ (reporting that the extortionate litigation by patent trolls costs the U.S. economy approximately $1.5 billion a week).

88. Boldrin, *supra* note 5, at 6.

89. Leahy-Smith America Invents Act Pub.L. 112–29, 125 Stat. 284 (2011) (hereinafter America Invents).

90. Sarah Tran, *Patent Powers*, 25 HARV. J. LAW & TECH. 609, 610 (2012) (asserting that not only is the America Invents Act a sausage, but it is a "supersized" one).

91. America Invents, *supra* note 89, at 293.

92. *Id.* at 332–33. *But see* Dongbiao Shen, *Misjoinder or Mishap? The Consequences of the AIA Joinder Provision*, 29 BERKELEY TECH. L. J. 545, 580 (2014) (arguing that while the AIA has resulted in a decline in multi-defendant suits, the $350 filing fee meant to discourage patent trolls has ultimately failed and there has been no noticeable decrease in patent infringement cases brought by trolls).

93. *See* H.R. 1260, 111th Cong. (1st Sess. 2009) (proposing several provisions regarding damages, including a requirement that damages be no less than a "reasonable royalty for the use made of the invention by the infringer" and allowing expert testimony by both sides to determine appropriate damages).

94. LITIGATION STUDY, *supra* note 67, at 5.

25 percent rule for determining patent royalties, which says 25 percent of the expected profit from sale of a patented item should be paid to the patent owner as a license royalty, is a "fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation."[95] *Uniloc* means that courts have more discretion in determining damages, rather than having a standardized rule for determining those amounts.[96] Companies may have to spend more money to battle in court because the stakes could be much higher, depending on the individual judge or jury.

High and unpredictable costs stemming from litigation, whether or not an NPE is involved, can negatively affect a company. For smaller startup companies, patent infringement litigation can be disastrous.[97] Many young startups lack the financial resources to fund litigation.[98] Being sued for patent infringement causes startups to rapidly lose resources, forcing them to lay off employees and lowering the value of the company.[99] When attempting to enforce patents, startups often cannot afford the inherent risk of litigating against larger entities with seemingly endless financial and legal resources.[100] The inability of startups to legally protect themselves is emblematic of the larger problem of innovation inhibition in the modern patent system.[101]

4. Rising Transaction Costs and its Impact on Developing a Patent Portfolio

In recent years, the mad rush to develop an extensive patent portfolio has made it increasingly difficult for companies to obtain the licensing rights needed to create a new product because the various patents have "become increasingly spread across numerous rights holders."[102] As a result of what has been described as the "patent

95. Uniloc USA, Inc. v. Microsoft Corporation, 632 F.3d 1292, 1315 (2011) (finding that Microsoft's "Product Activation Feature", which requires a user to input a 25 digit security code in order to install and utilize software, did not knowingly infringe upon Uniloc's patent, which described a similar process mean to prevent users from easily copying software onto more than one computer).

96. *Id.*

97. *See* Amy L. Landers, *The Antipatent: A Proposal for Startup Immunity*, 93 Neb. L. Rev. 950, 956 (2015) (advocating for a limited patent-free zone under which qualified innovative startups can operate with immunity from others' patents).

98. *Id.* at 965.

99. See Catherine E. Tucker, The Effect of Patent Litig. and Patent Assertion Entities on Entrepreneurial Activity 3, 6 (2014) (for case studies and empirical evidence that venture capital investment is directly affected by rising patent litigation rates). One of the case studies follows Ditto, a budding eyewear startup that uses 3D technology to copy a customer's face, letting them virtually try on glasses. Although the patent infringement case against Ditto was eventually dismissed, the startup was forced to lay off 4 of their 15 employees and loss approximately $3-4 million in valuation. *Id.*

100. Landers, *supra* note 97, at 965.

101. Tucker, *supra* note 99, at 36 (suggesting venture capital investment would have likely been "$21.772 billion higher over the course of five years but-for litigation brought by frequent litigators").

102. Elyse Dorsey, *Building Patent Portfolios to Facilitate Cross-Licensing Agreements: Implications for Merger Efficiency Analysis*, 15 Colum. Sci. & Tech. L. Rev. 125, 139 (2013).

holdup problem," companies developing new products have seen dramatic increases in transaction costs, which include "the costs of discerning quality and negotiating contracts."[103] Specifically, the spread of patents requires companies to spend more time and money negotiating with the various patent holders for licensing and increases the amount of royalties that must be paid.[104]

This problem is particularly noticeable amongst two populations: the tech sector and individual patent holders. In the tech sector, products often involve hundreds of discrete software patents, collectively costing tech manufacturers millions.[105] Individual patent holders often cannot afford the prohibitively high "costs of repeat contracting."[106] The problems faced by these groups are representative of the problem as a whole: the excessive transactions costs associated with developing a patent portfolio is a serious risk for many modern patent holders.

III. Using an Open Source Models and the Solution to the Patent Puzzle and Associated Problems

Open source models, as popularized by software developers in the 1980s and 1990s, is a system for sharing intellectual property that emphasizes collaboration and dissemination.[107] Applying an open source model to businesses, particularly those in innovative industries, would likely have highly beneficial results. This section gives a brief overview of the characteristics and history of open source models and demonstrates how adopting this model could reduce both the efficacy of patent trolls, as well as patent litigation and transaction costs.

103. *Id.* at 139.

104. Anne Layne-Farrar & Klaus M. Schmidt, *Licensing Complementary Patents: "Patent Trolls," Market Structure, and "Excessive Royalties*, 25 Berkeley Tech. L.J. 1121, 1129 (2010) (describing royalty stacking, in which "firms' royalty rates stack up to form a large cumulative burden for manufacturers").

105. *See generally* Don Clark, *Patent Holders Fear Weaker Tech Role*, Wall St. J. (Feb. 8, 2015), http://www.wsj.com/articles/patent-holders-fear-weaker-tech-role-1423442219 (reporting on lobbying efforts by technology companies to weaken patent licensors like Qualcomm, Inc., who make billions dollars each year in licensing patents from companies in the smartphone industry).

106. Robert P. Merges, Berkeley Law, Institutions for Intellectual Property Transactions: The Case of Patent Pools 14 (1999), https://www.law.berkeley.edu/files/pools.pdf (arguing that individuals holding intellectual property rights may alleviate the collectively high sum of repeating transactions costs by forming patent pools).

107. Naresh K. Kannan, *Open source expands to kale, quinoa and cars*, The Daily Record (July 15, 2014) http://nydailyrecord.com/2014/07/14/ip-frontiers-open-source-expands-to-kale-quinoa-and-cars/.

A. Open Source Models: Encouraging Innovation through Collaboration

An open source model allows intellectual property to be "openly licensed at no cost to users" in order to foster the spread of ideas and encourage collaboration.[108] This allows individuals to benefit from innovation made by the group as a whole.[109] Instead of holding exclusive rights to an invention and limiting its availability, the open source model's goal is "maximizing the value of the work through achieving the widest dissemination possible."[110] This is consistent with Elon Musk's assertion that Tesla's "true competition is not the small trickle of non-Tesla electric cars being produced, but rather the enormous flood of gasoline cars pouring out of the world's factories every day."[111] For many patent holders, especially those involved in innovative industries where they represent a minority of the market, increasing exposure of their product is crucial.[112]

Open source models originated from one of the most innovative industries of all time: computer software.[113] Developers began using open source in the early 1960s.[114] One of the early examples of a successful open source platform is the GNU Project.[115] It was developed as a mass collaboration project aimed at developing software that is free to use and more importantly, free for other developers to modify it and create new software.[116] The organization is governed by the GNU General Public License, which allows a user the right to use software source code "in return for imposing on the user certain legal obligations," including the obligation to include "complete source code of the derived software upon distribution of the software."[117]

108. *Id.*

109. Georg von Krogh, Sebastian Spaeth & Karim R. Lakhani, *Community, Joining, and Specialization in Open Source Software Innovation: A Case Study*, 1217 Res. Pol'y 1217 (2003) (explaining that the open source software model allows users to write their own code, share that code, and collectively benefit from code uploaded by other users).

110. Rod Dixon, Open Source Software Law 2 (2004).

111. Musk, *supra* note 1.

112. *See generally* Matthew Rimmer, *Tesla Motors' Open Source Revolution: Intellectual Property and the Carbon Crisis*, Medium (June 12, 2014), https://medium.com/@DrRimmer/tesla-motors-open-source-revolution-intellectual-property-and-the-carbon-crisis-95259ff867e6 (exploring the historical use of open source models to increase the popularity of new products and techniques, such as Richard Stallman's revolutionary use of free software licenses in order to disseminate source code).

113. *See generally* Josh Lerner & Jean Tirole, *Some Simple Econ. of Open Source*, L J. Indus. Econ. 197, 200–01 (June 2002).

114. *Id.* (tracing the roots of the open source model to the early 1960s, when academics and scientists from different organizations shared the basic operating code of computer programs, also known as the source code).

115. Bennett M. Sigmond, *Free/Open Source Software Licensing—Too Big to Ignore*, 34 Colo. L., 89, 90 (Dec. 2005).

116. *Id.*

117. Kannan, *supra* note 107.

In recent years, open source has expanded from software to include everything from plant seeds[118] to cola recipes[119] to social media.[120]

In 2012, Twitter began using a patent system known as the "Innovator's Patent Agreement" ("IPA"), which drew heavily from open source ideologies.[121] The IPA is a licensing contract Twitter offers to a variety of parties, including: companies, investors, and individual inventors and engineers.[122] It stipulates that parties to the contract may not assert the patents except for defensive purposes, and that Twitter will not use their patents for offensive litigation without the inventor's permission.[123] Furthermore, the terms of the contract "flow" with the patents, so that "if the patents were sold to others, they could only use them as the inventor intended."[124]

While this is not a purely open source model, it demonstrates how this type of ideology is growing and becoming more popular, especially amongst technological and other innovative industries.[125]

B. Solving the Patent Puzzle

Patents grant holders a monopoly, and while this may be an appropriate reward for past innovation, it does not give the holder any incentive to continue to innovate.[126] Most patents last for twenty years, which often translates into sustained periods of

118. *See* Dan Charles, *Plant Breeders Release First "Open Source" Seeds*, NPR (May 27, 2014, 2:49 PM), http://www.npr.org/sections/thesalt/2014/04/17/303772556/plant-breeders-release-first-open-source-seeds (discussing an open source model where farmers 29 new breeds of vegetables, including types of carrots, kale, broccoli, and quinoa, in exchange for not agreeing not to restrict use of the patented seeds. Furthermore, this open source agreement covers any future plant that's derived from the seeds.).

119. *See* Ian Steadman, *Open Source Cola and the "Napster Moment" for the Food Business*, WIRED UK (April 13, 2015), http://www.wired.co.uk/news/archive/2013-04/15/trade-secrets-open-source-cola (examining the Open Cola GNU, an open source agreement granting members shared access to a cola recipe. Several companies utilize this and create new versions of the cola through the original patent.).

120. Kannan, *supra* note 107.

121. *See generally* Adam Messinger, *Introducing the Innovator's Patent Agreement*, THE OFFICIAL TWITTER BLOG (April 17, 2012), https://blog.twitter.com/2012/introducing-innovators-patent-agreement.

122. *Innovators Patent Agreement*, GITHUB (May 21, 2013), https://github.com/twitter/innovators-patent-agreement.

123. *Id.*

124. *Id.*

125. Major open source companies include Red Hat Inc., creator of the open source internet browser Linux, and Mozilla, maker of popular internet browser, Firefox. *See Overview*, RED HAT, http://www.redhat.com/overview/ (last visited March 7, 2016).

126. GianCarlo Moschini & Oleg Yerokhin, *The Economic Incentive to Innovate in Plants: Patents and Plant Breeders' Rights*, IOWA ST. U. CTR. AGRIC. RURAL DEV. 1, 2 (2007), www.card.iastate.edu/faculty/profiles/giancarlo_moschini/Moschini-Yerokhin-Kesan-book-preprint.pdf (asserting that the exclusivity conferred to individuals by intellectual property rights provide an *ex ante* incentive for innovation, but the resulting market power yields an *ex post* inefficiency, because it limits use of the innovation).

stagnation.[127] In the mean time, current innovators are "subject to constant legal action and licensing demands from earlier patent holders."[128]

However in an open source patent model, innovation is not spurred by granting monopolies to patent holders.[129] Rather, competition and first-mover incentives are the main drivers behind innovation.[130] Open source proponents argue that "industry-driven initiatives" need to be considered in order to prevent current innovators from being plagued by offensive patent litigation and licensing demands.[131]

Furthermore, companies utilizing an open source model would save costs associated with defending against litigation.[132] Building a defensive patent portfolio can be extremely expensive. For example, Google recently spent $12.5 billion acquiring Motorola.[133] Moreover, the patents Google received were largely useless or redundant; they were acquired primarily to serve as a defensive patent portfolio.[134] An open source agreement would allow each company to contribute their own patents to a larger shared patent portfolio, which any party in the agreement can utilize.[135] This would save companies money, which they can shift to research and development, helping to solve the lack of growth in areas associated with innovation.[136]

127. *See* Dean Baker, *Stagnation in the Drug Development Process: Are Patents the Problem?*, CTR. ECON. & POL'Y RESEARCH 6 (Mar. 2007), http://www.cepr.net/documents/publications/healthcare_stagnation_2007_03.pdf (noting that despite increases in private and public spending, the pharmaceutical industry has seen no significant increase in the quality or quantity of drugs and that patents a substantial factor behind this trend).

128. Boldrin, *supra* note 5, at 2.

129. *Id.* at 1.

130. *Id.*

131. *See* Duane Valz, *Taking a Stand on Open Source and Patents*, GOOGLE OPEN SOURCE BLOG (Mar. 28, 2013), http://google-opensource.blogspot.com/2013/03/taking-stand-on-open-source-and-patents.html (advocating the use of open source software to achieve industry-driven initiatives, such as transparency, defensive protection, and durability, as well as an increase in patent quality and a reduction in costs from excessive litigation).

132. *See* Boldrin, *supra* note 5, at 8 (explaining that the current patent system utilizes the arms race theory of defensive patent portfolios, which forces all competing companies to race to acquire their own counterbalancing patent portfolios).

133. *See* Quentin Hardy, *Google Buys Motorola for Patent Parts*, FORBES (Aug. 15, 2011), http://www.forbes.com/sites/quentinhardy/2011/08/15/google-buys-motorola-for-patent-parts/#799c71486082 (theorizing that Google's acquisition of the Motorola patents is the next maneuver in the ongoing war over smart phone patents between Google, Apple, and Microsoft).

134. *See* Boldrin, *supra* note 5, at 7 (arguing that Google did not buy the Motorola portfolio for its "ideas and innovations" and that "few if any changes or improvements to Google's Android operating system" will result from that transaction).

135. Jonathan M. Barnett, *From Patent Thickets to Patent Networks: The Legal Infrastructure of the Digital Economy*, JURIMETRICS, Fall 2014, at 1, 2 (noting the similar collective benefits of patent pooling, in which patent-holders agree to waive licensing costs for any parties privy to the contract).

136. *See* Boldrin, *supra* note 5, at 6 (using research and development expenditures as an indicator of a firm's level of innovation).

C. Winning the War Against Patent Trolls and Reducing Litigation Costs

Adoption of an open source model may not totally eliminate non-practicing entities from pursuing frivolous patent infringement suits; however, it will most likely have a direct effect on "reducing the supply of weaponized patents."[137] Furthermore, sharing patent portfolios can be a way for practicing companies and inventors to band together to fight patent trolls by splitting costs and sharing assets.[138] This can be particularly helpful for small and medium-sized companies, who may lack the financial and legal resources to pursue high stakes litigation.[139] Patent trolls often target small and medium sized companies, which, as recently as 2011, accounted for 37% of the total aggregated costs of NPE litigation.[140] These types of businesses would benefit most from open source models.

Lessening the negative effects of patent trolls will most likely reduce litigation costs for companies.[141] Furthermore, adoption of an open source model will allow companies and inventors to save money by drastically reducing the need for both defensive and offensive patent ownership.[142] By sharing patents in an open environment, companies do not need to register patents in order to prevent or manage patent infringement suits.[143] This can save a significant amount of money.[144]

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137. Simon Phipps, *A New Way To End The Patent Madness*, INFOWORLD (June 15, 2012), http://www.infoworld.com/article/2617429/open-source-software/a-new-way-to-end-the-patent-madness.html (arguing that the Defensive Patent License ("DPL"), a modern-day patent pool that entitles members to use any patents licensed under the DPL in exchange for waiving the right to offensive patent litigation against fellow members, will have the long-term effect of decreasing the amount of intellectual property patent trolls can acquire and utilize).

138. *See generally* Steven C. Carlson, *Patent Pools and the Antitrust Dilemma*, 16 YALE J. ON REG. 359, 380 (1999) (discussing the utility of patent pools as a means of settlement in order to avoid costly and uncertain litigation).

139. *See generally* Kevin Closson, *Patent Pools: Are they right for your business?*, SPIE (Oct. 2009), http://spie.org/x37543.xml (finding that patent pools are useful for small and medium-sized companies as long as the pools achieve critical mass and are well administered).

140. *See* James Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 409 (2014) (adding that this number is likely significantly higher, because it does not account cases that settled, because smaller and medium companies often do not have the financial resources to battle patent suits in court).

141. *See* James Bessen, Jennifer Ford & Michael J. Meurer, *The Private and Social Costs of Patent Trolls* 1–6 (Bos. U. Sch. L., Working Paper No. 11-45, 2011) (concluding that between 1990 and 2010, non-practicing entity lawsuits were associated with half a trillion dollars of lost wealth to defendants, mostly from technology companies, thus "[diverting]. . .firm resources from production to litigation support").

142. *See* Raymond Miller, *Defensive Patent Pools: There are Surprisingly Few Options*, IP WATCHDOG (Dec. 10, 2012), http://www.ipwatchdog.com/2012/12/10/defensive-patent-pools-there-are-surprisingly-few-options-2/id=31233/ (studying the use of defensive patent pools to fight patent trolls and demonstrating that sharing patents acts as an insurance policy, effectively spreading the costs of litigation amongst all of its members); *see also* Eric P. Newcomer, *Building on the Tesla Approach to Patents*, THE INFORMATION (June 18, 2014, 12:32 PM), https://www.theinformation.com/Building-on-the-Tesla-Approach-on-Patents (contending that formal patent sharing agreements, such as Twitter's Innovator's Patent Agreement and the Defensive Patent License, deter offensive patent litigation).

143. *See generally* Jeanne Clark et al., *Patent Pools: A Solution to the Problem of Access in Biotechnology Patents?*, U.S. PATENT AND TRADEMARK OFFICE (Dec. 5, 2000),

Companies would no longer need to spend money to offensively sue entities for illegally infringing upon patents or failing to abide by licensing terms.[145]

By reducing litigation costs, companies can shift more money towards litigating against patent trolls. These suits are often more high-stakes than infringement cases involving practicing entities.[146] For example, the median damages award for NPEs was more than double the award in suits against practicing entities from 2006 to 2010.[147] By shifting more resources towards these court battles, companies may be able to scare away patent trolls or at least mitigate the often devastating financial losses caused by patent trolls. While, non-practicing entities will likely continue to prove a nuisance to the U.S. patent system for the foreseeable future, open source models have the potential to inflict some serious damage to patent trolls.

D. Reducing Transaction Costs

The effects of opening patent portfolios can be extrapolated from examining how the use of patent pools has reduced both litigation and transaction costs.[148] A patent pool is a contractual agreement in which patent owners "combine their patents, waiving their exclusive rights to the patent so that they or others can obtain rights to license the pooled patents."[149] Yet, there are risks associated with the development of patent pools. First, the agreements can "facilitate collusion" amongst members of the pool and make it easier to engage in unfair, monopolistic behavior.[150] Second, patent pools that are "associated with the establishment of an industry standard" may prohibit alternative pools with lower licensing rates from succeeding in the

http://www.uspto.gov/web/offices/pac/dapp/opla/patentpool.pdf (discussing the use of patent pools in the biotechnology industry and explaining that pooling patents create a "one stop" where parties can license all of the patents essential to their technology without spending time and money going through the patent registration process).

144. *See* Gene Quinn, *The Cost of Obtaining a Patent in the US*, IP Watchdog (Jan. 28, 2011), http://www.ipwatchdog.com/2011/01/28/the-cost-of-obtaining-patent/id=14668/ (estimating that attorney fees and government filing fees associated with patent registration can range from $5,000 to $7,000 for simple inventions to over $15,000 for highly complex inventions).

145. *See* Rimmer, *supra* note 112.

146. Litig. Study, *supra* note 67, at 7.

147. *Id.*

148. *See generally* Thierry Rayna & Ludmila Striukova, *Large-Scale Open Innovation: Open Source v. Patent Pools*, 52 Int. J. Tech. Mgmt. 477 (2010) (contending that patent pools possess many of the same benefits as open source systems, although patent pools limit membership and retain the ability to license those outside of the pool).

149. Phillip B. Nelson, *Patent Pools: An Economic Assessment of Current Law and Policy*, 38 Rutgers L.J. 539, 539 (2007).

150. *Id.* at 542.

marketplace.[151] Third, owners that hold patents essential to a certain technology may force pool members to pay licensing fees for "non-essential patents."[152]

Yet, these dangers are not present if companies voluntarily open their patent portfolios and engage in an open source-type agreement.[153] Open source agreements do not discriminate about membership.[154] Furthermore, a company would not be forced to pay unnecessary transaction costs because of another party including non-essential patents in the pool purely in order to boost profits.[155] An open source agreement gives members access to all of the patents involved in the relevant industry or subject area, such as all of the code involved in a type of software or parts and technologies involving electronic transport.[156] Additionally, there are no licensing fees. Instead profit is gained through other revenue streams. For example, competing members of an open source agreement gain ground in the market through what is known as the first mover advantage, which emphasizes quick development and distribution to consumers.[157] Competitors can also benefit from superior design and efficiency of advertisement and marketing.[158]

In addition, open source models decrease the amount of money and time spent on programming and research.[159] By sharing resources and spreading out labor costs, open source models allow individuals to spend less while continuing to create new technology.[160] An open-source model solves many of the issues causing transactions costs to rise. It allows companies to share individual patents in order to

151. *Id.* ("For example, a higher patent pool royalty rate that discriminates against non-pool members may be supported by a vertically integrated competitor that is a member of the patent pool to raise rivals' costs, reducing competition in downstream markets and leading to higher prices in those markets.").

152. *Id.*

153. *See* Rayna, *supra* note 148, at 3–4 (explaining that open source systems, as developed in the software industry, make source code available not only to members, but to the whole community).

154. *Id.*

155. *See id.* at 3–4 (illustrating that open source systems, unlike patent pools, do not require members to obtain patents deemed essential for the pool).

156. *See* *Mozilla Manifesto,* https://www.mozilla.org/en-US/about/manifesto/ (last visited Feb. 24, 2016) (explaining the open source philosophy behind popular web browser software, Firefox); *see also* Elon Musk, *Hyperloop*, Tesla (Aug. 12, 2013), https://www.teslamotors.com/blog/hyperloop (containing an open source agreement for inventions related to a theoretical high-speed transport system powered by electric motors).

157. Jonathan M. Barnett, *Private Protection of Patentable Goods,* 25 Cardozo L. Rev. 1251, 1257 (2004) (describing an effect known as the first mover advantage, in which a product is launched before any similar products and if the "lead time" is enough, can give raise barriers for competitors and preserve a "pioneer's long-term market share").

158. *See* Sandeep Krishnamurthy, *The Launching of Mozilla Firefox- A Case Study in Community-Led Marketing* 4–5 (U. Wash. Bothell Bus. Admin. Program, Working Paper, 2005) (exemplifying the importance of innovative advertising and marketing in Mozilla's community advertising techniques).

159. For an example of a method of decreasing programming costs through collective expense sharing, see *Mozilla Foundation Announces Security Bug Bounty Program,* Mozilla Blog (Aug. 2, 2004) (describing an open source bounty that "[harnesses] the power of the open source community to identify security vulnerabilities before they are exploited").

160. *See supra* Part III.B, III.D.

create more complex, unique products. Transactions costs are reduced, if not eliminated completely.

IV. Conclusion

The adoption of an open source model could be highly beneficial to patent holders, particularly those involved in innovative industries. An open source model may also solve the patent puzzle, the phenomena where patent registration rates have drastically increased in the past 30 years, with no measurable increase in the rate of innovation.[161] This type of system has the potential to weaken patent trolls,[162] as well as reduce both litigation and transaction costs.[163] Perhaps if more patent holders follow the footsteps of Tesla and adopt an open source model, innovation will thrive and companies will be able to reduce costs.

161. *See supra* Part III.B.
162. *See supra* Part III.C.
163. *See supra* Part III.D.