

# Patent Wars: The Attack of Blockchain

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Blockchain has rapidly become one of the most popular technologies that companies are scrambling to integrate into their businesses. The accelerated development of blockchain has created a race to obtain patents incorporating the technology. Fortune 500 companies including Goldman Sachs, Bank of America, and Mastercard are at the forefront of the sprint to patent blockchain. However, blockchain is not limited to high profile companies. Recent studies have shown as many as 80% of executives are using or considering the use of blockchain technology to improve their business models. Despite the increase in patent applications involving blockchain, it is unlikely that these applications are even capable of being patented.

Over the past fifty years the courts have been tasked with the role of crafting a subject matter eligibility test, specifically for patent claims directed at abstract ideas. Most recently, the Supreme Court has laid out the test in *Alice Corp. Proprietary Ltd. v. CLS Bank International*. The first step in the test focuses on whether the claim is directed at a patent ineligible concept. If it is, then the test proceeds to the second step which analyzes whether there is a sufficiently inventive concept in the claim that makes the patent ineligible concept innovative and eligible to be patented. *Alice Corp.* held that an application directed at a patent ineligible concept is not sufficiently inventive simply because of its use of software or a computer to enhance the application. The use of software is not sufficiently inventive because software focuses on providing a method of implementing an abstract idea rather than improving the process.

This Comment analyses the subject matter eligibility test for patent claims, specifically software-based claims, outlined in *Alice Corp.*, and compares software to blockchain. Focusing on the striking similarities between software and blockchain, this Comment analyzes why blockchain claims, like software claims, are generally patent ineligible technology. Finally, this Comment argues that blockchain claims are not only patent ineligible subject matter but allowing the technology to be patented will lead to less innovation. Patenting blockchain could lead to many unintended consequences such as stifling the growth of the technology

## **I. Introduction**

In just a decade since its inception, blockchain technology has gone from an obscure and new technology to something regularly discussed and used by Fortune 500 companies. And now, the race to patent blockchain has begun. Hundreds of patent applications have already been filed involving blockchain technology and obtaining such patents has become a goal of many corporations ranging from big banks to large technology companies.<sup>2</sup> However, a major issue has largely been ignored to this point: Is blockchain technology even subject matter eligible to be patented?

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<sup>2</sup> Inayat Chaudhry, *The Patentability of Blockchain Technology and the Future of Innovation*, 10 *LANDSLIDE* 21, 24 (2018).

Blockchain is the latest technology innovation that many see as the next big—or even the biggest—thing. Its system of securely distributing and storing data in public ledgers, readable by all but hackable by none, has potential to revolutionize the way information is recorded.<sup>3</sup> Although the eligibility of blockchain claims has yet to be directly considered by the Supreme Court, subject matter eligibility has long been a divisive topic. Most recently, the Supreme Court issued an important opinion on patentable subject matter, specifically software patents, in *Alice Corp. Proprietary Ltd. v. CLS Bank International*,<sup>4</sup> which involved a patent application for a “computerized scheme for mitigating ‘settlement risk.’”<sup>5</sup> In this case, the Supreme Court relied on many previous subject matter eligibility opinions to craft a two-part test for determining whether the application’s subject matter was eligible to be patented.<sup>6</sup> Applying this two-part test, the Court made clear that merely creating an application that uses software or computers does not turn an abstract idea into a patent-eligible concept.<sup>7</sup>

At its roots, blockchain technology is effectively a software used to provide a secure yet open-source method to record information and complete various transactions.<sup>8</sup> Although blockchain is currently less familiar than a computer or basic software program might be to most people, the underlying concepts are very similar. Blockchain is a “distributed database of records, or public ledger of all transactions or digital events that have been executed and shared among participating parties.”<sup>9</sup> The differences between blockchain and a basic database do not lie in the uses for both, but instead are visible in the storage methods, reliability, and visibility.<sup>10</sup> Although the methodology behind blockchain is significantly more complicated than most software, blockchain is effectively a software which creates transaction records in the form of “blocks” connected to prior blocks in the chain.<sup>11</sup> Blockchain runs via the connection of a large number of computers in a decentralized, public, and verifiable system.<sup>12</sup>

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<sup>3</sup> Gail Papermaster, *Blockchain Technology- Have No Fear, Dive In*, TEXAS LAW. (Jan. 1, 2018, 11:52 AM), <https://www.law.com/texaslawyer/sites/texaslawyer/2018/01/01/0118ihtmagcontribtechnologypapermaster>.

<sup>4</sup> 134 S. Ct. 2347, 2352 (2014).

<sup>5</sup> *Id.*

<sup>6</sup> See *infra* notes 84–149 and accompanying text.

<sup>7</sup> *Alice Corp.*, 134 S. Ct. at 2355, 2357 (“We must first determine whether the claims at issue are directed to a patent-ineligible concept . . . . At Mayo step two, we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” (quoting *Mayo Collab. Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72 (2012)).

<sup>8</sup> See *infra* text accompanying notes 15 – 47.

<sup>9</sup> Michael Crosby et al., *BlockChain Technology: Beyond Bitcoin*, 2 APPLIED INNOVATION REV. 6, 7 (2016).

<sup>10</sup> See *id.* at 10.

<sup>11</sup> Papermaster, *supra* note 2; see *infra* text accompanying notes 15–47.

<sup>12</sup> Arthur Iinuma, *What Is Blockchain And What Can Businesses Benefit From It?*, FORBES (Apr. 5, 2018, 7:00 AM), <https://www.forbes.com/sites/forbesagencycouncil/2018/04/05/what-is-blockchain-and-what-can-businesses-benefit-from-it/#7411a2fe675f>.

The patentability of blockchain has yet to be seriously challenged. This Comment argues that under the current subject matter eligibility test, a claim which takes an abstract idea and implements it by using blockchain should be patent ineligible. Also, preventing these claims from being patented will provide blockchain applications opportunities to grow and flourish. Patent applications utilizing blockchain are the equivalent of patent applications using software, and as such, must be analyzed under the subject matter eligibility test set forth in *Alice Corp.*<sup>13</sup> Under this test, any application directed at an abstract idea must have a significant “inventive concept” to be patentable.<sup>14</sup> Blockchain is a new software, therefore using blockchain to implement a fundamental or abstract idea is not a sufficiently “inventive concept.”

This Comment proceeds in four parts. Part II provides context about the history of blockchain technology, including the methodology behind the technology, and illustrates some of its current applications. Part III examines the construction of the subject matter eligibility test for patents, focusing on how the Supreme Court has examined applications involving abstract ideas, and summarizes the current approach the Supreme Court uses to test subject matter eligibility under *Alice Corp.* Part IV dissects blockchain to analogize its components to basic software and analyzes blockchain under the two-part subject matter eligibility test from *Alice Corp.*, ultimately concluding that it is not patentable subject matter. Part V discusses the negative implications of allowing blockchain to be patented, including a look at the potential growth and development of blockchain in an open-source environment.

## II. The History of Blockchain Technology

Blockchain technology has a very unusual provenance, and though it is most commonly associated with the virtual currency Bitcoin, its purpose has developed into something broader. Blockchain is a recent technological development but has already been used in a variety of ways beyond Bitcoin. This Part provides an overview of blockchain technology. Section A discusses the relatively short history of blockchain and focuses on defining blockchain. Section B analyzes the current ways that blockchain is being used, and Section C compares the similarities between blockchain and software.

### A. What is Blockchain?

“Email is to the Internet as [bitcoin] is to blockchain technology.”<sup>15</sup> Just as the Internet acts as a platform for email and in its early stages was associated almost exclusively with email, blockchain technology is a platform for Bitcoin that is frequently contemplated alongside Bitcoin.<sup>16</sup> Bitcoin was the first “peer-to-peer version of [an] electronic cash that allow[ed] online payments to be sent directly from

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<sup>13</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014).

<sup>14</sup> *Id.*

<sup>15</sup> Angela Morris, *Don’t Know What Blockchain Is? You Should. This Law Prof Can Help*, LAW.COM (August 4, 2017, 4:09 PM), <https://www.law.com/2017/08/04/dont-know-what-blockchain-is-you-should-this-law-prof-can-help/>.

<sup>16</sup> *Id.*

one party to another without going through a financial institution.”<sup>17</sup> However, just as the Internet has an abundance of purposes beyond email, blockchain technology is significant beyond its use as a platform for Bitcoin and other cryptocurrencies.<sup>18</sup> Blockchain technology is a secure, yet open-source method to record information and complete various transactions.<sup>19</sup> Although various uses for blockchain are continually being discovered, blockchain can generally be used any time a record of transactions is needed or created.<sup>20</sup> In just ten years, businesses have already found numerous ways to use blockchain.<sup>21</sup>

Blockchain is a relatively new technology. It originated in 2008 with the publication of the paper “Bitcoin: A Peer-To-Peer Electronic Cash System.”<sup>22</sup> This paper was published anonymously under the pseudonym Satoshi Nakamoto.<sup>23</sup> Many appreciated this paper only for its creation of Bitcoin, which is a type of electronic money that allows online payments to go from person to person without needing an intermediary financial institution.<sup>24</sup> While the main topic of the paper was the Bitcoin peer-to-peer network, the paper also highlighted the blockchain technology backing Bitcoin.<sup>25</sup> Blockchain is arguably the more important creation stemming from this paper because of the wide variety of ways the technology can be used.<sup>26</sup>

Blockchain can be summarized by just a few terms and facts. Blockchains are open-source public ledgers of various transactions, linked together in “chains” of “blocks,” that cannot be altered or hacked.<sup>27</sup> They are also decentralized, with no single individual controlling the information on the chain; rather, the data is spread across a large number of computers, or nodes.<sup>28</sup> These nodes work together to create a “series of digital blocks of information, with each new block digitally linked to the immediately preceding block and then successively back to every single prior digital block all the way back to the very first piece of digital information in the chain.”<sup>29</sup> For a block to be added into the chain, a “very special mathematical problem”<sup>30</sup> must be solved, which requires an extreme amount of computing power.<sup>31</sup> This math

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<sup>17</sup> Crosby, *supra* note 9, at 9.

<sup>18</sup> Morris, *supra* note 15.

<sup>19</sup> Crosby, *supra* note 9, at 7.

<sup>20</sup> BridgeTower Media Newswires, *A Primer on Blockchain and Cryptocurrencies*, MICH. LAW. WKLY (July 9, 2018), <https://milawyersweekly.com/news/2018/07/09/a-primer-on-blockchain-and-cryptocurrencies/>. A few uses of blockchain technology include: verifying the authenticity of documents, maintaining records of music rights ownership, smart contracts, decentralized storage functioning similarly to Google Drive or Dropbox, and anti-counterfeit solutions. Crosby, *supra* note 9, at 9.

<sup>21</sup> BridgeTower Media Newswires, *supra* note 20..

<sup>22</sup> SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM (2008).

<sup>23</sup> Crosby, *supra* note 9, at 9.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *See id.* at 12–13.

<sup>27</sup> Iinuma, *supra* note 12.

<sup>28</sup> *Id.*

<sup>29</sup> Papermaster, *supra* note 11.

<sup>30</sup> Crosby, *supra* note 9, at 11.

<sup>31</sup> Papermaster, *supra* note 11.

problem is also called “proof of work” because it functions as proof that the computer has “put enough resources [in] to solve [the] mathematical puzzle.”<sup>32</sup> The puzzle that the computer must solve is typically adjusted so that it takes a node in the network about ten minutes to generate a block.<sup>33</sup> The large number of computers overseeing every transaction adding to a chain eliminates the possibility of hacking the blockchain, and once information is added to the chain it cannot be changed without “invalidat[ing] the data in all blocks after it.”<sup>34</sup> “It is next to impossible for an attacker to introduce a fraudulent transaction since it has not only to generate a block by solving a mathematical puzzle, but it also has to race mathematically against the good nodes to generate all subsequent blocks in order to make the other nodes in the network accept its transaction and block as the valid one.”<sup>35</sup> The public and decentralized nature of the transaction record means that the only way to hack a blockchain is to own a substantial majority of the entire network, which is virtually impossible.<sup>36</sup> It is impossible to own a substantial majority of the entire network not only due to the immense number of nodes, but also because the network of nodes is not clustered in any particular area and can be spread throughout the world.<sup>37</sup> Finally, since blockchain is public and verified by the consensus of a large number of nodes, blockchain does not require any trust in a third-party intermediary or institution.<sup>38</sup>

Not only is blockchain highly resistant to being hacked, but it does not require trust in a third party that is custom with many technologies.<sup>39</sup> Technologies popular today that still require trust in third-party companies or hosts include “cloud file storage solutions such as Dropbox, Google Drive or One Drive.”<sup>40</sup> These storage solutions require people to trust companies with their data and storage, which raises privacy concerns.<sup>41</sup> The issue with these cloud file storage solutions is that there is no control mechanism to ensure the third party is securely handling private data like there is with blockchain.<sup>42</sup> Blockchain also eliminates previously required financial intermediaries in transactions on digital payment platforms such as PayPal and

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<sup>32</sup> Crosby, *supra* note 9, at 11.

<sup>33</sup> *Id.* at 12. Although it is possible for multiple blocks to be created at exactly the same time, it is unlikely. *Id.* Even if multiple blocks are created at the same time, the chain will stabilize quickly, and the nodes will agree on a solution due to the complexity of the math. *Id.* A “node” is a single computer of the many that communicate together and function as a network. These computers all work together to store blockchain records and record changes to the record. Morris, *supra* note 15. These computers function so that blockchain records are not stored on one computer or server but collectively on all the nodes. *Id.*

<sup>34</sup> Inuma, *supra* note 12.

<sup>35</sup> Crosby, *supra* note 9, at 12–13.

<sup>36</sup> Angela Guo, *Blockchain Receipts: Patentability and Admissibility in Court*, 16 CHI.-KENT J. INTELL. PROP. 440, 443 (2016). It is almost impossible to own a substantial majority of an entire network because the rapid increase in popularity of the technology is causing an increasing number of nodes and users to join the network. *Id.*

<sup>37</sup> *Id.*

<sup>38</sup> Inuma, *supra* note 12.

<sup>39</sup> Crosby, *supra* note 9, at 8.

<sup>40</sup> *Id.* at 15.

<sup>41</sup> *Id.*

<sup>42</sup> *See id.*

Venmo.<sup>43</sup> While these companies specialize in the transfers and transactions of digital currency, they still require trust to be placed into the hands of an institution.<sup>44</sup>

The resistance to hacking, public visibility, and security of the network all make blockchain a powerful and potentially lucrative technology that is capable of vastly improving many commonly used processes and applications.<sup>45</sup> The potential of blockchain has made applications implementing the technology attractive to businesses, which explains the “numerous start-ups working on them.”<sup>46</sup> Although the capabilities of blockchain applications are well understood, we are likely still a decade or more away from seeing blockchain’s true potential.<sup>47</sup> Despite the future improvements blockchain will inevitably see, the technology is already prevalent in applications across numerous industries.

### B. Current Applications of Blockchain

Digital currency was blockchain’s introduction to the world, but executives in a wide variety of industries are now finding ways to incorporate blockchain technology into their own businesses.<sup>48</sup> In a 2017 survey of 3,000 executives, 80% were using or looking into using blockchain as a part of their business.<sup>49</sup> In a separate survey, 28% of participants said that their companies were investing more than \$5 million dollars in blockchain technology.<sup>50</sup> Blockchain technology today is used for business records, healthcare records, financial transactions, and even smart contracts.<sup>51</sup> It is also likely to impact industry regulations, records and data sets, and the tracking and managing of products.<sup>52</sup> Looking into the future, blockchain should continue to see innovation improvement, “extend[ing] into everything from supply chains to provably fair internet dating,” and might be “as large as the original invention of the internet.”<sup>53</sup>

Following the elevated uses of blockchain technology is an increase in patent applications involving blockchain.<sup>54</sup> Currently, there is a major rush to file blockchain related patent applications. On January 2, 2018, a search for “blockchain technology” on the U.S. Patent and Trademark Office’s database returned sixteen patent

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<sup>43</sup> See Guo, *supra* note 36, at 443.

<sup>44</sup> See *id.*

<sup>45</sup> Crosby, *supra* note 9, at 15.

<sup>46</sup> *Id.* at 18.

<sup>47</sup> *Id.*

<sup>48</sup> Morris, *supra* note 15.

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> Papermaster, *supra* note 11; see also Jed Grant, *What Would A Blockchain Patent War Look Like?*, TECHCRUNCH (Sept. 11, 2018, 2:00 PM), <https://techcrunch.com/2018/09/11/what-would-a-blockchain-patent-war-look-like> (noting that smart contracts are “code that is shared across the whole blockchain to execute conditionally with irrefutable results,” which inserts the necessary pieces into a template like contract).

<sup>52</sup> Morris, *supra* note 15.

<sup>53</sup> Vinay Gupta, *A Brief History of Blockchain*, HARVARD BUS. REV. (Feb 28, 2017), <https://hbr.org/2017/02/a-brief-history-of-blockchain>.

<sup>54</sup> Chaudhry, *supra* note 2, at 22.

applications, and “blockchain” returned sixty patent applications.<sup>55</sup> Just a couple years later, a search for “blockchain technology” returned 450 patent applications,<sup>56</sup> and a search for “blockchain” returned 1319 patent applications.<sup>57</sup> This search indicates over a 2300% increase in patent applications involving some blockchain terminology in just two years.

For large companies, filing blockchain patents has the potential to be an incredibly useful and powerful tool, which may give them competitive advantages.<sup>58</sup> The realization of blockchain’s potential impact has created a race to file patents on specific blockchain uses and applications.<sup>59</sup> Patent applications have already been filed by some of the largest financial institutions and major technology companies, and many others companies are not far behind.<sup>60</sup> Banks such as Goldman Sachs, Bank of America, and Mastercard, have been the most high profile companies to apply for blockchain patent applications so far.<sup>61</sup>

It has been only eleven years since the unidentified Satoshi Nakamoto invented Bitcoin and simultaneously created blockchain technology, yet blockchain has already become one of the biggest innovative focuses for many companies.<sup>62</sup> Regardless of the innovation that blockchain technology provides companies, the issue of whether blockchain technology is patentable persists.

### C. Comparing Blockchain to Software

Before analyzing the subject matter eligibility test for patents, the relationship between software and blockchain must be considered. Although blockchain is typically viewed as a complex technological advancement, when the elements of blockchain and software are analyzed, it is evident that blockchain is just a type of software.<sup>63</sup>

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<sup>55</sup> *Id.*

<sup>56</sup> USPTO Patent Full-Text and Image Database, U.S. PAT. & TRADEMARK OFF., <http://patft.uspto.gov/netahtml/PTO/search-bool.html> (search in Term 1 for “blockchain technology”) (last visited Apr. 13, 2020).

<sup>57</sup> USPTO Patent Full-Text and Image Database, U.S. PAT. & TRADEMARK OFF., <http://patft.uspto.gov/netahtml/PTO/search-bool.html> (search in Term 1 for “blockchain”) (last visited Apr. 13, 2020).

<sup>58</sup> Marcella M. Bodner & Joseph B. Doll, *Patenting Blockchain Technology*, COLE SCHOTZ CORP. BLOG (Oct. 3, 2018), <https://www.cscorporateblog.com/2018/10/articles/crypto-currency/patenting-blockchain-technology/>.

<sup>59</sup> *Id.*

<sup>60</sup> Leslie Spencer & Marta Belcher, *Defensive Patenting Strategies for Blockchain Innovators*, LAW360 (Oct. 10, 2017, 2:03 PM), <https://www.law360.com/articles/968628/defensive-patenting-strategies-for-blockchain-innovators>. (noting that patent applications involving blockchain have been submitted by “major financial institutions like Bank of America, MasterCard, Visa, Goldman Sachs, U.S. Bank, American Express, Wells Fargo, and JPMorgan Chase, large technology companies like Amazon.com, Facebook, IBM, and Dell, and blockchain-focused startups like Coinbase, Coinlab, Chain and 21 Inc.”)

<sup>61</sup> Chaudhry, *supra* note 2, at 24.

<sup>62</sup> Morris, *supra* note 15.

<sup>63</sup> See *infra* text accompanying notes 15–47.

Software “is a set of instructions or programs instructing a computer to do specific tasks. Software is a generic term used to describe computer programs.”<sup>64</sup> Software is typically divided into three different categories: system software, programming software, and application software.<sup>65</sup> The type of software that is most useful relative to blockchain is application software. Application software is what most people are familiar with when they think of software.<sup>66</sup> It is a software that typically performs certain tasks and can be a single program or a group of programs working together.<sup>67</sup> “Examples of application software include office suites, gaming applications, database systems and educational software.”<sup>68</sup>

Blockchain technology is a type of application software because fundamentally it is used to perform certain tasks. As previously discussed, blockchain functions as an “append-only transaction ledger” that continually stores information.<sup>69</sup> This definition of blockchain fits squarely within the application software classification.<sup>70</sup> It is unnecessary to consider all of the possible uses of blockchain to compare it to software because the infrastructure of blockchain that allows it to function is its “distributed database of records.”<sup>71</sup> Even when considering blockchain beyond its core function as a transaction ledger, its various other uses suggest the technology is a type of software.<sup>72</sup>

Blockchain acts as a decentralized software that can replace various centralized software programs including digital content distribution systems and reputation systems.<sup>73</sup> A typical software for a digital content distribution system functions by receiving requests from users and determining the “usage policies based on the request.”<sup>74</sup> From there a transaction may occur to pay for a license, and then a license is transferred to the user through the Internet.<sup>75</sup> Acting exactly like a standard software, blockchain could complete the same transaction by cutting out the third-party provider and allowing the creator of the content to “control the distribution of their content themselves.”<sup>76</sup> Reputation systems are also typically run by centralized

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<sup>64</sup> *What is Software?*, TECHOPEDIA, <https://www.techopedia.com/definition/4356/software> (last visited Nov 21, 2018).

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

<sup>69</sup> Inuma, *supra* note 12.

<sup>70</sup> See *id.*; *What is Software?*, *supra* note 64.

<sup>71</sup> Crosby, *supra* note 9, at 6.

<sup>72</sup> See Millie Macdonald, Lisa Liu-Thorrold & Romain Julien, *The Blockchain: A Comparison of Platforms and Their Uses Beyond Bitcoin* (May 30, 2016) (unpublished paper, The University of Queensland) (on file with ResearchGate) (discussing various applications that typically run on software but can also function using blockchain).

<sup>73</sup> *What is Software?*, *supra* note 64 (“System software serves as a base for application software. System software includes device drivers, operating systems (OSs), compilers, disk formatters, text editors and utilities helping the computer to operate more efficiently.”).

<sup>74</sup> Macdonald, Liu-Thorrold & Julien, *supra* note 72.

<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

software, which is a problem because users do not typically understand how their reputation is determined.<sup>77</sup> If blockchain was used instead of a standard software, a reputation could be calculated just as easily, but also more transparently to the benefit of users.<sup>78</sup> Blockchain technology is software and the primary difference from classic software is in its decentralized nature.

### III. The Subject Matter Eligibility Test

The Supreme Court has frequently revisited the question of what subject matter is patentable. This is partly due to its inability to clearly interpret the broad statute governing eligible subject matter for patents and also advancements in technology.<sup>79</sup> The statute says that “[w]hoever 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 therefore, subject to the conditions and requirements of this title.”<sup>80</sup> The Supreme Court has determined that there are three types subject matter not eligible to be patented: “laws of nature, physical phenomena, and abstract ideas.”<sup>81</sup> Recently, the Supreme Court has laid out a two-part subject matter eligibility test to judge future claims on.<sup>82</sup> The two-step analysis determines (1) whether the claims are directed at a patent-ineligible concept, such as an abstract idea, and (2) whether the elements contain an “inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application.”<sup>83</sup> Before reaching the Court’s current position on subject matter eligibility in *Alice Corp.*, several important precedents paved the way. Starting in the 1970s, the Supreme Court began to craft what is now the current subject matter eligibility test for patents, and since then the test has been altered several times to arrive at the current structure of the test established in *Alice Corp.*

This Part discusses the direction the Supreme Court’s subject matter eligibility test has gone from the 1970s through present day. Section A analyzes early cases from the 1970s shaping the test and the Court’s early focus on computers not making patent ineligible ideas patent eligible. Section B focuses on more modern subject matter eligibility cases of the 2000s and the Courts inability to create a concrete test. Section C discusses the current test set forth in *Alice Corp.*, and Section D looks into the present impact that the *Alice Corp.* ruling has on subject matter eligibility cases.

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<sup>77</sup> *Id.* Reputation systems are used by e-commerce websites to show the trustworthiness of the seller or buyer before a transaction is made between them. *Id.* Typically, people will make transactions with people who have a better reputation, which can create problems when sellers try to improve their own reputation through forgery or attacks on competitors’ reputations. *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> 35 U.S.C. § 101; *see, e.g.*, *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014); *Mayo Collab. Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012); *Bilski v. Kappos*, 561 U.S. 593 (2010); *Diamond v. Diehr*, 450 U.S. 175, 187 (1981); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>80</sup> 35 U.S.C. § 101.

<sup>81</sup> *Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980). This Comment focuses mostly on the eligibility of abstract ideas.

<sup>82</sup> *Mayo*, 566 U.S. at 73.

<sup>83</sup> *Alice Corp.*, 134 S. Ct. at 2355, 2357.

### A. An Early Look at the Subject Matter Eligibility of Patents

Subject matter eligibility of patents was not a significant issue dealt with by the Supreme Court until the 1970s.<sup>84</sup> In *Gottschalk v. Benson* and *Parker v. Flook*, the Supreme Court held that a mathematical formula and an algorithm, respectively, were not eligible to be patented.<sup>85</sup> In both cases, the Court focused its holding on the concept that the use of a computer or similar device did not make a patent ineligible idea patent eligible.<sup>86</sup>

The patent application in *Benson* focused on a “method of programming a general-purpose digital computer to convert signals” from one form to another.<sup>87</sup> The Court reasoned that since the formula in the application did not have a substantial use without a digital computer, a patent on the application would effectively be a patent on the formula itself.<sup>88</sup> Here, the Court determined that a formula is patent ineligible because a formula is effectively an abstract idea, which cannot be patented.<sup>89</sup> Since the use of a program did not substantially make the application more than a bare use of the formula, the Court held that the application was not patentable subject matter.<sup>90</sup> While the Court acknowledged that there may be a need to extend patent laws to cover applications similar to this, it declined to delve further into a “policy matter to which [it is] not competent to speak.”<sup>91</sup>

However, the *Benson* decision has not been wholly accepted. One major critique of *Benson* is that the Supreme Court has “misrepresented the nature of algorithms” by claiming that the inventor simply discovered a pre-existing algorithm and used it in his invention.<sup>92</sup> The critique goes further to say the Court’s decision has “cast doubt on the availability of patent protection for software, since all software consists of retrieving numbers, storing numbers, and performing a limited set of simple arithmetic or logical functions on these numbers, regardless of how complex, sophisticated, or innovative the software is.”<sup>93</sup> The Court reasoned “that the

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<sup>84</sup> Timothy R. Holbrook & Mark D. Janis, *Patent-Eligible Processes: An Audience Perspective*, 17 VAND. J. ENT. & TECH. L. 349, 355 (2015).

<sup>85</sup> *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972); *Parker v. Flook*, 437 U.S. 584, 594 (1978).

<sup>86</sup> See *Flook*, 437 U.S. at 594; *Benson*, 409 U.S. at 71–72.

<sup>87</sup> *Benson*, 409 U.S. at 65.

The method sought to be patented varies the ordinary arithmetic steps a human would use by changing the order of the steps, changing the symbolism for writing the multiplier used in some steps, and by taking subtotals after each successive operation. The mathematical procedures can be carried out in existing computers long in use, no new machinery being necessary. And, as noted, they can also be performed without a computer.

*Id.* at 67.

<sup>88</sup> *Id.* at 71–72.

<sup>89</sup> *Id.* at 71.

<sup>90</sup> *Id.* at 71–72.

<sup>91</sup> *Id.* at 72.

<sup>92</sup> Rob Merges, *Symposium: Go Ask Alice — What Can You Patent After Alice v. CLS Bank?*, SCOTUSBLOG (June 20, 2014, 12:04 PM), <http://www.scotusblog.com/2014/06/symposium-go-ask-alice-what-can-you-patent-after-alice-v-clb-bank/>.

<sup>93</sup> Ognjen Zivojnovic, *PATENT LAW: Patentable Subject Matter After Alice—Distinguishing Narrow*

mathematical algorithm underlying the computer program was discovered rather than invented—it was a preexisting mathematical relationship which the ‘inventor’ merely harnessed for his patented invention.”<sup>94</sup> This holding possibly misunderstood algorithms because they are not something that can just be discovered, and this opinion by the Court creates early confusion about the subject matter eligibility standard.<sup>95</sup> Although the Supreme Court’s rationale in *Benson* has been questioned by other critics, the Court has not explicitly overruled *Benson*, and instead uses it as a guide in subject matter cases.<sup>96</sup>

Just a few years removed from *Benson*, the Supreme Court decided *Parker v. Flook* and restricted patentable subject matter further.<sup>97</sup> The patent application at issue in this case was a method for updating alarm limits via a three-step process.<sup>98</sup> The Court noted that just because a method is a process does not immediately mean it is patentable.<sup>99</sup> “The line between a patentable process and an unpatentable principle is not always clear,” and a process application may sometimes be no more than a flawed attempt to patent a purely abstract idea.<sup>100</sup> However, a process application that contains an algorithm or law of nature is not always unpatentable.<sup>101</sup> If the application contains an abstract idea, such as a mathematical formula, but also includes an “inventive concept” that builds upon the abstract idea, then the Court may find that the application is a patentable invention.<sup>102</sup> Guided by these principles, the Court determined that the application for updating alarm limits was not a patentable invention because the process in the application was well known and “[r]espondent’s application simply provide[d] a new and presumably better method for calculating alarm limit values.”<sup>103</sup> Although the Court relied on several opinions written before computers were used to run programs,<sup>104</sup> its opinion was “driven by concerns that a competent draftsman should not be able to transform a patent-ineligible abstract idea into a patent-eligible application by appending conventional or obvious post-solution activity (i.e., additional physical steps taken after a mathematical expression is

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*Software Patents from Overly Broad Business Method Patents*, 30 BERKELEY TECH. L.J. 807, 811 (2015).

<sup>94</sup> Merges, *supra* note 92.

<sup>95</sup> *Id.*

<sup>96</sup> See, e.g., *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2357 (2014); *Bilski v. Kappos*, 561 U.S. 593, 609 (2010).

<sup>97</sup> *Parker v. Flook*, 437 U.S. 584, 594 (1978).

<sup>98</sup> *Flook*, 437 U.S. at 585. An alarm limit signals the presence of an abnormal condition that could pose a danger or an inefficiency. *Id.* The three steps process involves (1) measuring the present value of the variable; (2) using an algorithm to calculate the new alarm limit; and (3) adjusting the alarm limit to the new value. *Id.* The only difference from traditional alarm limit methods is the algorithm used in step two. *Id.*

<sup>99</sup> See *Gottschalk v. Benson*, 409 U.S. 63, 68 (1972) (holding that the process claim at issue was too broad and not patentable).

<sup>100</sup> *Flook*, 437 U.S. at 589.

<sup>101</sup> *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939) (cited in *Flook*, 437 U.S. at 590–91).

<sup>102</sup> *Flook*, 437 U.S. at 594.

<sup>103</sup> *Id.* at 594–95.

<sup>104</sup> *Id.* at 595.

solved).<sup>105</sup> The Court proceeded cautiously with this opinion because it did not want to allow a previously understood method to be patentable simply because it was carried out on a computer.<sup>106</sup>

Somewhat contrary to the decisions in *Benson* and *Flook* was the Supreme Court decision in *Diamond v. Chakrabarty*.<sup>107</sup> Although the decision in *Chakrabarty* focused more on the general patentability of subject matter than on the patentability of processes, the Supreme Court took a very expansive view of eligible subject matter.<sup>108</sup> The patent application at issue in *Chakrabarty* was the invention of a human-made bacteria.<sup>109</sup> The Court held that the created microorganism was patentable subject matter because it was a “nonnaturally occurring manufacture or composition of matter—a product of human ingenuity.”<sup>110</sup> Although this appears to be an expansive view of eligible subject matter, the Court tried not to contradict prior precedent, specifically *Flook*, which ultimately created more confusion.<sup>111</sup>

Just when it looked as if that the Supreme Court was focused on preventing patents on algorithms and mathematical equations implemented on computers, the Court appeared to shift its opinion in *Diamond v. Diehr*.<sup>112</sup> At issue in this case was an application for a process to mold rubber into specific products.<sup>113</sup> The Court held that the application was not an attempt to patent a mathematical formula but an attempt to patent a “process of curing synthetic rubber.”<sup>114</sup> In this process there was clear use of a formula, but the Court reasoned that the application did not prevent others from using the formula.<sup>115</sup> Instead, “[the applicants sought] only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process.”<sup>116</sup> The Court in *Diehr* focused not on the fact that formulas and

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<sup>105</sup> *Zivojnovic*, *supra* note 93, at 813 (quoting *Flook*, 437 U.S. at 590).

<sup>106</sup> *Id.*

<sup>107</sup> *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

<sup>108</sup> *Id.* at 309.

<sup>109</sup> *Id.* at 305–06.

<sup>110</sup> *Id.* at 309.

<sup>111</sup> *Id.* at 315.

Nothing in *Flook* is to the contrary. That case applied our prior precedents to determine that a “claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101.” The Court carefully scrutinized the claim at issue to determine whether it was precluded from patent protection under “the principles underlying the prohibition against patents for ‘ideas’ or phenomena of nature.” We have done that here. *Flook* did not announce a new principle that inventions in areas not contemplated by Congress when the patent laws were enacted are unpatentable per se.

*Id.* (citations omitted).

<sup>112</sup> *Diamond v. Diehr*, 450 U.S. 175, 177 (1981).

<sup>113</sup> *Id.* The process accurately and consistently shaped the rubber by using a formula to determine the necessary time and temperature, something that respondents claimed had not been able to previously be accomplished. *Id.* at 177–78.

<sup>114</sup> *Id.* at 191. “Respondents characterize their contribution to the art to reside in the process of constantly measuring the actual temperature inside the mold.” *Id.* at 178.

<sup>115</sup> *Id.* at 187.

<sup>116</sup> *Id.* at 187.

These include installing rubber in a press, closing the mold, constantly determining the temperature of

computer programs are used in the application, but instead looked at the entire claim and determined that the application went beyond “seeking patent protection for [a] formula in the abstract.”<sup>117</sup>

*Diehr* set the standard for patentable processes using mathematical formulas because the Court said that a “process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing),” is patentable subject matter.<sup>118</sup> Although this suggested that applications for processes using mathematical formulas should be analyzed wholly, it left open for interpretation how much of the process can strictly be a formula before it becomes unpatentable subject matter.<sup>119</sup> After the Court’s opinion in *Diehr* created more confusion, the Supreme Court did not address the issue again for nearly thirty years.

#### B. A More Modern Look at Subject Matter Eligibility

The Supreme Court returned to the question of subject matter eligibility in full force with its 2010 decision in *Bilski v. Kappos*.<sup>120</sup> In the thirty years since *Diehr* was decided, the technological landscape changed dramatically, and thus the question of whether innovation via software and various other forms of technology created patentable subject matter again needed to be considered.<sup>121</sup> Neither *Bilski* nor *Mayo Collaborative Services, v. Prometheus Labs Inc.* “categorically excluded software innovation from the patent system, [but] the two cases in effect rendered the validity of most software patents uncertain.”<sup>122</sup>

Prior to *Bilski*, the Federal Circuit Court of Appeals determined in *State Street Bank & Trust Co. v. Signature Financial Group* that the test for whether a claim is patentable rests on whether it is a “practical application of an abstract idea . . . because it produced a useful, concrete or tangible thing.”<sup>123</sup> Under this test, the court determined that the patent claim at issue for a data processing system that managed mutual funds<sup>124</sup> produced “a useful, concrete and tangible result” by

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the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time. Obviously, one does not need a “computer” to cure natural or synthetic rubber, but if the computer use incorporated in the process patent significantly lessens the possibility of “overcuring” or “undercuring,” the process as a whole does not thereby become unpatentable subject matter.

*Id.*

<sup>117</sup> *Id.* at 191.

<sup>118</sup> *Id.* at 192.

<sup>119</sup> *Id.* at 187.

<sup>120</sup> *Bilski v. Kappos*, 561 U.S. 593 (2010).

<sup>121</sup> *Id.*; *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012).

<sup>122</sup> *Zivojnovic*, *supra* note 93, at 816.

<sup>123</sup> *State St. Bank & Tr. Co. v. Signature Fin. Grp.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998).

<sup>124</sup> *Id.* at 1370.

The ‘056 patent is generally directed to a data processing system (the system) for implementing an investment structure which was developed for use in Signature’s business as an administrator and accounting agent for mutual funds. In essence, the system . . . facilitates a structure whereby mutual funds (Spokes) pool their assets in an investment portfolio (Hub) organized as a partnership.

expressing “numbers, such as price, profit, percentage, cost, or loss.”<sup>125</sup> However, the *State Street Bank* test did not last as the Federal Circuit subject matter eligibility test for long.<sup>126</sup> Within a decade, there was a revival of the machine-or-transformation test from *Diehr* and a rejection of the test outlined in *State Street Bank* as inadequate.<sup>127</sup> While the “useful, concrete and tangible result” test from *State Street Bank* may often be helpful to determine if a claim is directed at a “fundamental principle or a practical application of such a principle,” it is alone an insufficient test to determine the patent eligibility of a claim.<sup>128</sup>

Following the Federal Circuit’s string of consistency in applying of the machine-or-transformation test, the Supreme Court yet again changed course and rejected the machine-or-transformation test as capable of determine patentable subject matter.<sup>129</sup> In *Bilski*, the application in question involved a procedure for telling buyers and sellers how to protect themselves from the risk of drastic price changes in a particular portion of the economy.<sup>130</sup> The Federal Circuit had already affirmed that the application “merely manipulate[d] [an] abstract idea and solve[d] a purely mathematical problem without any limitation to a practical application,” and was thus unpatentable subject matter.<sup>131</sup> It had used the machine-or-transformation test,<sup>132</sup> which the Supreme Court held could not be the sole test for determining what is a process.<sup>133</sup> After concluding that the machine-or-transformation test is useful but not dispositive of patentable subject matter, the Supreme Court made clear that business methods can be patentable unless they clearly attempt to patent abstract ideas.<sup>134</sup>

The Supreme Court’s ultimate decision looked to *Benson*, *Flook*, and *Diehr* for support.<sup>135</sup> “Hedging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class,” and this is as unpatentable of an abstract idea as an algorithm.<sup>136</sup> The Court followed its previous decisions in *Benson* and *Flook*, and reaffirmed the strong limitations on patents of abstract ideas enhanced with software.<sup>137</sup> Following *Bilski*, the Supreme Court only further

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*Id.*

<sup>125</sup> *Id.* at 1375.

<sup>126</sup> *Holbrook & Janis*, *supra* note 84, at 356 n.28 (first citing *In re Comiskey*, 499 F.3d 1365 (Fed. Cir. 2007), *revised and superseded by* 554 F.3d 967 (Fed. Cir. 2009); and then citing *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007); and then citing *In re Bilski*, 545 F.3d 943, 954 (2010)).

<sup>127</sup> *In re Bilski*, 545 F.3d at 959–60; *In re Comiskey*, 554 F.3d at 978–80.

<sup>128</sup> *In re Bilski*, 545 F.3d at 959.

<sup>129</sup> *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

<sup>130</sup> *Id.* at 599.

<sup>131</sup> *Id.* at 599–600.

<sup>132</sup> *In re Bilski*, 545 F.3d at 954. The machine-or-transformation test says that an invention is a process only if: “(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.” *Id.*

<sup>133</sup> *Bilski*, 561 U.S. at 602 (noting that the machine-or-transformation test was still a useful tool to help determine what is a process).

<sup>134</sup> *Id.* at 608–09.

<sup>135</sup> *Id.* at 609.

<sup>136</sup> *Id.* at 611.

<sup>137</sup> *Zivojnovic*, *supra* note 93, at 817–18.

restricted patent eligibility in *Mayo*.<sup>138</sup>

The Court's holding in *Mayo* had very similar reasoning to that in *Bilski*. Although its decision was less about software and focused more on the patent eligibility of applications using natural law, the Court's reasoning provided further clarification on subject matter eligibility of abstract concepts.<sup>139</sup> Not only did the patent claims for drugs that intended to treat autoimmune diseases and avoid harmful side effects involve the use of natural laws, but they also included well-known activity that previous researchers had engaged in.<sup>140</sup> The question the Court asked in *Mayo* was “whether the claims d[id] significantly more than describe these natural relations. To put the matter more precisely, d[id] the patent claims add enough to their statements of the correlations to allow the processes they describe to qualify as patent eligible processes that apply natural law?”<sup>141</sup> The Court answered this question in the negative.<sup>142</sup>

The Court looked at these claims as ones that “inform a relevant audience about certain laws of nature; any additional steps consist of well understood, routine, conventional activity already engaged in by the scientific community; and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately.”<sup>143</sup> After squaring its decision with those in *Diehr* and *Flook*,<sup>144</sup> the Court determined that “the claim before [it] present[ed] a case for patentability that [was] weaker than the (patent-eligible) claim in *Diehr* and no stronger than the (unpatentable) claim in *Flook*.”<sup>145</sup> The instructions in the claim did not add anything significant to the law of nature, and they were steps that must be taken to make use of the law.<sup>146</sup> The Court was worried that there was a potential for “patent law [to] inhibit further discovery by improperly tying up the future use of laws of nature,” and to prevent this concern from becoming a reality, the Court held in *Mayo* the same way it did in *Bilski*.<sup>147</sup>

Although *Mayo* was narrowly decided about a law of nature and was not immediately identified as impacting software patent eligibility, the framework from *Mayo* was later adopted in *Alice Corp.*<sup>148</sup> The uncertainty surrounding whether “software executed by a physical computer [was] patent-eligible”<sup>149</sup> was clarified because *Alice Corp.* harmonized the eligibility rules and established the framework for the subject matter eligibility test as a whole.

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<sup>138</sup> *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012).

<sup>139</sup> *Id.* at 72.

<sup>140</sup> *Id.* at 73.

<sup>141</sup> *Id.* at 77.

<sup>142</sup> *Id.* at 73.

<sup>143</sup> *Id.* at 79–80.

<sup>144</sup> *Id.* at 80–83.

<sup>145</sup> *Id.* at 82.

<sup>146</sup> *Id.* at 79.

<sup>147</sup> *Id.* at 85.

<sup>148</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014).

<sup>149</sup> *Zivojnovic*, *supra* note 93, at 819.

### C. The Current Standard for Subject Matter Eligibility—*Alice Corp.*

“We hold that the claims at issue are drawn to the abstract idea of intermediated settlement, and that merely requiring generic computer implementation fails to transform [the] abstract idea into a patent-eligible invention.”<sup>150</sup> At first glance, this holding seems similar to those in *Bilski*, *Mayo*, and many of the previous cases decided by the Supreme Court, and it is. However, *Alice Corp.* added much needed clarity to the uncertainty surrounding the subject matter eligibility test. *Alice Corp.* focused on clearly establishing the two-step framework set forth in *Mayo*<sup>151</sup>, which helped create consistency in determining whether claims involving laws of nature, natural phenomena, and abstract ideas are patent eligible.

Before analyzing the specific claims of *Alice Corp.*, it is important to consider the two-step framework set forth in *Mayo* and *Alice Corp.* The first step is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts,” including laws of nature, natural phenomena, and abstract ideas.<sup>152</sup> If the claims are directed at a patent ineligible concept, then the courts must move to step two. Step two of the test assesses whether the claim has an “inventive concept,”<sup>153</sup> which can be an element that is “sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”<sup>154</sup>

In *Alice Corp.*, the claim at issue was a computerized method to “mitigate settlement risk,” and “facilitate the exchange of financial obligations between two parties by using a computer system as a third-party intermediary.”<sup>155</sup> Under the first step of the subject matter eligibility test, it was determined that this patent draws upon a patent ineligible concept because the “claims are drawn to the abstract idea of intermediated settlement.”<sup>156</sup> The idea of an intermediated settlement is a fundamental economic concept, and thus an abstract idea.<sup>157</sup> Since the first step of the test was answered affirmatively, the Court moved to the second step. The second step of the subject matter eligibility test required the Court to consider whether the elements of the claim contained an “inventive concept” that transformed the abstract

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<sup>150</sup> *Alice Corp.*, 134 S. Ct. at 2352.

<sup>151</sup> *See id.* at 2355.

<sup>152</sup> *Id.* (citing *Mayo*, 566 U.S. at 72).

<sup>153</sup> *Id.* at 2357.

<sup>154</sup> *Id.* at 2355 (quoting *Mayo*, 566 U.S. at 73).

<sup>155</sup> *Id.* at 2352.

The intermediary creates “shadow” credit and debit records (i.e., account ledgers) that mirror the balances in the parties’ real-world accounts at “exchange institutions” (e.g., banks). The intermediary updates the shadow records in real time as transactions are entered, allowing “only those transactions for which the parties’ updated shadow records indicate sufficient resources to satisfy their mutual obligations.” At the end of the day, the intermediary instructs the relevant financial institutions to carry out the “permitted” transactions in accordance with the updated shadow records, thus mitigating the risk that only one party will perform the agreed-upon exchange.

*Id.* (citations omitted).

<sup>156</sup> *Id.* at 2355.

<sup>157</sup> *Id.* at 2356.

idea into something patent eligible.<sup>158</sup> For a claim with an abstract idea to be patent eligible, “*Mayo* made clear that transformation into a patent-eligible application requires ‘more than simply stat[ing] the [abstract idea] while adding the words apply it.’”<sup>159</sup> Also, use of a computer did not change the analysis of the claim.<sup>160</sup> The Court determined that the claim did no more than “instruct the practitioner to implement the abstract idea of intermediated settlement on a generic computer,” and thus was not patentable subject matter.<sup>161</sup> Here, the computer was used to “create and maintain shadow accounts,” which is just recordkeeping, a basic function of a computer.<sup>162</sup> Ultimately, the claim at issue in *Alice Corp.* tried to implement an abstract idea via a computer, and the Court determined that was unpatentable subject matter.

In *Alice Corp.*, the focus of the Court was on the use of the computer in the claim. The Court determined that the use of a computer in an ordinary manner did not add anything to an abstract idea that was “not already present when the steps are considered separately.”<sup>163</sup> This definitive holding by the Court laid the foundation that claims using software or computers will be closely scrutinized, and such claims will only be patent eligible if using a computer makes the abstract idea a truly inventive concept.<sup>164</sup>

#### D. The Present Impact of *Alice Corp.*

While it may appear that *Alice Corp.* only extend the principles established in previous subject matter eligibility cases, many see *Alice Corp.* as a landmark case due to its immediate and continuing impact.<sup>165</sup> In the seven months following *Alice Corp.*, there were “over one hundred patents that [were] invalidated for claiming ineligible subject matter, more than the total number of patents invalidated under Section 101 in the past five years.”<sup>166</sup> Lower courts have pushed back against *Alice Corp.*, claiming that any patent can be seen as abstract if looked at “from far enough away.”<sup>167</sup> After *Alice Corp.*, a subject matter eligibility analysis became fairly subjective and based primarily on the patent claims and the court’s own knowledge of the specific claims.<sup>168</sup> Although *Alice Corp.* has restricted eligible subject matter for patents and placed a great burden on software patents, *Alice Corp.* has not killed

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<sup>158</sup> *Id.* at 2357.

<sup>159</sup> *Id.* (quoting *Mayo*, 566 U.S. at 72).

<sup>160</sup> *Id.* at 2357.

<sup>161</sup> *Id.* at 2359.

<sup>162</sup> *Id.*

<sup>163</sup> *Id.*

<sup>164</sup> *See id.* at 2355.

<sup>165</sup> *See generally* Daniel Taylor, *Comment: Down the Rabbit Hole: Who Will Stand Up for Software Patents After Alice*, 68 ME. L. REV. 217, 247 (2016) (discussing the immense impact of *Alice Corp.* on the patent landscape).

<sup>166</sup> *Id.* (quoting Robert R. Sachs, *Twenty-Two Ways Congress Can Save Section 101*, BILSKIBLOG (Feb. 12, 2015), <http://www.bilskiblog.com/blog/2015/02/twenty-two-ways-congress-can-save-section-101.html>).

<sup>167</sup> *Messaging Gateway Solutions LLC v. Amdocs Inc.*, No. 14-732-RGA, 2015 U.S. Dist. LEXIS 49408, at \*16 (D. Del. Apr. 15, 2015).

<sup>168</sup> Taylor, *supra* note 165, at 250.

patents on software entirely.<sup>169</sup>

In Judge Moore's partial dissent to the Federal Circuit's en banc decision in *CLS Bank International v. Alice Corp.*, she claimed "death to hundreds of thousands of patents, including all business method, financial system, and software patents," would result from the court's decision.<sup>170</sup> Judge Moore may have been hyperbolic, but *Alice Corp.* will have a lasting and important impact on the patenting of applications involving software.<sup>171</sup> While many fear for the future of software patents as a whole, they are not per se ineligible subject matter.<sup>172</sup> Instead, every claim must be looked at under the two-step analysis that *Alice Corp.* has set forth to determine if the claims containing an abstract idea lack the requisite "inventive concept" and are patent ineligible.<sup>173</sup>

Although the Supreme Court firmly established the two-part subject matter eligibility test in *Alice Corp.*, there is relative flexibility built into the test for patent examiners or the courts to conclude that a claim is either subject matter eligible or ineligible to be patented.<sup>174</sup> The courts "are given considerable flexibility in characterizing the claim or otherwise identifying the 'gist' of the invention."<sup>175</sup> However, if the claim is related to an abstract idea, there is a difficult evidentiary burden placed on the applicant to prove that the claim advances the abstract idea or has a sufficiently "inventive concept."<sup>176</sup> Part of the challenge an applicant faces with proving that there is "significantly more than the abstract idea" in their claim is that many of these applications are complex and not fully understood by those applying the subject matter eligibility test.<sup>177</sup>

As evidenced by recent Federal Circuit decisions, determinations of subject matter eligibility for similar claims might not reach the same conclusion on patent eligibility.<sup>178</sup> For example, in *Research Corp. Technologies v. Microsoft Corp.*, the Federal Circuit found the claim of digital image halftoning, which "allows computers to present many shades and color tones with a limited number of pixel colors," patentable subject matter.<sup>179</sup> Although this decision was reached before the *Alice Corp.* decision, the court still analyzed whether the claims were directed at a law of

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<sup>169</sup> See generally James E. Daily, *Alice's Aftermath: Changes in Patentee Behavior since Alice v. CLS Bank*, 23 B.U. J. SCI. & TECH. L. 284, 302 (2017) (analyzing the significance of *Alice Corp.* and the impact it has had on patents).

<sup>170</sup> *CLS Bank Int'l v. Alice Corp.*, 717 F.3d 1269, 1313 (Fed. Cir. 2013) (en banc) (Moore, J., dissenting in part).

<sup>171</sup> Daily, *supra* note 169, at 302.

<sup>172</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355, 2357 (2014).

<sup>173</sup> *Id.*

<sup>174</sup> Ben Dugan, *Draft: Estimating the Impact of Alice v. CLS Bank Based on a Statistical Analysis of Patent Office Subject Matter Rejections* 11 (Feb. 23, 2016) (unpublished manuscript) (on file with SSRN).

<sup>175</sup> *Id.* at 11.

<sup>176</sup> *Id.*

<sup>177</sup> *Id.*

<sup>178</sup> *Id.* at 6–11.

<sup>179</sup> 627 F.3d 859, 863, 868 (Fed. Cir. 2010).

nature, natural phenomena, or abstract idea.<sup>180</sup> The court determined that there was nothing abstract in the subject matter and thus it was a patent eligible claim because the invention was a “functional and palpable application of computer technology,” and the algorithms used did not make the invention abstract.<sup>181</sup> In a similar case that was decided after *Alice Corp., Digitech Image Technologies, LLC v. Electronics for Imaging, Inc.*,<sup>182</sup> the Federal Circuit determined that a digital imaging claim was an abstract idea.<sup>183</sup> The claim at issue was a “method of generating a device profile that describes properties of a device in a digital image reproduction system for securing, transforming or rendering an image.”<sup>184</sup> Here, the court found the claim to be abstract because it used “mathematical algorithms to manipulate existing information to generate additional information.”<sup>185</sup> The logic in reaching different conclusions in these cases is difficult to square since neither of the “claims include any substantial physical limitations that tie the claimed inventions to a specific machine or application,” although it is possible that *Research Corp.* could have been decided differently post-*Alice Corp.*<sup>186</sup> Regardless, the difference in outcomes highlights the difficulties of using *Alice Corp.* as a standard because of the flexibility it offers in determining whether a claim is patent eligible.<sup>187</sup> Even though *Alice Corp.* created a more detailed test for the courts to follow than what they previously had to rely on, the difficulties of determining patent eligible subject matter have remained—as have the inconsistencies of the courts.

Maintaining consistency when determining the subject matter eligibility of highly complex technological advances has been difficult, and there have been several other occasions where the courts have come to seemingly contradictory conclusions on the eligibility of claims.<sup>188</sup> In *Ultramercial Inc. v. Hulu, LLC*, the patent at issue was one for a method of distributing copyrighted media via the Internet after viewing an advertisement.<sup>189</sup> The “concept embodied by the majority of the limitations [in these claims] describes only the abstract idea of showing an advertisement before delivering free content” and are implemented by “conventional activity.”<sup>190</sup> Although the claims at issue in *Ultramercial* were determined to be subject matter ineligible to be patented under the *Alice Corp.* test, the Federal Circuit found similar claims in *DDR Holdings, LLC v. Hotels.com, L.P.* eligible to be patented.<sup>191</sup> The patent claim at issue in *DDR Holdings* related to an e-commerce system that focused “on a ‘scalable computer architecture’ to serve ‘dynamically

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<sup>180</sup> Dugan, *supra* note 174, at 9–10.

<sup>181</sup> *Research Corp. Techs.*, 627 F.3d at 868–69.

<sup>182</sup> *Digitech Image Techs., LLC v. Electronics for Imaging, Inc.* 758 F.3d 1344 (Fed. Cir. 2014).

<sup>183</sup> Dugan, *supra* note 174, at 10.

<sup>184</sup> *Digitech Image Techs.*, 738 F.3d at 1351.

<sup>185</sup> *Id.* at 1350.

<sup>186</sup> Dugan, *supra* note 174.

<sup>187</sup> *Id.*

<sup>188</sup> *See, e.g., Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709 (Fed. Cir. 2014); *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014).

<sup>189</sup> *Ultramercial*, 772 F.3d at 712.

<sup>190</sup> *Id.* at 715–16.

<sup>191</sup> *DDR Holdings*, 773 F.3d at 1259.

constructed [web] pages' associated with multiple host website and merchant pairs."<sup>192</sup> The Federal Circuit noted that the claim was similar to the claim in *Ultramercial* because both claims dealt with the use of the Internet to perform a business practice; however, the court differentiated the claim enough to justify it as patentable subject matter.<sup>193</sup> The difference, the court explained, is in the specification of how the use of the Internet was manipulated rather than "operating in its normal, expected manner by sending the website visitor to the third-party website that appears to be connected with the clicked advertisement."<sup>194</sup> The different outcomes that these two cases reached is not uncommon in the Federal Circuit post-*Alice Corp.*, and it provides added difficulty in predicting what will happen in future subject matter eligibility cases.<sup>195</sup>

While often claims are clearly "patent-ineligible ideas [that] are plainly identifiable and divisible from the generic computer limitations recited," there are many claims where it is unclear how the courts will decide subject matter eligibility due to various reasons, including the complexity of the claims.<sup>196</sup> To determine the patentability of blockchain technology, it must be further analyzed whether blockchain is clearly a patent ineligible idea or if it is a concept that the courts feel they have flexibility under the *Alice Corp.* test to determine patent eligibility on a case by case basis. Seemingly, blockchain technology falls into both categories.

#### **IV. Applying *Alice Corp.* To Blockchain Technology**

*Alice Corp.* provided a relatively clear subject matter eligibility test to apply to software claims, but it did not specifically analyze the eligibility of blockchain claims. Without a Supreme Court opinion, or any court opinion, on the subject matter eligibility of blockchain to use as guidance, the focus is on equating software and blockchain, so that the *Alice Corp.* test can also guide subject matter eligibility decisions for blockchain.<sup>197</sup> Effectively, blockchain is a decentralized software that can be used similarly to any application software.<sup>198</sup> Once blockchain is broken down to its most basic components, it is easy to compare blockchain to software and then apply *Alice Corp.* to blockchain patent claims.

This Part analyzes blockchain under the *Alice Corp.* test and discusses how the courts should consider the subject matter eligibility of blockchain claims. Section A focuses on blockchain more generally and evaluates whether blockchain can ever be subject matter eligible to be patented. Section B considers more specific examples of blockchain and applies *Alice Corp.* directly to various blockchain patent claims, which have already been accepted by the USPTO. Finally, Section C concentrates on the USPTO's recently published 2019 Revised Subject Matter Eligibility Guidelines

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<sup>192</sup> *Id.* at 1249 (citations omitted).

<sup>193</sup> *Id.* at 1259.

<sup>194</sup> *Id.*

<sup>195</sup> Dugan, *supra* note 174, at 11.

<sup>196</sup> *DDR Holdings*, 773 F.3d at 1256.

<sup>197</sup> See *infra* notes 63–78 and accompanying text.

<sup>198</sup> Iinuma, *supra* note 12.

and how they may affect a subject matter eligibility analysis for blockchain.

#### A. General Analysis of the Subject Matter Eligibility of Blockchain Technology Under the *Alice Corp.* Test

The subject matter eligibility of blockchain technology needs to be considered generally before specific examples of patents applications with claims using blockchain technology can be analyzed. The first step in the *Alice Corp.* framework is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts,” including laws of nature, natural phenomena, and abstract ideas.<sup>199</sup> The most logical place to start in determining whether a blockchain claim is directed at a patent ineligible concept, is with *Benson* and *Flook*.<sup>200</sup> In *Benson*, an “algorithm for converting binary-coded decimal numbers into pure binary form” was considered an abstract idea.<sup>201</sup> In *Flook*, “the mathematical formula for computing ‘alarm limits’ in a catalytic conversion process” was also considered an abstract idea.<sup>202</sup> Similar to both of these, patenting a claim involving blockchain technology will certainly be “directed to an abstract idea” because of the algorithm like nature of blockchain.<sup>203</sup> Blockchain’s use of a decentralized network to create a public record of transactions makes blockchain an algorithm, regardless of how complex it is.<sup>204</sup> Not only is an entire blockchain one large algorithm, but the creation and addition of each new block to the chain requires a node to use a large amount of computing power to “solve” a special mathematical equation.<sup>205</sup> Solving the algorithm to add a block to the chain is part of the larger algorithm that operates the entire blockchain.<sup>206</sup> Since getting a patent on a claim using blockchain technology will likely be considered a patent on an abstract idea, the claims should be analyzed under the second step of the *Alice Corp.* framework.<sup>207</sup>

Step two of the *Alice Corp.* test is to determine whether the claim has an “inventive concept,”<sup>208</sup> which is concept or element that is “sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”<sup>209</sup> Under this step of the *Alice Corp.* test, it is not as clear whether blockchain claims have a sufficiently inventive concept and the analysis will provide less certain results than step one.<sup>210</sup> While any patent involving blockchain technology will likely meet the first step of the *Alice Corp.* framework regardless of

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<sup>199</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72 (2012)).

<sup>200</sup> Chaudhry, *supra* note 2, at 23.

<sup>201</sup> *Id.*

<sup>202</sup> *Id.*

<sup>203</sup> *Id.*

<sup>204</sup> *Id.*

<sup>205</sup> Crosby, *supra* note 9, at 12.

<sup>206</sup> *See id.* at 13 (noting that once the smaller algorithm is complete, the node “broadcasts the block to the rest of the network,” which allows the chain of transactions to grow).

<sup>207</sup> Chaudhry, *supra* note 2, at 23.

<sup>208</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2357 (2014).

<sup>209</sup> *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012).

<sup>210</sup> Chaudhry, *supra* note 2, at 23.

how the blockchain technology is used,<sup>211</sup> the second step of the analysis requires more interpretation into the specific use of the technology and whether significant improvements are made.<sup>212</sup> Many applications for blockchain technology simply use blockchain for its general function as a decentralized network that records transactions and do not use it as an “inventive concept” that sufficiently transforms the abstract claim.<sup>213</sup> However, some believe that the technology alone goes beyond “taking already existing human activities and merely digitizing them via software to run on a generic computer,” and thus satisfies the second step of the *Alice Corp.* framework.<sup>214</sup> The fault in this line of thinking is that blockchain technology is already becoming a well-understood technological advancement as it becomes increasingly older and more frequently used.<sup>215</sup> For a claim using blockchain to be subject matter eligible to be patented, it must make significant improvements beyond merely using the technology to improve a process commonly known.<sup>216</sup>

#### B. Analysis of Blockchain Patents Under the *Alice Corp.* Framework

Determining whether blockchain technology is significantly inventive enough to pass the second step of *Alice Corp.* cannot be done by looking at blockchain generally, but instead requires an analysis of specific claims involving blockchain technology. Like software patent claims, there will be many blockchain patent claims that are more obviously patent ineligible subject matter, while there will be some that are much more difficult to evaluate.<sup>217</sup> Since several major companies have begun filing patent applications involving blockchain technology, there are plenty of available patent applications to use in analyzing whether different types of claims are patent eligible subject matter.<sup>218</sup> The following blockchain claims are all claims from current patents; however, even though they initially passed the subject matter eligibility test, does not mean that when analyzed in greater detail that they actually meet the criteria of patentable subject matter.<sup>219</sup>

The first sample patent claim to consider comes from Accenture Global

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<sup>211</sup> *Id.*

<sup>212</sup> Richard A. Catalina Jr., *Patentability of Blockchain and Distributed Ledger Technology*, LEGAL INTELLIGENCER (Mar. 29, 2018, 4:04 PM), <https://www.law.com/thelegalintelligencer/2018/03/29/patentability-of-blockchain-and-distributed-ledger-technology/?slreturn=2018102116222>.

<sup>213</sup> Chaudhry, *supra* note 2, at 23.

<sup>214</sup> Catalina Jr., *supra* note 212.

<sup>215</sup> See Chaudhry, *supra* note 2, at 23 (“The algorithm behind the blockchain technology is already ‘well known in the art,’ given Satoshi Nakamoto’s paper and the innumerable papers that followed which explain blockchain technology.”); Bodner & Doll, *supra* note 58 (“The blockchain technology originally used to code the Bitcoin blockchain is not patentable because it is not actually ‘new.’”).

<sup>216</sup> See *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2357 (2014).

<sup>217</sup> See *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1256 (Fed. Cir. 2014).

<sup>218</sup> USPTO Patent Full-Text and Image Database, U.S. PAT. & TRADEMARK OFF., <http://patft.uspto.gov/netahhtml/PTO/search-bool.html> (search in Term 1 for “blockchain”) (last visited Apr. 13, 2020).

<sup>219</sup> See, e.g., U.S. Patent No. 10,115,068 (issued Oct. 30, 2018); U.S. Patent No. 10,122,661 (issued Nov. 6, 2018); U.S. Patent No. 10,135,834 (issued Nov 20, 2018) (valid patents involving blockchain).

Solutions Limited Patent No. 10,115,068.<sup>220</sup> This patent generally focuses on a device that performs an analysis on products that are shipped by comparing the information that is collected with information that is stored on a blockchain, so that the product can be verified by its product attributes.<sup>221</sup> The claims for this invention focus on the method of using blockchain to verify the attributes of the item that is shipped.<sup>222</sup> If this patent claim is analyzed under the *Alice Corp.* framework, the patent is likely directed at an abstract idea because it is a standard method for comparing information pulled from an item to a record of information, which happens to be information within a blockchain.<sup>223</sup> Similar to *Benson*, which focused on a “method of programming a general-purpose digital computer to convert signals from binary-coded decimal form into pure binary form,”<sup>224</sup> the claim in Patent No. 10,115,068 focuses on a method of programming a device to read attributes of an item and compare them to a blockchain record.<sup>225</sup> Since this claim is directed at a conventional method of comparing attributes from an item with the attributes stored in a previous record to verify the accuracy of the item, it meets step one of the *Alice* method and must be considered under step two.

Taking a look at step two, the method at issue in this claim does not appear to have an inventive concept that sufficiently makes the patent claim more than the abstract idea itself. The claim here is a conventional method of pulling data from the item being shipped, analyzing specific attributes of the item, and comparing these attributes to a previously created record for the item to verify the accuracy of the item being shipped.<sup>226</sup> The method at issue is similar to the methods in *Flook* and *Benson*, which were both determined to be patent ineligible.<sup>227</sup> The method in *Flook* measures the value of a variable, uses an algorithm to calculate an alarm-limit, and adjusts the actual alarm-limit.<sup>228</sup> The only change from a standard alarm-limit method in *Flook* is the use of a formula in the middle step.<sup>229</sup> In *Benson*, the standard method of programming a computer to convert binary-coded decimal into pure binary is only altered by performing the calculations via a computer.<sup>230</sup> Accenture’s claim in Patent No. 10,115,068 only alters the conventional method of pulling data and comparing it to a previous record of data by using blockchain to instantly and continuously verify the data.<sup>231</sup> This patent claim differs from that in *Diehr* because the claim in *Diehr*

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<sup>220</sup> U.S. Patent No. 10,115, 068 (issued Oct. 30, 2018); *see also Global 500 List*, FORTUNE (March 31, 2018), <http://fortune.com/global500/accenture> (noting that Accenture was ranked 316 on the Fortune Global 500 list with a revenue of over \$36 billion from its reported fiscal year ending August 31, 2017).

<sup>221</sup> U.S. Patent No. 10,115,068 (issued Oct. 30, 2018).

<sup>222</sup> *Id.*

<sup>223</sup> *Id.*

<sup>224</sup> *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

<sup>225</sup> U.S. Patent No. 10,115,068 (issued Oct. 30, 2018).

<sup>226</sup> *Id.*

<sup>227</sup> *See infra* notes 228–230 and accompanying text.

<sup>228</sup> *Parker v. Flook*, 437 U.S. 584, 585–86 (1978).

<sup>229</sup> *Id.*

<sup>230</sup> *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

<sup>231</sup> *See* U.S. Patent No. 10,115,068 (issued Oct. 30, 2018).

only used a formula as a small part of the process and did not prevent others from using the formula.<sup>232</sup> Since the entire claim in *Diehr* did more as a whole process than just seeking to patent an already existing process, the Court held that it was patent eligible.<sup>233</sup> Here, the claimed invention does no more than replace standard data records with blockchain-stored records to verify data collected via a standard method, and this is not an inventive concept that makes the claim sufficiently more than the abstract idea.<sup>234</sup> Although it appears that this claim should be subject matter ineligible to be patented, the claim comes directly from a patent issued in 2018.<sup>235</sup>

Another blockchain patent was recently issued to Social Patent LLC for a method to “register users with a social network application coupled to blockchain.”<sup>236</sup> The goal behind this method is to allow each user to set parameters to filter which users they want to allow to socially network with them, and then compare their parameters with the characteristics of each user recorded in blockchain.<sup>237</sup> One claim from this issued patent outlines the general idea of the method, and another incorporates in blockchain.<sup>238</sup> Analyzing these claims under the *Alice Corp.* standard, the claims appear to be directed at an abstract idea. The method takes data from individual users on the social media application and runs the data through an algorithm to determine whether other users match the preferences of the individual.<sup>239</sup> This method is similar to the standard one in *Flook* because it measures a value, uses an algorithm to create a list of preferences, and then compares the preferences to other users’ data to “update” the social connections the user will see in the application.<sup>240</sup> Since the method makes significant use of an algorithm, the method must be analyzed to determine if any “inventive concept” is added to the abstract idea.<sup>241</sup>

Changing the way the application retains its stored records from a centralized database to blockchain is not sufficiently inventive to make an abstract idea patent eligible.<sup>242</sup> The claim at issue is a method for narrowing a user’s social network to people that meet its preferences.<sup>243</sup> This method can be implemented by comparing user’s preferences against a centralized computer database of other users’ characteristics just as effectively as it can be implemented by comparing user preferences against a blockchain record, which is a similar comparison to a standard

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<sup>232</sup> *Diamond v. Diehr*, 450 U.S. 175, 187 (1981).

<sup>233</sup> *Id.* at 191.

<sup>234</sup> See U.S. Patent No. 10,115,068 (issued Oct. 30, 2018).

<sup>235</sup> *Id.* Due to the recent issuance of the patent, a challenge on the subject matter eligibility is still very possible.

<sup>236</sup> U.S. Patent No. 10,135,834 (issued Nov 20, 2018).

<sup>237</sup> *Id.*

<sup>238</sup> *Id.* Claim 4 recites “the method of claim 1, wherein the repository of facts as a service is a blockchain.” *Id.*

<sup>239</sup> *Id.*

<sup>240</sup> *Parker v. Flook*, 437 U.S. 584, 585–86 (1978).

<sup>241</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014).

<sup>242</sup> See *id.* at 2359 (implementing an abstract idea using technology is not inventive enough to make a claim patent eligible).

<sup>243</sup> U.S. Patent No. 10,135,834 (issued Nov 20, 2018).

algorithm that is able to be performed with or without a computer.<sup>244</sup> When blockchain is used as an open-source public ledger of transactions, its use is no more transformative of an algorithm than the use of a computer.<sup>245</sup> Although blockchain may “improv[e] social network applications”<sup>246</sup> or improve the function of a method, improvement alone is not a sufficiently inventive concept to make a claim directed at an abstract idea become patent eligible.<sup>247</sup>

Another patent that was recently issued involving blockchain is U.S. Patent No. 10,122,661, which was issued to salesforce.com, Inc.<sup>248</sup> The patent that was issued is for an email messaging system that uses blockchain to validate specific components of the email message in an attempt to more accurately identify spam messages and separate them from a user’s main mailbox.<sup>249</sup> Analyzing this claim under the *Alice Corp.* standard, the claim appears to meet the first step because the claim is directed at the abstract idea of anti-spam programs.<sup>250</sup> Anti-spam programs are effectively algorithms that determine what emails that are received should be sent to a spam folder, and which emails should be sent to the main mailbox.<sup>251</sup> Anti-spam programs that determine what words and phrases are likely to be found in normal emails versus spam emails are not unique technologically, so this claim is directed at the abstract idea.<sup>252</sup>

Salesforce.com’s issued patent appears to fail the second step of the analysis under *Alice Corp.* The introduction of blockchain into a method for analyzing emails to determine whether they are spam<sup>253</sup> does not add an inventive concept to the idea in the claim. In the patent description, salesforce.com discusses how the invention’s use of blockchain will increase the benefits of anti-spam technology because of the higher rate of success the method will have in identifying spam messages that a user does not want to receive.<sup>254</sup> Increasing the rate of success because blockchain verifies the contents of the emails does not change the core structure of the algorithm used in anti-spam programs.<sup>255</sup> What the patent is claiming to do can “be carried out in existing computers long in use, no new machinery being necessary.”<sup>256</sup> Even if the success rate improves because of the use of blockchain to complement these algorithms, that does not mean that an inventive concept has changed the abstract

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<sup>244</sup> See *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (determining that since no new machinery was necessary for the algorithms in the claim, or even a machine at all, the use of a computer did not substantially improve the abstract idea).

<sup>245</sup> Inuma, *supra* note 12.

<sup>246</sup> U.S. Patent No. 10,135,834 (issued Nov 20, 2018).

<sup>247</sup> *Alice Corp.*, 134 S. Ct. at 2359.

<sup>248</sup> U.S. Patent No. 10,122,661 (issued Nov. 6, 2018).

<sup>249</sup> *Id.*

<sup>250</sup> *Id.*

<sup>251</sup> *Id.*

<sup>252</sup> *Id.*

<sup>253</sup> U.S. Patent No. 10,122,661 (issued Nov. 6, 2018).

<sup>254</sup> *Id.*

<sup>255</sup> *Id.*

<sup>256</sup> *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

idea.<sup>257</sup> The patent issued to salesforce.com is another example of a current patent that appears to fail the subject matter eligibility test laid out in *Alice Corp.*

Using blockchain technology is no different than the using a computer when considering the most basic functions of each. For a claim to be patentable subject matter, the claim must do more than “instruct the practitioner to implement the abstract idea . . . on a generic computer.”<sup>258</sup> Using the basic function of blockchain, which is to provide a secure and open record of information, combined with an abstract idea is not sufficiently inventive enough to be patentable subject matter.<sup>259</sup> Ultimately, blockchain technology should be analyzed in the same way that a computer is, such that when blockchain is not used beyond its normal function nothing is added to the claim that is “not already present when the steps [of the claim] are considered separately.”<sup>260</sup>

### C. The Effect of the 2019 Revised Subject Matter Eligibility Guidelines

On January 7, 2019, the United States Patent and Trademark Office published “revised guidance for use by USPTO personnel in evaluating subject matter eligibility.”<sup>261</sup> While these guidelines are important, they are not truly determinative of the subject matter eligibility test because they did not compel a change in law that the courts are required to follow.<sup>262</sup> These guidelines suggest a change to two major parts of the current subject matter eligibility test.<sup>263</sup> First, the guidance changes the way to determine if a claim is directed at a patent ineligible concept by explicitly defining abstract idea.<sup>264</sup> Second, the USPTO gives new guidance on how to determine whether a claim “recites a practical application of a judicial exception.”<sup>265</sup> Both changes are significant and could have an impact on blockchain patent applications if the courts decide to follow the guidance and analysis that the USPTO has laid out when they determine the eligibility of patents.<sup>266</sup>

The first issue the USPTO tackles with the *Alice Corp.* test is to “explain the abstract idea exception” by specifically defining what an abstract idea is.<sup>267</sup> The

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<sup>257</sup> See *Parker v. Flook*, 437 U.S. 584, 594–95 (1978) (improving a method for using a previously well-known process or algorithm is not an inventive concept sufficient to make a claim subject matter eligible to be patented).

<sup>258</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2359 (2014).

<sup>259</sup> *Id.*

<sup>260</sup> *Id.*

<sup>261</sup> U.S. PATENT AND TRADEMARK OFFICE, 2019 REVISED SUBJECT MATTER ELIGIBILITY GUIDANCE (Jan. 7, 2019).

<sup>262</sup> K&L Gates, *USPTO Clarifies Alice/Mayo Step 2A With New Patent Subject Matter Eligibility Guidance*, NAT’L L. REV. (Jan. 9, 2019), <https://www.natlawreview.com/article/uspto-clarifies-alicemayo-step-2a-new-patent-subject-matter-eligibility-guidance>.

<sup>263</sup> U.S. PATENT AND TRADEMARK OFFICE, *supra* note 261.

<sup>264</sup> K&L Gates, *supra* note 262.

<sup>265</sup> *Id.*

<sup>266</sup> See Gene Quinn, *Revised Patent Eligibility Guidance Effectively Defines What Is an Abstract Idea*, IPWATCHDOG (Jan. 4, 2019), <https://www.ipwatchdog.com/2019/01/04/patent-eligibility-guidance-abstract-idea/id=104754/>.

<sup>267</sup> *Id.*

guidance lists three categories for abstract ideas: (1) “mathematical concepts,” including relationships, formulas and calculations; (2) “methods for organizing human activities,” including economic principles, legal interactions, and managing social interactions; and (3) “mental processes.”<sup>268</sup> The guidance is intended to reduce the number of patents that are rejected on subject matter eligibility grounds.<sup>269</sup> “By narrowly identifying certain subject matter groups as being those that properly qualify for characterization as *abstract ideas* the USPTO is effectively defining what is and what is not an abstract idea, thereby filling a void intentionally left ambiguous by both the Supreme Court and the Federal Circuit.”<sup>270</sup> By filling this void, the guidelines define one of the most important terms in the subject matter eligibility landscape—abstract idea—which should make rulings less subjective and more consistent.<sup>271</sup>

The first suggestion from the USPTO guidelines should not have an impact on how blockchain patent claims fare in step one of the *Alice Corp.* test. Well before these guidelines were written, the courts recognized that mathematical equations were an abstract idea.<sup>272</sup> When analyzing blockchain claims under step one of the *Alice Corp.* test, the underlying method or process used with blockchain technology is often a mathematical equation or algorithm,<sup>273</sup> and the blockchain technology itself is also an algorithm.<sup>274</sup> Although the first change that the USPTO guidelines suggests should not have an impact on blockchain specifically, the overarching goal of the changes appears to be to limit the number of rejected claims on subject matter eligibility grounds, which could affect the way the courts analyze all claims.<sup>275</sup>

The other change that stems from the guidelines is suggesting a slightly different subject matter eligibility test for claims directed at a patent ineligible concept.<sup>276</sup> The USPTO guidelines clarified that the *Alice Corp.* test should determine subject matter eligibility based on whether there is a practical application of the judicial exception, “i.e., an abstract idea, a law of nature, or a natural phenomenon.”<sup>277</sup> The guidelines reasoning behind this suggestion is that “[a] claim that integrates a judicial exception into a practical application” uses the judicial exception in a limited manner which makes the claim more than an attempt to “monopolize the judicial exception.”<sup>278</sup> The new guidance also made it clear that the *Alice Corp.* test should exclude from consideration whether the elements added to the patent ineligible concept are “well-

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<sup>268</sup> U.S. PATENT AND TRADEMARK OFFICE, *supra* note 261.

<sup>269</sup> K&L Gates, *supra* note 262.

<sup>270</sup> Quinn, *supra* note 266.

<sup>271</sup> *Id.*

<sup>272</sup> *Parker v. Flook*, 437 U.S. 584, 594 (1978) (determining that an algorithm was not patent eligible); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972) (determining that a mathematical equation was not patent eligible).

<sup>273</sup> *See supra* notes 217–260.

<sup>274</sup> *See supra* notes 204–207.

<sup>275</sup> K&L Gates, *supra* note 262.

<sup>276</sup> *Id.*

<sup>277</sup> U.S. PATENT AND TRADEMARK OFFICE, *supra* note 261.

<sup>278</sup> *Id.*

understood, routine [or] conventional activity.”<sup>279</sup> The USPTO offered some examples and explanation in the new guidance of what it means by “practical application,” including that “an improvement in the functioning of a computer, or an improvement to other technology or technical field” is a practical application.<sup>280</sup> The USPTO also offered examples of times when a “judicial exception has not been integrated into a practical application” such as when “an additional element . . . merely uses a computer as a tool to perform an abstract idea.”<sup>281</sup> The guidance attached a footnote relevant to blockchain claims under these new guidelines which says that a claim “indicating that a particular function such as creating and maintaining electronic records is performed by a computer, without specifying how,” does not apply the patent ineligible idea practically.<sup>282</sup>

These suggested changes to the *Alice Corp.* test might have an impact on blockchain patents and all software-related claims, but it is unclear how significant of an impact they will have. The guidance notes that a claim with a patent ineligible concept does not become patent eligible because a computer is used as a tool “to perform an abstract idea.”<sup>283</sup> A claim using blockchain is effectively using blockchain as a tool to record secured transactions on a public ledger.<sup>284</sup> Blockchain acts like a computer would “to perform an abstract idea,” so if the underlying claim is directed at a “judicial exception,” then the claim probably is still not subject matter eligible to be patented.<sup>285</sup> Also, even if examiners that follow the new guidance determine that blockchain claims are a sufficient practical application of an ineligible idea, the guidelines are not binding law.<sup>286</sup> The courts have not adopted reasoning similar to the guidelines in previous decisions,<sup>287</sup> and it is unclear if they will change their analysis or “assess the validity of patents granted in accordance with the USPTO’s new subject matter eligibility guidelines.”<sup>288</sup>

## V. Implications of Patenting Blockchain

Traditionally, blockchain has been dominated by the open-source software model; however, the rise in patents on blockchain has begun to shift blockchain away from the open-source model. There are many advantages to the open-source software model. Since an open-source project does not have to be developed by a single company or individual and no one individual controls the software, “there isn’t a single chokepoint in the development process” to restrict or slow down the growth.<sup>289</sup>

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<sup>279</sup> K&L Gates, *supra* note 262 (quoting *id.*).

<sup>280</sup> U.S. PATENT AND TRADEMARK OFFICE, *supra* note 261.

<sup>281</sup> *Id.*

<sup>282</sup> *Id.*

<sup>283</sup> *Id.*

<sup>284</sup> Crosby, *supra* note 9, at 8.

<sup>285</sup> K&L Gates, *supra* note 262.

<sup>286</sup> *Id.*

<sup>287</sup> Quinn, *supra* note 266.

<sup>288</sup> K&L Gates, *supra* note 262.

<sup>289</sup> Peter Van Valkenburgh, *What Is “Open Source” and Why Is it Important for Cryptocurrency and Open Blockchain Projects?*, COIN CTR. (Oct. 17, 2017), <https://coincenter.org/entry/what-is-open-source-and-why-is-it-important-for-cryptocurrency-and-open-blockchain-projects>.

One of the main reasons that open-source development is so beneficial to blockchain is that it ensures that anyone with good programming skills has the opportunity to work on and develop the technology.<sup>290</sup> Also, open-source allows the best programmers to work together as “co-developers,” and the collaboration will often lead to more efficient work.<sup>291</sup> With a collaboration of extensive amounts of programmers, any problem that arises will likely be solved by someone, even if the person that runs into the problem is unable to work through it.<sup>292</sup> Although many of the large corporations that are attempting to patent blockchain likely intend to continue to advance the technology both in their specific applications and generally, it is unlikely that any corporation will be able to keep up with the pace which advancements are made by the unlimited number of programmers that can work on blockchain when it is an open-source project.<sup>293</sup>

Even though blockchain technology is relatively new, the leaps and bounds that have been made in the innovation of the technology so far are enormous. Blockchain has been growing at a tremendous rate since the introduction of Bitcoin, and the growth has generally not come from patenting the technology, but because the code is open-source.<sup>294</sup> The use of open-source software allows anyone to “copy the code and improve upon it,” which has allowed innovation to “progress so fast that Bitcoin’s blockchain is comparatively primitive technology” to current blockchain technologies.<sup>295</sup> In 2009 when Bitcoin was created, it took about ten minutes for one block to be created.<sup>296</sup> Each time that one block is created, it means that a transaction is recorded on the chain.<sup>297</sup> By the time Ethereum was released in 2015, the technology had become so efficient that it only took about fourteen seconds for a transaction to be recorded.<sup>298</sup> Ethereum is a “decentralized platform that runs smart contracts,” and it is run on a custom created, open-source blockchain.<sup>299</sup> This incredible improvement in the technology makes Bitcoin’s “blockchain look dated” and “comparatively primitive” to the recent developments.<sup>300</sup> In many cases, the decentralized nature of open source programs is exactly what allows an unlimited

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<sup>290</sup> *Id.* (stating that not only do the best programmers have the ability to look at the technology and advance it, but the ones that work on growing it usually have a strong personal motivation to improve what they are working on because of their use of the software).

<sup>291</sup> *Id.* (“Many of the people who use the open-source code will also be able to identify and flag issues, and may even be able to offer solutions.”).

<sup>292</sup> *Id.*

<sup>293</sup> See Alexandra Sims, *Why Blockchain Challenges Conventional Thinking About Intellectual Property*, CONVERSATION (Feb. 26, 2018), <http://theconversation.com/why-blockchain-challenges-conventional-thinking-about-intellectual-property-91469> (discussing the rate at which blockchain is progressing via open-source code).

<sup>294</sup> *Id.*

<sup>295</sup> *Id.* (noting that using open-source allows the community to “fork the blockchain (copy the blockchain and its data)” if they do not like what the technology is doing so that they can create another competing blockchain).

<sup>296</sup> *Id.*

<sup>297</sup> *Id.*

<sup>298</sup> *Id.*

<sup>299</sup> ETHEREUM, <https://www.ethereum.org/> (last visited Feb. 14, 2019).

<sup>300</sup> Sims, *supra* note 293.

number of people to contribute and make such sustained improvements.<sup>301</sup> Considering open-source beyond blockchain, companies like Mozilla, MySQL, and WordPress have had much success using open-source software.<sup>302</sup> Mozilla has been one of the more well-known open-source platforms, and they have created major web browsers, including Firefox.<sup>303</sup> Reaping the benefits of open-source software for blockchain may be threatened by the race to patent the technology.

While it is still uncertain the extent to which blockchain is patentable, the patenting of blockchain is very likely more harmful than it is useful. Historically, patents were created to give people an incentive to design useful inventions and to prevent others from “free-riding on their work.”<sup>304</sup> Although patent law was created to protect inventors and spur innovation, there are many cases where patents have ended up harming the industry, blockchain included.<sup>305</sup> It is unclear if allowing blockchain to be patented will spur any more innovation than is realized as an open-source software, but the ability to patent blockchain is likely to cause an influx of “patent trolls” filing as many patents on blockchain as they can so that they can later sell them at a high price.<sup>306</sup> A patent troll is a company that files patents with no intention to use the patent to create a product for sale, but instead they license the patents to companies and file lawsuits against infringing businesses.<sup>307</sup> These patent trolls are not the only ones likely to stunt the growth of blockchain by preventing innovation.<sup>308</sup> Large corporations that enter the blockchain world may “defend their core business by asserting their patents against challengers who threaten their revenue streams.”<sup>309</sup> If blockchain technology is patent eligible subject matter, innovation of this rapidly growing technology might be threatened, and blockchain could be patented defensively regardless of whether the companies intend on using it.<sup>310</sup>

Currently, both large corporations and well-funded patent trolls are patenting blockchain technology.<sup>311</sup> While large corporations are patenting the technology to protect their business and potential profit, the patent trolls are patenting the technology to “attack any startup that could be remotely considered infringing on

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<sup>301</sup> *Id.*

<sup>302</sup> Daniel Rubinstein, *4 Successful Open Source Business Models to Consider*, OPENSOURCE.COM (Dec. 18, 2017), <https://opensource.com/article/17/12/open-source-business-models>.

<sup>303</sup> *History of the Mozilla Project*, MOZILLA, <https://www.mozilla.org/en-US/about/history/details/> (last visited February 12, 2019).

<sup>304</sup> Sims, *supra* note 293.

<sup>305</sup> *See e.g., id.* Patents have been harmful both in Europe and also the United States. For example, when a patent was originally granted in England for the steam engine, it prevented anyone from building upon the technology of the steam engine until the patent expired. *Id.*

<sup>306</sup> Grant, *supra* note 51.

<sup>307</sup> Marianna Galstyan, *Who Are Patent Trolls & How Do They Work?*, INVESTOPEDIA (Apr. 15, 2017), <https://www.investopedia.com/articles/investing/071515/who-are-patent-trolls-how-do-they-work.asp>.

<sup>308</sup> Grant, *supra* note 51.

<sup>309</sup> *Id.* (“This is typical behavior and is often derided as the reason patents can hold back innovation.”).

<sup>310</sup> Jeff John Roberts, *Are Blockchain Patents a Bad Idea?*, FORTUNE (Dec. 1, 2016), <http://fortune.com/2016/12/01/blockchain-patents/>.

<sup>311</sup> Grant, *supra* note 51.

their patent portfolio.”<sup>312</sup> Although one of these groups is patenting for a perceived benefit and the other is patenting purely to block others from entering the market and making money off of those that do, both often “prioritiz[ing] having a registered technology over actually using it.”<sup>313</sup> Large corporations, such as Bank of America, have admitted that they are obtaining blockchain patents to “reserve [their] spot even before [they] know what the commercial application might be.”<sup>314</sup> The effect of these large scale movements to patent blockchain by both large corporations and patent trolls, without any real desire to continue to innovate, is troubling, especially combined with a drastic decline in open-source blockchain innovation.<sup>315</sup> For example: “A 2017 collaborative research of the open-source blockchain efforts conducted by Deloitte and GitHub suggested that a majority of such experiments had failed. According to their report, while more than 26,000 open-source blockchain projects were started on GitHub in 2016, merely 8 percent of those projects remained active in 2017.”<sup>316</sup> Although some corporations claim that they are patenting blockchain only to prevent other companies from profiting off the technology and not to halt innovation and development, the result of these patents is less people having the ability to freely work to develop and work with the various blockchain applications.<sup>317</sup> “[T]echnology that forms the basis of a fundamental shift” usually results in patent litigation.<sup>318</sup> Although an increase in lawsuits has yet to occur involving blockchain patents, history has shown that as more patents are issued and blockchain grows in use, litigation will follow.<sup>319</sup> Continuing the current trend will lead to lack of innovation and development which may halt the growth of one of today’s most important technologies.<sup>320</sup>

The aftermath of *State Street Bank* decision provides more context for what may happen if blockchain technology is determined to be patent eligible subject matter. After the *State Street Bank* decision, patents on business methods were issued at a rapid rate.<sup>321</sup> There was worry that the business method patents being issued were of worse quality than other patents, and also that the issuance of these patents would

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<sup>312</sup> *Id.*

<sup>313</sup> Stephen O’Neal, *Is Blockchain About to Become a Patent War Battleground?*, COINTELEGRAPH (Jul. 25, 2018), <https://cointelegraph.com/news/is-blockchain-about-to-become-a-patent-war-battle-ground>.

<sup>314</sup> *Id.*

<sup>315</sup> *Id.*

<sup>316</sup> *Id.*

<sup>317</sup> See Huang-Chih Sung, *When Open Source Software Encounters Patents: Blockchain as an Example to Explore the Dilemma and Solutions*, 18 J. MARSHALL REV. INTELL. PROP. L. 55, 72 (2018).

<sup>318</sup> Matthew Bultman, *Blockchain Looks to Avoid Patent Wars of the Past*, LAW360 (Jul 12, 2018), <https://www.law360.com/articles/1062707/blockchain-looks-to-avoid-patent-wars-of-the-past>.

<sup>319</sup> *Id.*

<sup>320</sup> See Grant, *supra* note 51 (arguing that patenting blockchain will hurt the industry and the speed of improvements).

<sup>321</sup> Robert A. McFarlane & Robert G. Litts, *Business Methods and Patentable Subject Matter Following In re Bilski: Is Anything Under the Sun Made by Man Really Patentable*, 26 SANTA CLARA HIGH TECH. L.J. 35, 42 (2012).

negatively impact innovation of business.<sup>322</sup> Some professors have argued that the “explosion of business method and software patents would have a ‘devastating effect’ on the future of cyberspace by advantaging large institutions that can afford the transaction costs associated with obtaining such patents at the expense of smaller companies and open source initiatives.”<sup>323</sup> In response to much public pressure and criticism, the USPTO implemented an initiative to limit the number of business method patents by improving the examination procedures.<sup>324</sup> The criticism even led to bills being introduced in Congress to try and restrict the number of business method patents.<sup>325</sup> Many of the criticisms that stemmed from the increase in business methods patents issued are similar to the criticisms that may follow blockchain patents, such as restricting the benefits of open-source improvements and providing large corporations heavy advantages.<sup>326</sup> While the extent of the ramifications from patenting blockchain are unknown, the public criticism and resulting action taken by both the USPTO and Congress that followed the rise in business method patents after the *State Street Bank* decision do not foreshadow a positive outcome.

## VI. Conclusion

The patentability of blockchain is a topic that the Supreme Court has yet to address; however, the number of blockchain patent applications which are likely ineligible subject matter is rapidly growing. The Court has crafted a test for the subject matter eligibility of patents over the past several decades which is laid out in *Alice Corp.* Although *Alice Corp.* focuses on applying the subject matter eligibility test to software and makes no mention of blockchain, blockchain technology should be analyzed under the same test because it is simply a complex software. Analyzing blockchain under the *Alice Corp.* test, a blockchain specific invention will be directed at an abstract claim in the first step for one of two reasons: (1) Blockchain itself is an algorithm that works to create a secure public record of transactions; or (2) the underlying process that is using blockchain technology is a commonly known process or algorithm. Under the second step of the *Alice Corp.* test, the addition of blockchain to a process or algorithm is not a sufficiently inventive concept to make the patent ineligible subject matter patent eligible. Enhancing a process or application with blockchain is equivalent to using a computer to run a previously invented application. Even though blockchain technology should be questioned by patent examiners and the courts in the same way as any software claim, blockchain claims are currently being patented at an alarmingly fast rate. Not one blockchain claim has yet to be seriously challenged as subject matter ineligible to be patented. Ignoring the fact that

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<sup>322</sup> *Id.* at 47.

<sup>323</sup> *Id.* (citing Lawrence Lessig, *The Death of Cyberspace*, 57 WASH. & LEE L. REV. 337, 345–46 (2000)).

<sup>324</sup> Russell A. Korn, *Is Legislation the Answer? An Analysis of the Proposed Legislation for Business Method Patents*, 29 FLA. ST. U. L. REV. 1367, 1373 (2002).

<sup>325</sup> McFarlane & Litts, *supra* note 321, at 48 (first citing The Business Method Improvement Act of 200, H.R. 5364, 106th Cong. (2000); and then citing The Business Method Improvement Act of 2001, H.R. 1332, 107th Cong. (2001)).

<sup>326</sup> Roberts, *supra* note 310.

blockchain is subject matter ineligible to be patented, patenting blockchain directly conflicts with one of the most beneficial aspects of the technology. Blockchain is most effective as an open-source software that can constantly be improved upon by everyone. The consequence of allowing blockchain to be patented by corporations and patent trolls could lead to a drastic decline in innovation, stifling the growth of an immensely powerful technology. Blockchain has the potential to provide countless improvements to the current technological landscape as an open-source secure and public ledger, and it should not be restricted by the improper use of the patent.