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A Software Patent War: The Effects of Patent Trolls on Startup Companies, Innovation, and Entrepreneurship

*Sona Karakashian*

I. INTRODUCTION

The patent system offers a limited monopoly on inventions to reward innovation.¹ The incentive to invent is supported by patent protections found in the U.S. Constitution—in particular, Congress’s right “to promote the progress of science and useful arts, by securing for limited times . . . the exclusive rights to their respective writings and discoveries.”² Patent rights are negative rights that exclude others from the ability to make, use, or sell an invention.³ Although intellectual property protection began with the Founding Fathers, an inherently basic conflict continues to exist. Granting exclusive rights through patents is essential to encourage innovation, but excluding society from access to these ideas and inventions stifles further innovation. The patentability of computer-implemented software is neither a clear Constitutional protection nor explicit in patent law. What should and should not be patentable continues to be the center of discussion among scholars, disputing parties, and the Supreme

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¹ Stuart J.H. Graham et al., High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey, 24 BERKELEY TECH. L.J. 1255, 1317 (2009) (Fraham’s study “show[s] that entrepreneurs have varied and subtle reasons for using the patent system, many of which diverge from the traditional theory that patents provide an “incentive to invent.””).

² U.S. CONST. art. I, § 8, cl. 8.

³ ROBIN FELDMAN, RETHINKING PATENT LAW 23 (Harvard Univ. Press 2012).
The underlying economic principle of intellectual property is that the process of developing innovative products is an “expensive, time-consuming, labor-intensive, and risky endeavor.” Once that struggle has been overcome and the invention exists, it is inexpensive and easy to reproduce. Startup companies have become one of the central producers of most innovative products. They are a key source for job creation and innovation, but the hurdle that nonpracticing entities (i.e., entities that assert patents but do not offer products or services) present make it difficult for emerging companies to grow.

One of the most serious concerns of patents in a startup company’s competitive environment is the threat of patent infringement and costly litigation. These smaller companies are struck by “patent trolls,” a term coined by Intel's Deputy General Counsel, Peter Detkin, in 2001 and based upon mythical creatures that lie underneath bridges and collect tolls from unsuspecting travelers. Most people use this term to refer to nonpracticing entities (“NPEs”), which are persons or businesses that do not produce or make use of a product or service, but rather, make money from licensing and asserting patents. The Bayh-Dole Act encourages NPEs such as universities, non-profit institutions, and small businesses to license inventions discovered with the use of federal funds and requires that they seek patent protection. Generally, universities and non-profit organizations are not threatening with their patents. However, the same cannot be said for other entities. Professor Robin Feldman, along with Joshua Walker and Sara Jeruss, have coined the term “patent monetization entity” to describe entities whose primary focus is “deriving income from licensing and

5. Id. at 1315.
8. See Bayh-Dole Act, 35 U.S.C. §§ 200-212 (2000-2012). See also Bd. of Trustees of Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 131 S. Ct. 2188, 2196 (2011) (holding that title in a patented invention vests first in the inventor, even if the inventor is a researcher at a federally funded lab subject to the Bayh-Dole Act).
9. “Patent monetization entity” will also be referred to as “patent monetizers” or “patent trolls.”
litigation, as opposed to making products.”\textsuperscript{10} This term distinguishes those entities going after patent infringers for monetary purposes from product-producing entities, which would arguably not be classified as “patent trolls.”\textsuperscript{11}

Patent trolls give rise to more than sixty percent of all patent lawsuits in the U.S.,\textsuperscript{12} and this number only seemed to be increasing until current Supreme Court decisions and their aftermath. Although U.S. patent law reform has tried to regulate litigation brought by patent trolls, permanent changes must adhere to the problems that are faced by startup companies “bullied”\textsuperscript{13} by patent monetizers from costly settlements and litigation to potentially diluting the company of all its assets.

The effects of patent monetizers may differ depending on whether the startup company is developing computer software and hardware, biotechnology, or medical devices. Most biotechnology and medical device manufacturing companies own patents. In contrast, many emerging companies in the software industry may decide not to patent their invention due to its cost, lack of knowledge, or belief that the product is not patent eligible.

Research has shown that most high-technology startups prefer to opt-out of patent protection altogether. Some of the reasons to opt-out are, among others, the belief that the technology is not patentable, the cost of litigation to defend the patent against patent trolls, and the availability of other forms of protection.\textsuperscript{13} Most of these technology startups use software that, unbeknownst to them, would be covered by a patent owned by a patent troll. The extent that this software may be patentable remains controversial in both the legislative and judicial branches of the government.

\textsuperscript{10} Sara Jeruss et al., \textit{The America Invents Act 500: Effects of Patent Monetization Entities on Us Litigation,} 11 DUKE L. \\ 

\textsuperscript{11} See generally Mark A. Lemley, \textit{Are Universities Patent Trolls?,} 18 FORDHAM INTELL. \\ 


\textsuperscript{13} Graham et al., \textit{supra} note 1, at 1315–16 (“bully” referring to patent trolls).

\textsuperscript{14} Id. at 1309.
Regardless of the Supreme Court’s decision in *Alice Corp. Pty. Ltd. v. CLS Bank Intern.*,\(^{15}\) which has spearheaded a new era of patentability, the software patent war will not end until the legislature has defined a bright-line rule for what is patentable pursuant to 35 U.S.C. § 101. The legislature should go beyond the merits and apply its knowledge and resources to help startups and entrepreneurs avoid patent troll attacks and encourage innovation during rapid changes in technology.

This note will analyze the effects of patent trolls on startup companies and the issues that software patentability under § 101 impose on this highly controversial area of intellectual property. First, this note will elaborate on the current patent reforms as well as the common law struggles addressed in Supreme Court decisions. Then, this note will discuss the software patent war and the controversial issues raised in § 101 of the patent system followed by the issues of patentability and its effects on startup companies. Lastly, this note will discuss short-term and long-term progress in the patent system, as well as address the current state of the law today. It will ultimately conclude that, although issues of patentability and protecting companies from patent trolls may be raised in the Supreme Court, the solution ultimately lies in the hands of the legislature.

II. BACKGROUND

A. AMERICA INVENTS ACT RECOGNIZES EFFECTS OF PATENT TROLLS

On September 16, 2011, President Obama signed into law the Leahy-Smith America Invents Act ("AIA").\(^{16}\) With the modernization of technology, the AIA was the first major reform of U.S. patent law to incorporate the advancements of technology in the past sixty years.\(^{17}\) Although many may argue in favor of patent trolls, Congress found the need to control patent troll infringement suits

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17. Bryant, *supra* note 6, at 680.
through the AIA, with the prevailing view that “patent trolls deter innovation and harm the economy.”\textsuperscript{18}

NPEs, such as product manufacturing companies and other entities, may be harmed by litigation because they need to maintain a reputation, avoid disruptions in their business, maintain relationships with business partners, and avoid the risk of countersuits. On the other hand, “patent monetizers” are less likely to be harmed by litigation that would affect their business because their focus does not pertain to developing or commercializing technology, but rather, their goal is to maximize their return on investment (“ROI”). Patent trolls fear losing losing litigation, which would result in lost profits and diminish the efficiency of their initial investment in the patent.

Patent monetizer-initiated litigation has increased in the past several years, and with the increase of infringement suits, Congress has addressed its concerns about patent trolls by making it difficult for them to file suit.\textsuperscript{19} Prior to the amendment of § 299 of the AIA,\textsuperscript{20} patent-assertion entities (“PAEs”),\textsuperscript{21} another term to describe NPEs, attacked multiple target companies at one time (i.e., joinder suits), asserted the same patent repeatedly, and utilized contingent-fee attorneys such that their cost of litigation drastically decreased per defendant and per lawsuit filed.\textsuperscript{22}

Joinder suits had two advantages for patent trolls: first, they reduced the cost of litigation by joining multiple defendants in one suit, and second, suing multiple defendants simultaneously made it easier to transfer the case to a more convenient venue.\textsuperscript{23} Amended § 299 of the AIA protects defendants that are victims of multiple

\textsuperscript{18} Bryant, supra note 6, at 680.

\textsuperscript{19} Wagner, supra note 7, at 16.

\textsuperscript{20} 35 U.S.C. § 299 (2013) (“[P]arties that are accused infringers may be joined in one action as defendants or counterclaim defendants, or have their actions consolidated for trial” with certain restrictions.).


\textsuperscript{22} See generally Chien, supra note 21.

\textsuperscript{23} See Bryant, supra note 6, at 677.
infringement suits. To file a joinder suit, the AIA requires infringement suits to arise out of the same occurrence or transaction, and the questions of fact must be common to all defendants named in the complaint.

Among other things, the AIA also changed the system from a “first to invent” to “first to file.” The new system establishes patent priority such that, when there is more than one patent application filed for the same invention, the patent application filed first for the invention will be given priority. The new legislation is intended to help remove a well-funded infringer from taking advantage of startup-owning technology (i.e., software patents). The short term goals were to create jobs, bolster innovation, streamline the patent system, reduce patent litigation, and maintain U.S. and global competition. Although the new patent reform still does not do much for startup companies and these emerging companies are still affected by the patent system, further research has been encouraged by Congress.

Congress inserted a provision in the AIA that directed the nonpartisan Government Accountability Office (“GAO”) to conduct a study on the “consequences of patent infringement lawsuits brought by [NPEs].” Professor Feldman and Professor Ewing, in response to the GAO’s request, provided data on NPEs over a five-year period (2007–2011) using a database from Lex Machina. This research illustrated that within the years 2007 through 2011, lawsuits filed by patent monetizers have increased from twenty-two percent to almost

27. Bryant, supra note 6, at 680.
28. Id. at 680–81 (“In an FITF system, the most important date is the objective date on which the application was filed, and there is no requirement for corroborating evidence, as would be needed to prove the date of invention (the determinative date under a first-to-invent system). The FITF system takes effect on March 16, 2013.”) (citing Leahy-Smith America Invents Act sec. 3(n)).
29. Jeruss et al., supra note 10, at 364 (“NPE” refers to the effects of patent trolls in this particular research project.).
30. Id. at 360–61. Professor Robin Feldman and Thomas Ewing conducted research regarding patent troll litigation between 2007 and 2012. Lex Machina, formerly the Stanford IP Clearinghouse, was founded by Mark Lemley.
forty percent. Additionally, while the drastic increase in lawsuits filed by patent trolls may seem like a red herring, the monetizers were also heavily represented in the list of those who filed the greatest number of lawsuits. Four out of five parties in the study sample were monetizers. Furthermore, twenty percent of all high-tech patent suits were brought by NPEs.

Both the White House reports and Chairwoman Edith Ramirez’s speech cite to Professor Feldman and Ewing’s research. These findings are not a new revelation but simply something that Congress is beginning to look deeper into. As a result, many research centers have started to gather and analyze data from the effects of patent trolls and the patent system.

1. The Berkeley Center of Law and Technology Survey Results

The Berkeley Center of Law and Technology (“BCLT”) conducted a wide-scale survey in 2008 of high-technology startup companies in the U.S. to determine how these companies use and are affected by the patent system. Part of the reason this survey was conducted was to identify those aspects of the patent system that substantially “encourage or hinder entrepreneurial activity, particularly in high-growth technology industries such as internet, computer software and hardware, medical device, and biotechnology companies.”

Substantial amounts of emerging companies opt-out of the patent system all together. Sixty-four percent of the startup companies that were surveyed hold no patents. Among the startup companies that were surveyed, results determined that the likelihood

32. Id. at 361 n.19.
33. See id. at 362.
34. Graham, supra note 1, at 1255 (“We offer description and analysis of the 2008 Berkeley Patent Survey—the first comprehensive survey of patenting and entrepreneurship in the United States—summarizing the responses of 1,332 early-stage technology companies founded since 1998. Our results show that entrepreneurs have varied and subtle reasons for using the patent system, many of which diverge from the traditional theory that patents provide an “incentive to invent.””)
35. Id. at 1260.
36. Id. at 1276.
of holding (or not holding) patents, particularly by technology startups, was not necessarily driven by age effects, but by the company’s “business model, strategy, technology, or other factors, such as the cost of patenting and subsequent enforcement.”

Reasons to opt-out of patent protection include: the belief that the technology is not patentable, the mindset that the costs of litigation and enforcement are too high, the perception that, with reverse engineering, patents afford relatively weak protection, the fear of disclosure, and the availability of other forms of protection that are less costly.

Continuous research has shown that some startup companies opt out of patenting products due to the belief that their technology is not patentable; meanwhile, patent monetizers patent and later sue companies for infringement on their patents that arguably may not be patent-worthy. This is the argument that the Supreme Court has been struggling with for years. The companies attacked and affected are the startup companies that cannot afford the costly litigation attached to this ongoing problem. Consequently, these startups usually will end up settling and paying licensing fees.

B. COMMON LAW STRUGGLES WITH PATENTABILITY

The common theme among research is the ambiguity in patent eligibility. The common factor whether to patent something or fight a costly litigation boils down to patentability. While common law has fought with the idea for many decades, the Legislature is slowly starting to catch up with the technological advancements that were either ignored or not foreseen when the patent system was originally constructed.

1. Post-Bilski

The Supreme Court has granted certiorari on several controversial cases that have shaped the patent system. Recent discussion of patentability has risen from the Supreme Court case

37. Graham, supra note 1, at 1276.
38. Id. at 1309.
Bilski v. Kappos. Bilski involved an invention that explains how buyers and sellers of commodities in the energy market can manage risk for price changes in the industry. The discussion focused on the patentability of a mathematical formula that was associated with the steps that instructs the buyer or seller of the commodity how to hedge risk. The Supreme Court affirmed the decision of the Federal Circuit Court, sitting en banc, rejecting the prior test used to determine whether the invention was a patentable “process” under the Patent Act—i.e., that a patent must be “useful, concrete, and tangible.” The Federal Circuit concluded that the way to determine whether an invention constitutes an unpatentable process would be to apply the “machine-or-transformation test.” Under the “machine-or-transformation test,” an invention is patentable if it is “tied to a particular machine or apparatus or it transforms a particular article into a different state.” The Supreme Court rejected the “machine-or-transformation test” as an “exhaustive and exclusive test.” Although this interpretation may be re-defining the term “process” in § 101, the Court in Bilski has also broadened the scope of patentability in a sense.

The arguments continue through cases brought to the Supreme Court, including the most recent case, CLS Bank Int’l v. Alice Corp. Pty. Ltd., which discussed the infringement and patentability of a

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40. See id. at 3220.
41. Id.
42. 35 U.S.C. § 101 (“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.”).
43. Bilski, 130 S. Ct. at 3218; In re Bilski, 545 F.3d 943, 959–60 (Fed. Cir. 2008) (aff’d but criticized sub nom).
44. In re Bilski, 545 F.3d at 956.
45. Feldman, supra note 3, at 116 (see also In re Bilski, 545 F.3d at 953 (citing Gottschalk v. Benson, 409 U.S. 63, 70 (1972)); Diamond v. Diehr, 450 U.S. 175, 192 (1981)).
46. Bilski, 130 S. Ct. at 3236 (citing Gottschalk, 409 U.S. at 70 (“[T]ransformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.”). At the same time, Bilski explicitly declined to “hold that no process patent could ever qualify if it did not meet [machine-or-transformation] requirements.” Id. at 3258; see also Parker v. Flook, 437 U.S. 584, 588 n.9 (1978) (taking a similar approach, “assum[ing] that a valid process patent may issue even if it does not meet [the machine-or-transformation test].”).
computer system that is used to help avoid settlement risk inherent in the trading of financial instruments.\textsuperscript{48} The discussion in the Federal Circuit Court surrounded the patent eligible subject matter set forth under § 101—that processes, machines, manufacturers, and compositions of matters are “patent eligible.”\textsuperscript{49} Although something is “patent eligible,” it does not necessarily mean that it is “patentable.”\textsuperscript{50} The limits on patent eligibility have been established through common law, that is, “laws of nature, natural phenomenon, and abstract ideas.”\textsuperscript{51} The argument in \textit{Alice} extends to limitations that must be placed on patentability all together with the motivation of not hindering and preventing the exceptions going so far as to “swallow patent law entirely.”\textsuperscript{52}

While the discussions continue in the Supreme Court, establishing a bright-line for software patentability will take more than just common law; the legislature must step in and define patentability. The root of patentability extends to the software that a patent troll may patent and enforce against companies, particularly startups. The ambiguities affect the core purpose of patent law, which is to grant exclusive rights to an invention in order to promote innovation and entrepreneurship. With the staggering increase in patent litigation imposed by patent monetizers and technological modernization being minimized by the threats of patent trolls, the software patent war continues.

III. THE SOFTWARE PATENT WAR

A. OVERVIEW

Patent protection extends to the value the inventor places on its invention. As a matter of public policy, the debate continues

\textsuperscript{48} \textit{Alice}, 717 F.3d at 1274.
\textsuperscript{49} \textit{Id} at 1276.
\textsuperscript{50} \textit{Id} (Although a patent “may” be eligible to be patented under § 101, it ultimately depends on whether, “in addition to presenting a patent eligible invention, the inventor also satisfies ‘the conditions and requirements of this title’” pursuant to § 102, § 103, and § 112 for “novelty, nonobviousness, and disclosure requirements.”).
\textsuperscript{51} \textit{Id} at 1276–77.
\textsuperscript{52} \textit{Id} at 1277.
whether patentability extends to software and computer-implemented inventions. The lack of visibility in this area of patent law undermines an inventor’s incentive to patent. Additionally, patent trolls are asserting patents that should not be patent eligible, but are affecting the smaller companies (i.e., startup companies) who lack the funds and resources to raise this argument in court. While AIA introduced *inter partes* review ("IPR"), a procedure to challenge the validity of patent claims, as a counterpart to post-grant reviews, bringing such claim in lieu of going to court would still be expensive for a startup company.

An inventor will have an incentive to create and patent if there is a high rate of return in an open market. Therefore, many startup company managers argue they have less motivation to patent software as opposed to biotechnology and medical device companies. With a look at the statistics, not patenting would only defend startup companies from patent troll attacks, but on the downside, steering away from patenting only discourages innovation and limits entrepreneurship.

There are several reasons why startup companies would opt-out of patents, including: the belief that their product is not patentable or outside the subject-matter scope of a patent, the cost of litigation imposed by the high-rate of patent troll attacks, and the idea that potential inventors put less importance on patents for software and internet companies than biotechnology companies.


In determining the statutory interpretation of § 101, the Supreme Court in *Bilski* stated that to be protected by the Patent Act, the claimed invention must also satisfy “the conditions and requirements of this title,” that is, the requirement to be novel, nonobvious, and fully and particularly described. The Court continued to hold that

the concept of hedging reduced to a mathematical formula is an abstract idea, and allowing such a patent would “pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.” The Court left open the discussion of software patents although the Court later affirmed, in Mayo Collaborative Services v. Prometheus Laboratories, Inc., that the “[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.” It continued to reason that yet again monopolization of these “abstract ideas” by granting patents would “impede innovation more than it would tend to promote it.” Arguably, software patents may fall into this gray area of “abstract ideas.” The implications caused by granting patents on software may monopolize the scientific and technological work, and in return affect innovation.

These Supreme Court cases have shown that in order to change the patent system, the Supreme Court must “change its prevailing view of what a patent is.” While the Patent Act defines the scope of patentable “subject-matter” in 35 U.S.C. § 101, the Supreme Court has consistently held that laws of nature, abstract ideas, and natural phenomenon cannot be patented. The Supreme Court interpretation of a patent extends further than Bilski and Prometheus Laboratories—two cases decided in 2013 that were recently granted certiorari and have been influential in the long race to an answer.

In the most recent case, Association for Molecular Pathology, et al. v. Myriad Genetics, Inc., the Supreme Court affirmed that, with respect to § 101 of the Patent Act, the “laws of nature, natural phenomena, and abstract ideas” lie beyond the domain of patent protection. Myriad Genetics, Inc. (“Myriad”) obtained patents on the discovery of the precise location and sequence of genetic

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58. Bilski, 130 S. Ct. at 3231.
60. Id. at 1293.
62. See generally Prometheus, 132 S. Ct. 1289.
mutations associated with certain forms of breast and ovarian cancer as well as patents on the methods of testing associated with those mutations and researching treatment. The Court held that the naturally occurring DNA segment is a product of nature and therefore, not patentable because it was not isolated, but the composite DNA—synthetically created exons-only strands of nucleotides—is patentable because DNA was extracted from the cells to isolate specific segments for study, and it is not considered a naturally occurring phenomena.

The idea of patentability depends on whether the invention is new “with markedly different characteristics from any found in nature and one having the potential for significant utility.” In Diamond v. Chakrabarty, the Supreme Court decided whether the patent of a “human-made, genetically engineered bacterium capable of breaking down crude oil” was a valid non-natural invention. It held that the bacterium was a “nonnaturally occurring manufacture or composition of matter” that is patentable subject matter under § 101. On the other hand, the Court found, in Funk Brothers Seed Co. v. Kalo Inoculant Co., that the composition of bacteria to create a single inoculant was not patent eligible because the patent holder did not alter the bacteria as it did in Chakrabarty.

The Court has come closer than ever to creating a visible line for what may be considered patent eligible under § 101, but the gray areas still remain. It continued to argue that even if an invention is “groundbreaking, innovative, or even [a] brilliant discovery” it may not by itself satisfy § 101. It has better defined what may constitute an “abstract idea” and a “natural phenomena,” but applying this to other patentable products, such as software, is more difficult and remains as a bigger challenge in developing and interpreting the patent system.

64. Myriad Genetics, 133 S. Ct. at 2109.
65. Id.
67. Id. at 303.
68. Id.
70. Myriad Genetics, 133 S. Ct. at 2110 (citing Funk Bros. Seed Co., 333 U.S. 127).
B. A MONOPOLISTIC FIGHT: SOFTWARE PATENTS NOT PATENTABLE?

How much monopolistic competition should be granted to software patents compared to other patents? Patent law restricts competition by allowing exclusive rights to sell, manufacture, and invent; therefore, the broader the scope of intellectual property rights, the less new innovators will develop and market new products and inventions. 71

The argument continues: exclusive rights granted through patents are necessary to encourage innovation while excluding society from new ideas and inventions may be putting a damper on the incentive to invent. One of the main reasons startup companies opt out of patents is because they believe their product is not patentable. 72 Under § 101 of the Patent Act, a software must be considered a “new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement,” 73 such that they are not laws of nature, abstract ideas, or natural phenomenon. 74

1. Drawing the Line

Before determining whether a software patent falls under the “subject-matter” as defined in the Patent Act, one must understand and interpret what a software patent entails. A software patent may be a patent on the performance of a computer through some form of technical programming, but even this definition is vague.

Section 18 of the AIA of 2011 along with recent Supreme Court decisions have made efforts to restrict certain types of software patents. 75 Following the Supreme Court’s rejection of having a

71. Myriad Genetics, 133 S. Ct. at 1057.
72. See generally Graham, supra note 1.
73. Supra note 54.
74. See Prometheus, 132 S. Ct. at 1293.
75. Supra note 16 (section 18(d) states that “For purposes of this section, the term ‘covered business method patent’ means a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions.”).
“useful, concrete, and tangible” result to determine patentability. Federal Circuit decisions have found many software products unpatentable. Some ineligible patents included a method for detecting fraud in a credit card transaction over the Internet, which consisted of unpatentable mental steps falling under the category of “abstract ideas,” and a “computer-implemented method for processing car loan applications” such that they did not apply concrete steps that required extensive computer interface. More unpatentable abstract ideas included computer related financial claims as well as a real estate business technique designed to produce certain tax savings.

a. Alice Corporation Pty. Ltd. v. CLS Bank International et al.

Recently, the Supreme Court of the United States published its opinion in Alice, a case that received a lot of media and attention, but did not receive the visibility that most would have expected. The Court applied a two-part patent eligibility analysis established in Mayo (i.e., “Alice Standard”). First, the court wanted to determine whether the claims were not patent eligible such that the claims were drawn to the abstract idea of intermediated settlement. Second, the Court decided whether the abstract idea contained an “inventive concept” to transform the claim into patentable subject matter. To apply the § 101 exception, the distinction was made between patents that “claim the ‘building block’ of human ingenuity” from those patents that “integrate blocks into something more” and transform the product into a patentable invention. The patent at issue was a computer-implemented method for mitigating “settlement risk,” such that the program was designed “to facilitate the exchange of financial

77. See CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d 1366, 1367 (Fed. Cir. 2011).
78. See Dealertrack, Inc. v. Huber, 674 F.3d 1315 (Fed. Cir. 2012).
81. Alice, 134 S. Ct. at 2355 (citing Prometheus, 132 S. Ct. at 1294, 1303).
82. Id at 2357.
83. Id at 2350 (citing Prometheus, 132 S. Ct. at 1294, 1303).
obligations between two parties by using a computer system as a third party intermediary.  

An abstract idea encompasses the longstanding rule that “[a]n idea of itself is not patentable.” The Court in *Gottschalk v. Benson* determined that an algorithm for converting binary-coded decimal numbers into pure binary form was not patent eligible because it was an idea of itself and nothing more. Similar to the invention in *Gottschalk* and the computer-implemented method for mitigating financial risk against price fluctuations in *Bilski*, the Court in *Alice* stated that the use of third party intermediary is a “building block of the modern economy,” and therefore, an abstract idea.

The Court then moved onto the second step in the Mayo framework. An invention that is a “fundamental economic practice” is an abstract idea, but the claims may still be patent eligible if that method can be applied to a “new and useful end.” Implementing the mathematical formula on a computer, or any tangible system for that matter does not make it patentable under §101; one cannot state an abstract idea and simply add the words “apply it.”

The Court determined that the computer-implemented mathematical method was an abstract idea and did not add anything that was not already present when the steps were considered separately. The concept of patentability for computer-implemented software extended to the policy issues raised in the patent system. Monopolizing abstract ideas impedes rather than promotes innovation and preempts use of these generic computer implementations in all fields. While *Alice* was an important case that has helped direct software patentability, it has still failed to define it. Currently the Court has demonstrated an interpretation of the patent system that leans toward the European patent system, which is the understanding that an abstract idea is patent eligible when it provides

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84. *Alice*, 134 S. Ct. at 2352.
85. *Id*. at 2350 (citing *Gottschalk*, 409 U.S. at 67).
86. *Id*.
87. *Id*. at 2350.
88. *Id*.
89. *Id*. at 2358.
90. *Id*. at 2359.
91. *Id*. 

a technical contribution.

2. European Patent Law

In Europe, a program for a computer is not patentable if it does not have the potential to cause a “further technical effect” beyond the inherent technical interaction between hardware and software. It would be inaccurate to say that the European Patent Office (“EPO”) does not grant software patents because it has granted more than thirty thousand software patents in the past thirty years.93 The patents were specifically for “computer-implemented inventions.” Article 52 of the European Patent Convention (“EPC”) states that a European patent “shall” be granted for all technological inventions “provided that they are new, involve an inventive step and are susceptible of industrial application.”94 Article 52(2) defines the terms that make a product not patentable. Non-patent eligible subject matter includes “discoveries, scientific theories and mathematical methods,” as well as aesthetic creations and programs for computers.95 Furthermore, the EPC goes on to define an “inventive step” as an invention that is “not obvious to a person skilled in the art.”96

Similar to the United States, the European patent system demonstrates that an invention is patentable subject matter when it is not an abstract idea and has a “technical character.”97 Although computer-implemented programs may be restricted under Article 52(2), the EPC may not exclude the patent if it has a technical character (i.e., “instruction, addressed to a technically skilled person as to how to solve a particular technical problem in a particular

95. EPC art. 52(2), supra note 94, at 271–72 (“The following in particular shall not be regarded as inventions within the meaning of paragraph 1 [52(1)] (a) discoveries, scientific theories and mathematical methods; (b) aesthetic creations; (c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers; (d) presentations of information.”).
96. EPC art. 56, supra note 94, at 273.
97. Id.
technical means”). Additionally, recent case law in Europe has demonstrated that software-related claims may still be patent eligible if they “contain physical hardware features.” While the EPC emphasizes the physicality of the invention, it has been argued that the U.S. Congress intended statutory subject matter under § 101 to “include anything under the sun that is made by man.”

Although U.S. patent law does not digress far from the regulations of the EPC, uncertainty is a recurring theme in software patentability. A study conducted by Catherine E. Tucker suggested that there is a correlation between patents granted in the U.S. and the amount of patent litigation. In order to decrease the high volume of litigation, the U.S. must decrease the amount of patents it grants. It may do this by increasing the threshold for patentability. The research continues to demonstrate that patents in Europe as well as Japan must meet a higher threshold for innovation. Tucker defined “triadic patents” as patents that have been approved by the United States Patent Office (“USPTO”), the EPO, as well as the Japanese Patent Office (“JPO”). Triadic patents are considered to be of “higher quality” because they are approved under more stringent requirements. The study continued to demonstrate that patent litigation decreases with the percentage of triadic patents, but there is a caveat. Even with triadic patents, pharmaceutical patents are more likely to be triadic than technology patents; therefore, a higher percentage of technology patents will continue to face litigation.

It is evident that applying stringent requirements and evaluations to patents benefit most patents but there remains a fuzzy threshold for software patentability not only in the U.S. but all over the world.

98. EPC art. 56, supra note 94, at 273.
100. Id. at 257 (citing Diamond, 447 U.S. at 310).
102. Id.
103. Id.
104. Id.
105. Id.
106. Id.
Patents are meant to encourage innovation and monopolize an invention that is new and useful, but the uses of computer-implemented programs are widely used in all fields of technology, making the threshold for patentability more challenging.

IV. STARTUP COMPANIES TAKE THE HIT

The “Software Patent War” has kept many wondering when a patent infringement lawsuit on a software patent is valid under the patent system. Patent trolls target a diverse set of companies, but the ones that seem to be most affected both financially and economically are startups in the high-tech industry. Most vulnerable to attacks, startup companies are the focus of litigation in the world of patent monetizers. They go after these emerging companies that lack the budget and resources to litigate, may not have patents themselves, and are the source of potentially thousands of new jobs for the economy.

In a recent patent lawsuit, Ditto, a virtual eyewear startup which allows customers to virtually “try” on glasses without physically trying them on, was sued by Wellpoint, owners of 1-800-Contacts and Glasses.com for patent infringement.107 At that time, Ditto was in the process of receiving additional funding to expand the business. Kate Doerksen, the founder of the startup, knew that litigation costs were going to be expensive, but when she tried to sell the company, buyers valued her startup three to four million dollars less than it would cost prior to litigation.108 Consequently, the startup had to lay off four of its fifteen employees to pay for legal expenses.109 As a result, Ditto joined forces with a patent troll, IPNav, whose founder, Erich Spangenberg, agreed to help fight and pay legal expenses in exchange for equity in Ditto.110 Even if a patent monetizer is not attacking a startup company through lawsuit, patent trolls find other avenues to expand their patent portfolio.

108. Id.
109. Id.
110. Id (IPNav is known to be “the most notorious patent troll in America.”).
The increase of patent troll attacks has created an entry barrier for startup companies. Venture capitalists refrain from funding companies with impending lawsuits with the fear that there will be high costs of litigation and possible dilution.

A. COST OF LITIGATION

Patent monetizers assert patents knowing startup companies lack the budget and resources to litigate and may even attack the company at a vulnerable stage—for instance, “on the eve of a funding or acquisition event” or directly to their customers. While most biotechnology companies have claimed that the most important reason they decided not to pursue a patent on an invention was because they were reluctant to disclose information, startup companies claimed the cost of patent prosecution was too high. Acquiring a patent costs an average of thirty-eight thousand dollars while prosecuting a patent may cost even more, including potential loss of the company.

It is often difficult to know what a patent covers, regularly costing millions of dollars in attorney’s fees to find out; therefore, “when a patent holder knocks on a door a rational company may choose to settle, even if the patent is weak or doesn’t apply to the product.” Many times the patent that is being asserted may not even be valid, but just proving the validity of a patent is also very costly (i.e., *inter partes* review).

This conflict extends far beyond the “smartphone wars,” a never-ending chain of lawsuits and countersuits on patents and trademarks among smartphone competitors. Patent monetizers send out letters to small companies and demand licensing fees for use of common, everyday office equipment, such as scanning and emailing.

112. Graham, supra note 1, at 1311.
113. *Id.*
documents. For example, the owner of BlueWave Computing, an IT services provider, received a demand letter inquiring that he had to pay $1,000 per employee to license a patent. The patent claims the process for using an office scanner to scan and email a PDF document. Unlike many other business owners, he decided to fight back and was victorious, but these patents have not gone away. The patent holder, Project Paperless, has been asserting its patents through several other shell companies and sending out the same demand letter to small businesses and requesting payments from $900 to $1,200 per employee.

Startup companies and smaller businesses do not have the know-how regarding the patents that exist, and they have little choice but to pay the licensing fees to avoid time-consuming and costly litigation; even the cost of due diligence on the patents may be a cost-sensitive matter. The scarce resources and vulnerability make these small companies “sitting ducks.”

B. VC INVESTMENT AND FINANCING

The cost of litigation not only impacts the well-being of the company, but it hinders its ability to grow. Emerging companies in all industries (high-tech, biotechnology, as well as medical device companies) have a need for funding. Although most startup companies will seek funding from angel investors, who play a passive role in the company, large amounts of money flow into successful startups through venture capital (“VC”) investments.

Securing investments and financing may be a key asset for the well-being of a company, especially in its early stages. Patents play a significant role in increasing ROI, as well as maintaining competitive prices, and licensing to generate profits. Patents are considered

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117. Id.
118. Id.
119. Id.
120. Colleen V. Chien, Startups and Patent Trolls, 17 STAN. TECH. L. REV. 461 (forthcoming 2014) (“sitting duck” refers to someone or something that is vulnerable to attack. It alludes to ducks that float on the surface of the water without suspecting that is the object of a predator).
valuable “hard assets” that can help secure loans, increase a company’s value upon liquidation, and affect the firm’s overall success.121 All these factors are taken into consideration along with the potential litigation when a venture capitalist considers funding an emerging company. Although patents play a key role in funding, many surveyed venture capitals view patenting for software and Internet companies less important than biotechnology companies.122

While many VCs seem less impacted by startups without software patents, surveys have shown that they have nevertheless been greatly affected by patent monetizers. Surveys show that nearly ninety percent of all technology VC investments have been impacted by patent troll demands.123 About forty percent of the time, the demand was a result of the startup’s adoption of another’s technology.124 This may include the “smart phone wars” as well as predators such as Project Paperless who assert patents on everyday office equipment use. This once again demonstrates that simple patent schemes allow patent trolls to monopolize the patent system and potentially cost startup companies their endeavors and life savings.

C. STARTUP COMPANIES AND THEIR EFFECT ON BOLSTERING THE ECONOMY: THE CHILLING EFFECT

Regardless of the decisions startup companies make with regards to software patent, the vagueness of the patent system—combined with small companies’ lack of understanding of the system—not only affects these emerging companies, but also affects the entire economy on a larger scale. A dataset compiled by the U.S. government called Business Dynamics Statistics (“BDS”) shows that firms within their first year of existence (i.e., startup companies) add an average of three million jobs per year, but this could change rapidly.

Patent troll attacks have a chilling effect on innovation. Many

122. Id.
123. Id.
124. Id.
survey respondents claim that they try to avoid any attack by using open source software or even limit their companies to United Kingdom and European markets. Staying in the U.S. market “is a when, not if question” regarding the threat of patent litigation. This only discourages many companies from flourishing in the U.S. and bolsters economies of countries overseas.

In a case study, a flight simulator program called X-Plane which has been widely used by NASA, the Federal Aviation Administration, and Boeing, was available on the Android operation system for a small fee. Austin Meyer, the founder of X-Plane, was sued by Uniloc for using “Google-provided copy-protection software.” The litigation greatly impacted X-Plane’s plans for further innovation. In an attempt to secure their business, the startup was “forced to abandon product updates and new products that were in development” with the intent to avoid further litigation. Uniloc continues to sue smaller companies for infringement on its patents. In 2013, Uniloc also sued Rackspace Hosting, Inc. for infringement on its patent, but the U.S. District Court for Eastern Texas stated that a “formula to ‘solve mathematical problems of converting one form of numerical representation to another’” was not patentable under § 101. The District Court analyzed patent eligibility using Bilski’s “machine-or-transformation test” and analogized the mathematical formula to the general method for converting numbers between different representations in Benson. Unlike X-Plane, Rackspace was a larger company with the money and resources to fight a patentability claim and dismiss the case.

Companies are being discouraged from innovation because of

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125. Chien, supra note 120, at 477 (“Among those who had not received a demand, some reported significant impacts from watching others receive them. Numerous respondents who had not received a demand said they used open source software in order to avoid liability. Others reported being very conscious of patent threats. Said one small software company, for example: ‘we have limited ourselves to the UK & European markets, simply because the mere threat of Patent Litigation if we enter the US market, is a WHEN not IF question.’ Another said ‘I used to develop software for retail and on spec for publishing by other companies. But we’ve quit that because the risk of patent litigation.’”)
126. Tucker, supra note 101.
127. Id.
129. Id. at *2–3.
the threat of litigation and small companies, unlike Rackspace, are not able to fight software-patent wars due to all the severe implications. In a survey conducted by Colleen Chien, with a pool of seventy-nine companies, results demonstrated that twenty-two percent of the respondents that received a demand did not do anything, while thirty-five percent fought the demand, and eighteen percent settled.130 Although many startup companies may refrain from even responding to a demand letter, forty percent of those small businesses that do respond have reported a “significant operational impact.”131 A significant operational impact includes: delayed hiring or achievement of another milestone, change in the product, a pivot in business strategy, a shut-down business line or possibly the entire business, and/or loss of valuation of the company.

Chien’s research also illustrates that forty percent of the respondents were being targeted because of their “use of another’s or a widely available technology.”132 The patent assertions raised by patent monetizers include technology people use on a daily basis such as patents related to scanning, having Wi-Fi on the premises of their business, or even the everyday online transactions that use a digital shopping cart.

In common litigation asserted by patent trolls, Innovatio IP Ventures, LLC (“Innovatio”) is a patent monetizer known to assert patent infringement suits targeting small companies. In 2011, Innovatio had sent more than eight thousand letters to end-users of Wi-Fi technology (i.e., “targets”), demanding them to pay license fees.133 Instead of targeting the manufacturers of the infringing device, Innovatio has been targeting the end-users such as “bakeries, restaurants, cafes, hotels and other small businesses” that only use the device but are not involved with the sale or manufacturing of the

130. See Uniloc USA, 2013 WL 7393173, at *2 (“Around 60% of the demands during this period [2006 to present] involved software or high-tech patents.”).
131. Chien, supra note 122, at 465 (“The characteristics of small companies can make it harder to absorb a PAE demand – forty percent of small companies that received a demand and responded to the survey (N=79) reported a ‘significant operational impact’: delayed hiring or achievement of another milestone, change in the product, a pivot in business strategy, a shut-down business line or the entire business, and/or lost valuation . . .”).
132. Id.
infringed device.\textsuperscript{134} These small businesses are unaware that their everyday use of Wi-Fi may be infringing on a patent. Yet, patent monetizers, such as Innovatio, prefer to target small businesses and startups rather than the large manufacturing companies that may be able to retaliate.

Some inventions that one would not believe to be patentable pass muster in the USPTO like Amazon’s “one-click” patent.\textsuperscript{135} These nuances place startup companies in danger of patent troll attacks. Without the finances nor the knowledge, honest mistakes can lead to costly litigation and may shut down their company all together, leaving many jobless and hopeless. In the words of a well renowned economist, Joseph Schumpeter, “Small company innovation plays a crucial role in the success and dynamism of capitalist economies.”

V. PROPOSAL

The impact of patent assertions on startups and small companies alike has caused great harm. The effect of high litigation cost ranges from the loss of jobs to companies shutting down, as well as negatively affecting innovation and entrepreneurship. Patent trolls are a growing and recognizable threat to companies and innovation. Although Congress has taken measures to incorporate the harms of patent trolls through legislation, patent reform is only a temporary solution. There are several solutions that may be considered. One very controversial yet increasingly popular idea is “abolishing” software patents. As discussed earlier, there are many gray areas associated with software patentability; therefore, abolishing software patents may be less attractive in the short term. Alternatively, cases currently argued in the Supreme Court and legislative activity will affect the patent system and may help define software patentability. Ultimately it will be in the hands of Congress to adopt a standard of patent eligibility to reduce patent troll litigation and patentability suits raised in the Supreme Court. Meanwhile, patent reform and better defense tactics may help ameliorate the harms caused by

\textsuperscript{134} In re Innovatio IP Ventures, 921 F. Supp. 2d at 907.
\textsuperscript{135} Chien, supra note 111 (Amazon’s “one-click” patent is “a single-action ordering component . . . in response to performance of only a single action.”).
patent monetization entities.

A. PATENT REFORM: A TEMPORARY RELIEF IN THE SHORT-TERM, DEFINING PATENTABILITY IN THE LONG-TERM

Legislation has made recent efforts to recognize the harms caused by patent monetization entities, but patent reform has done more for older and well-established companies than it has for new startups. The AIA tried to make it more difficult for patent trolls to file lawsuits through the limitation of joinder suits as well as incorporated a grace period to determine validity of a patent in its “prior art” provision of § 102.

Current patent reform is only a temporary relief and does little for startup companies. Startup companies are cash-poor while patent litigation is expensive. Such reform may help deter suits being brought but that does not stop threats of litigation aimed towards smaller companies. A demand letter may threaten a new startup company and cost them large sums of money for licensing or just responding to the demand.

Playing the devil’s advocate, the patent system allows monetizers to initiate their rights granted to them. Section 271 of the Patent Law states that “whoever without authority makes, uses, offers to sell, or sells any patented invention, within the U.S., or imports into the U.S. any patented invention during the term of the patent therefore, infringes the patent.” If the patent system allows patent trolls to pursue litigation against those entities infringing the patents they own, they are just enforcing the laws Congress created. However, the argument goes beyond whether patent trolls should be enforcing the law and suing the infringers. Patent trolls are “monetizers” and they profit from asserting patents. The way to prevent or limit the litigation imposed on startups is by clearing the

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136. Supra note 20 (Joinder suits are only available in patent litigation if the parties are jointly or severally liable for the infringements rising out of the same transaction or occurrence, and there are common questions of fact.).

137. 35 U.S.C. § 102 (2011) (The priority date for determining whether the patent is valid is the date of conception of the invention rather than the date of filing the patent. This gives patentees the ability to delay patenting for a few years.).

blurred thresholds for software patentability.

Amending the patent system to limit joinder suits and incorporating the prior art provision does not help startup companies that lack an understanding of the patent system, are cash-poor, and are many times infringing a patent that probably should not exist (i.e., software patents). In order to effect long-term change, Congress needs to define software patentability under § 101. Defining the patentability of computer-implemented software and patent eligibility in general needs more than vague language incorporated in patent law. Rather, ideas similar to the European Patent System must be used to influence the limitations that are drawn. These limitations start with the physicality of the subject matter.

Currently, case law such as *Alice* has helped solidify the notion that an “abstract idea” pursuant to § 101 is not patent eligible. The Supreme Court continues to uphold the test discussed in *Mayo* that the invention must do more than “apply it,” it must add some value. This is similar to what the EPA and JPA have been practicing for several years. Although they have not defined software-patentability themselves, they have acknowledged the effects this issue raises in a new era of innovation and entrepreneurship. Both the EPA and JPA have incorporated this legal issue in their patent system—which the USPTO has undoubtedly been struggling with.

When the Founding Fathers drafted the Constitution, they were unaware that technological advancements would redefine the laws of the nation. Now, technology has gone beyond the tangible devices and has evolved into computer-implemented algorithms incorporated in undefined space. Should this be patentable? What is being patented? These are questions members of Congress should be asking themselves. They should draw a line at physicality or at the complex algorithm used to create that undefined space, but it must go well beyond the discussion raised in the Supreme Court. With the exponential increase in the technology industry, computer-implemented software patentability is an issue forced into legal conversations, and hence, must be acknowledged as a pressing issue.

B. ELIMINATING SOFTWARE PATENTS: A GOOD IDEA?

Many entrepreneurs in the software industry believe that
patenting is a “gigantic waste of time and money.” Recent case law has demonstrated that in order to determine patentability of software, it is important to understand the scope of § 101. The decision in Bilski was the start of discussion about the abstract ideas limitation on patentable subject matter, but what that actually entails still remains a mystery. Putting limitations on patentability protects innovation and supports the current trend of diminishing patent troll litigation. It may seem as though eliminating software patenting would eliminate the problem, but instead that would be avoiding the rooted issue. The question is not whether software patents should exist, but rather whether eliminating software patenting would eliminate patent troll attacks on startup companies, and whether they are abstract ideas that fall outside the scope of a patentable subject matter under § 101.

Abolishing software patents removes overly abstract ideas from patentable subject matter, as distinguished in § 112. Professor Mark Lemley appropriately states that, “by moving patenting downstream, we both permit competition in research and development and encourage competition among the practical, applied inventions developed by that research.” Therefore, whether legislatures eliminate software patents or define a software patent and apply restrictions to its patentability, it would be “stimulating optimal invention.”

Patent trolls attack startup companies that infringe software patents, but because of the lack of patent subject-matter definiteness, a startup company will not know whether they are infringing a patent or whether an invention is patent-worthy. The U.S. may consider adopting provisions that are imposed by the EPC, such that they continue to grant software patents but they restrict patentability to inventions that are “new, and ha[ve] an inventive step and industrial applicability.” Granting a limited monopoly on an invention was designed to encourage innovation, rather than be asserted to threaten companies and essentially put new and emerging companies out of business. Therefore, abolishing software patents would devalue both

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141. *Id*.
142. See Rosser, *supra* note 95.
the patent system all together and all patent-using entities.

C. WHERE DO THE GOVERNMENT, THE COURTS, AND THE PEOPLE STAND TODAY?

While the patent wars continue in both the judicial and legislative branches of government, the question of software patentability remains the most controversial topic of them all. The most current case argued in the Supreme Court, *Alice Corp. v. CLS Bank International*, and Congress’ acceptance of the effect of patent troll litigation have opened Pandora’s box to discussion among scholars and entrepreneurs alike. It is not simply what is patent eligible under § 101 but rather, what constitutes a software patent altogether.

Prior to the Supreme Court’s decision in *Alice*, many scholars had expressed their thoughts and concerns regarding the decisions of the Supreme Court through their written *amicus* briefs. Some people have raised the issue of software patentability promulgated in *Mayo*, such that patent eligibility should not “depend simply on the draftsman’s art.” A distinguished professor at the University of California, Hastings College of the Law, Robin Feldman, explains in her *amicus brief* that patents may be divided into two types: “product and process patents.” Product patents are “granted on [a] particular device or machine, while process patents are granted on a method of doing something.” Software patents are a hybrid of both process and product patents. Professor Feldman continues to argue that software patents may be held to the same standards of patenting for all kinds of patents if there is a cohesive understanding of patentable subject matter through the concepts of “preemption and specific commercial application.” The idea is to define a software patent such that it does not fall under the concept of “abstract ideas.”

Further arguments have been raised by organizations affected

145. Id. at 15.
146. Id. at 36.
by the lack of definitiveness in the language of the statute and the open door to patent troll litigation. The National Venture Capital Association (“NVCA”) drafted a letter to the Senate Judicial Committee expressing its concerns with patent reform. The NVCA voiced concern in regards to weak patent reform that deter venture capitalists from investing in emerging companies due to what they called “abusive practices” (referring to patent troll litigation).\textsuperscript{147} The organization went into detail regarding shifting fees and costs, joinder suits, as well as extending the Covered Business Method (“CBM”) procedure, which is a method of review for all “software” patents. The problem with CBM goes back to the rooted issue about defining a software patent and its patentability. The problems have extended to investors who fund startup companies. Without the funding of VCs, many emerging companies would be nonexistent. In the words of the President and CEO of NVCA, VCs work closely with “entrepreneurs to transform breakthrough ideas into emerging growth companies that drive U.S. job creation and economic growth.”\textsuperscript{148}

The Supreme Court changed the landscape of patent law in \textit{Alice}, not because it established common law to define patentability, but rather because it shed light on the importance of raising the issue of software patent eligibility pursuant to § 101. Now, courts have adopted the “\textit{Alice} Standard” and have become more hostile than ever before.

\textit{1. Post-\textit{Alice} Ramifications}

The USPTO was infamous for approving the “do it on a computer”\textsuperscript{149} patent in the late 1990s and early 2000s. These are the exact type of patents that the Supreme Court invalidated in \textit{Alice}. A

\textsuperscript{147} Letter from the National Venture Capital Association to the Senate Judicial Committee (Mar. 31, 2014) (on file with the NVCA Public Policy).

\textsuperscript{148} \textit{Id.}

\textsuperscript{149} Timothy B. Lee, \textit{Software Patents Are Crumbling, Thanks to the Supreme Court}, \textsc{Vox} (Sept. 12, 2014, 3:50 PM), http://www.vox.com/2014/9/12/6138483/software-patents-are-crumbling-thanks-to-the-supreme-court (“These patents take some activity that people have been doing for centuries . . . and claim the concept of performing that task with a computer or over the internet.”).
patent that converts a task into a computer-implemented software is an abstract idea and hence, not patent eligible under § 101. Alice is the first case in thirty-three years to be decided in the Supreme Court on software patentability. The decision has made courts more aggressive towards this issue. Lower courts have ruled on almost a dozen software patentability cases since the Supreme Court decision, invalidating and rejecting every single one.150

Just a few weeks after the Supreme Court published its decision, a Delaware trial court rejected a Comcast patent that determined when a new connection was available through a computer-implemented telecommunication.151 The trial court claimed this was a system that could be performed by a person making telephone calls and the computerized system did not add anything new and useful.152 Ten days later, the Federal Circuit Appeals Court—which is the leading court in patent law and has liberalized access to patents in the area of technology—rejected a patent for a device profile and a method for creating a device profile within a digital image processing system.153 The Federal Circuit found the software patent to be overly abstract, stating, “Without additional limitations a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible.”154 The Federal Circuit followed this decision with another case where it once again rejected a patent on a system that runs a bingo game on a computer, arguing that converting a process into computerized software does not make an invention patent eligible.155

150. The Supreme Court made its decision on June 19, 2014 and these statistics are updated through September 17, 2014. Almost three months after the decision, and courts have drastically relied on the decision in Alice to invalidate “do it on a computer” patents and reject other disputed patents brought to judicial attention.


152. Id.

153. See Digitech Image Tech., LLC v. Elec. for Imaging, Inc., 758 F.3d 1344 (Fed. Cir. 2014). Id. at 1351.

Within three months, courts have invalidated patents for computer-implemented instructions created to individualize meal plans, achieve dieting goals,\(^{156}\) link a mortgage line of credit to a checking account,\(^{157}\) and control the release of information to establish anonymous communications.\(^{158}\) Courts also invalidated patents involving a computerized method to “upsell” offers generated from initial transactions,\(^{159}\) as well as a process for rounding to dollars and subtracting amounts from each payment to set collected small amounts in a larger pool.\(^{160}\) These are a few of several other patents that were invalidated or struck down just weeks after *Alice*.\(^{161}\) All these courts cited to *Alice* and the two-step test that would determine patent eligibility. The lower courts as well as the Federal Circuit Appeals Court argued that these patents were no different if the methods were performed by a human mind. These were abstract ideas that only transferred a process conducted by a human into software-implemented instructions performed by a computer.

The Supreme Court has not only established a new two-part test in *Alice*, it has spearheaded a shift in software patentability. The USPTO has been withdrawing notices of allowance after issue fees have been collected and calling them “*Alice* rejections.”\(^{162}\) Although


this may seem like a step towards a solution, it is actually a step towards invalidating all software patents, which can ultimately preempt the idea of monopolizing a creative idea for the purposes of innovation.

2. What Next?

Similar to abolishing software patents, the current state of patentable subject matter has not strengthened the case for software patents. Courts are invalidating software patents because they just implement an idea in a computer, which is not enough to satisfy patentability. One can say, however, the same about every software system created. The idea of the computer was to make a process faster and more efficient, even if that meant transferring human skill sets into computer-implemented instructions. The Supreme Court is saying that it needs more than just transferring an ordinary skill; it needs something creative, something new and useful.

Alice has established a threshold that goes beyond the Court’s opinion. The two-part test, although it institutes a framework to determine software patentability, induces ambiguities that will remain on a case-by-case basis. The concept of innovation is to move forward, and one cannot move forward without the incentive to invent technological processes that modernize the virtual world we live in today.

Allowing society to patent software is where Congress and the PTO play a prominent role. Congress must define a software patent in the patent system and should differentiate computer-implemented instructions from computerized processes that add new and useful technology to society. This leads the USPTO to establish a more stringent patent application process for software patents that places the burden on the patent applicant to prove how their invention provides an additional technical advancement. The USPTO should practice software patentability similar to the one adopted in the EPO and JPO. Although the USPTO has already begun to reject and invalidate software patents, there is no clear and distinguishable basis for doing so aside from the Alice standard.

Making software patents more difficult to obtain consequently threatens patent monetizers from bringing their current software
patents to court with the fear that they will be invalidated. The patent system should allow software patents to the extent that it encourages new ideas and inventions, but not to the extent that it allows patent trolls to obtain broad patents on everyday office equipment that affects startups, small business, and entrepreneurship. Incorporating in the statute the definition of software patents and its extent of patentability as well as establishing a process similar to the Japanese and European patent system will bring solace to this discussion and allow the furtherance of innovation and entrepreneurship by limiting patent troll litigation.

D. LEGISLATURE: IT TAKES MORE THAN THE SUPREME COURT TO DECIDE

Throughout this note I have argued that it would take more than the Supreme Court decision in *Alice* to define and interpret software patentability; the legislature would need to create boundaries for what is and is not patent eligible pursuant to § 101. Justice Scalia would undoubtedly argue that the legislature is more suited to tailor to the needs of society, and that is the argument I set forth.

Unlike the Supreme Court, the legislature is a democracy that represents what the people want in a current area of law. State representatives and members of Congress are better versed in the subject matter than a Supreme Court Justice who is deciding on the merits. They also have more resources and may go beyond the merits to enact legislation that can adopt the technological advancements and reinforce the strengths of small companies and startups. This debate goes beyond issues of law; they are policy issues that society as well as members of the government have begun to see as a threat. The ambiguities in software patenting have reinforced patent troll attacks and impeded the continuous urge for America to prosper and grow through advances in technology. The legislature must accept that the companies and people inventing are the startups based in Silicon Valley and other tech hubs; they need funding and support but that will not be possible with the current state of the patent system.

Although *Alice* has spearheaded a new era in patentability, which has magnified the problem in the lower courts, it is not the
Supreme Court that will instill this change in society, but rather, it will take legislative knowledge and active public policy to help startup companies and entrepreneurs drive innovation.

E. DEFENSE TACTICS: PROTECTING EMERGING COMPANIES FROM PATENT TROLLS

Patent reform and reevaluating software patenting are solutions that take time, money, and legislative support. For short-term effects, emerging companies should consider certain defense tactics to protect themselves from patent troll attacks.

In a recent article, Colleen V. Chien proposed the idea of identifying the most threatening patents ahead of time in order to reduce the risk of patent assertion.\textsuperscript{163} Software patents are the riskiest patents. It can be determined whether a patent is going to be litigated depending on the economic value of the patent, the characteristics of the owner of the patent, and the propensity to litigate.\textsuperscript{164} Software patents are more likely to be litigated because they are economically valuable; software patents are usually infringed by startup companies, and they are asserted by large and wealthy patent trolls who are inclined to litigate.

There are several defense tactics for startups to protect themselves from potential litigation and be less vulnerable to patent troll attacks. Because startup companies are susceptible targets, “spreading information, risks and costs, the transaction costs and thus the return on trolling, can be reduced.”\textsuperscript{165} Smaller companies are the ones innocently using technology rather than creating it. Many of these patents asserted on startup companies are invalid, but determining validity is very costly. “Royalty-based settlements” should be imposed when small companies “legitimize” patents held by patent monetizers in order for the small company to increase its return on the patent assertion.\textsuperscript{166}

Several advocates and software patent war veterans have also

\textsuperscript{163} Chien, supra note 21, at 328.
\textsuperscript{164} Id.
\textsuperscript{165} Chien, supra note 111, at 4.
\textsuperscript{166} Chien, supra note 120, at 485.
started campaigning and raising awareness. Establishing a platform to upload demand letters, discuss asserted patents, and create a laundry list of patent monetizers attacking small companies and startups will help ameliorate the harm. TrollingEffects.org is an online platform created by a San Francisco digital-privacy group and has posted about fifty demand letters over the past year. Other companies such as Lex Machina, a legal analytics company, has created a free tool, “Demand Letter Analytics,” for small companies to search the company that send the demand letter along with prior actions from the company, cases that go to trial, and damage fees. Similarly, RPX Corporation provides RPX Search and “Assertion Letter Management” free of charge to learn more about the patent asserted and other necessary legal information. The USPTO has accepted the threat and harm patent trolls have been causing and has itself linked TrollingEffects.org as a resource on their website.

Exposing emerging companies to risks associated with using technology can help fight off patent trolls in the short-term. Law firms directing emerging companies have slowly implemented guides for startup companies to be more in sync with the patent system.

VI. CONCLUSION

The Founding Fathers incorporated patent protection rights that grant a limited monopoly on inventions. Their assumption was that this provision would encourage innovation, increase research and development, promote entrepreneurship, and help the economy flourish. When this provision was implemented in the Constitution, however, the advancement of technology and the creation of patent monetization entities was not predicted.

Patent litigation asserted by patent monetization entities (i.e., patent trolls) has grown drastically since 2007. The effects of litigation target startup companies that are still in the process of growing and prospering, but patent troll attacks have not only affected startup

168. Id.
169. Id.
companies financially but more importantly, hindered innovation and entrepreneurship. Most of these patent assertions are software patents that may be arbitrary, vague, and broad. The threat of asserting software patents leads startups and small companies to pay patent licensing fees to avoid costly litigation or potential dilution.

Patentability of software patents under 35 U.S.C. § 101 remains obscure, but eliminating them all together would not resolve the problem either. The intent of pursuing bright-line rules for patentable subject matters is to encourage optimal innovation. Startup companies drive innovation and entrepreneurship, and allowing patent trolls to disrupt new inventions and the process of technological advancements affects the concept of monopolizing patents under the Constitution.

Regardless of the decision the Supreme Court made in *Alice* and its aftermath, patent reform will require the legislature to define patentability because it has the resources and knowledge that will tailor to societal needs. Congress should adopt ideas from the European and Japanese patent system in determining the limitations on software patent eligibility and define a software patent that is new, useful, and takes a step towards an inventive process. Similar to the European patent system, Congress must also lay out those ideas that are not patent eligible such as a mathematical formulas, scientific theories, and computer programs. Although these issues have been argued in the courts, each decision focuses on a particular case rather than the underlying problems that bring these disputes to court.

While biotech and medical device patents are considered higher quality patents, Congress, when implementing a new patent system for software, must encourage stringent guidelines for software patentability. The concept of establishing a “triadic patent” for software would allow the USPTO to impose strict standards for patentability and the burden would be placed on the inventor to prove what distinguishes its idea from an abstract one. This goes beyond the concept of physicality and focuses on the application of the invention.

The increases in technological innovation have expanded the ideas of applying a process to create a product, and consequently, startup companies are leading the new technology era. Defining patent eligible subject matter under § 101 will allow startup
companies to keep inventing and entrepreneurs to keep investing. Most importantly, it will help eliminate patent trolls from targeting the vulnerable minority.