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INFORMATION AGE TECHNOLOGY, INDUSTRIAL AGE LAWS

ELIZABETH WINSTON*

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The United States patent system was born during the Industrial Age—at a time where the focus was on promoting innovation in machines and tangible means of changing the world. With the dawn of the Information Age, innovation is increasingly intangible. The Industrial Age laws, as currently interpreted, are not well-suited for the changing and evolving technological world. Information Age innovators face challenges at the United States Patent and Trademark Office, through the judicial system and at the United States International Trade Commission. It is time for a change in the system to reflect the realities of modern technology. Adequate protection is not currently provided for intangible innovations. This lack of protection has wide-ranging implications, especially now as data processing is increasingly migrating to “the cloud,” geographic boundaries are eroding, and intangible technology is advancing in importance. The Industrial Age laws can incentivize innovation in the Information Age—and it is time to recognize this before private ordering subsumes the public interest.

INTRODUCTION

Technology is outpacing our patent system. Intangible innovations are eroding geographic boundaries and defying categorization. Absent change, those leading the evolution will leave the patent system behind, seeking protection through private ordering, the use of trade secrets, or other forms of protection that do not uphold the public’s interest in building a storehouse of knowledge. The Industrial Age laws, as currently interpreted, are not well-suited for the changing and evolving technological world. This Article is the first of its kind to analyze the difficulty in patenting the intangible and the issues innovators face at the United States Patent and Trademark Office (Patent Office or PTO) through the judicial system and at the United States International Trade Commission. It is time for a change in the system to reflect the realities of modern technology. Adequate protection is not currently provided for intangible innovations. This lack of protection has wide-ranging implications, especially now as data processing is increasingly migrating to “the cloud,” geographic boundaries are eroding, and intangible technology is advancing in importance.

The United States patent system was born during the Industrial Age—at a time where the focus was on promoting innovation in machines and tangible means of changing the world. The patent system reflects the incentives to innovate in the field of tangible advances. Much of modern innovation focuses on data—an intangible asset fraught with value and judgment. Consider the example of orthodontia. Traditionally, teeth were straightened by an orthodontist placing metal braces on a patient’s teeth—a tangible advance in technology. Today, that method is still common, however, a system of using clear, plastic retainers to realign and correct patients’ teeth known as the Invisalign™ system is changing the face of orthodontia. Align Technology (Align), an orthodontic innovator, owns a number of patents related to the Invisalign™ system.¹ ClearCorrect Operating (ClearCorrect) is a competitor, also making clear retainers that straighten patient’s teeth without using traditional metal braces.² Align’s technology requires taking an impression of the patient’s teeth, creating a computer model of the impression, and using a 3-D printer to print a series of retainers that are then worn by the patient to straighten their teeth.³ The innovation is in the translation of the impression of the teeth to pure data that can be uploaded to the cloud. That same innovation has made circumvention of traditional intellectual property a relatively straightforward enterprise for Align’s competitors. ClearCorrect, for instance, takes an impression of the patient’s teeth, uploads the impression to the internet, uses ClearCorrect Pakistan—a Pakistani company—to create a computer model of the impression in Pakistan, downloads the computer model, and prints the retainers in the United States.⁴ The patient is unaware

1. *See, e.g.*, U.S. Patent No. 8,070,487 (issued Dec. 6, 2011).

2. *See, e.g.*, ClearCorrect Operating LLC v. Int’l Trade Comm’n, 810 F.3d 1283, 1287 (Fed. Cir. 2015).

3. *Id.*

4. In the ongoing Invisalign litigation, the accused products are digital models, digital data, and treatment plans. The treatment plans are virtual 3-D models of the desired position of patients’ teeth at various stages of orthodontic treatment. The models are initially created based on impressions of patients’ teeth, and that occurs in the United States. The impressions are uploaded to a server and downloaded in Pakistan, where the models are manipulated to create a treatment plan. The digital models, digital data, and treatment plans are electronically transmitted by uploading them to a server for use in the United States. The digital models are then used in the United States to print 3-D physical models of a patient’s teeth. The aligners are then formed over the physical models of the patient’s teeth. *Id.*

of where each step in the patented method took place.⁵ The intangible nature of the data used in performing this method of straightening the teeth permits a seamless use of the method across geographic and across patent boundaries. Align has faced difficulties in protecting its valuable intellectual property rights,⁶ finding itself defending itself before the Patent Office,⁷ in the judicial system,⁸ and before the United States International Trade Commission.⁹ This multi-phased litigation strategy is a common, expensive, and time-consuming strategy. The heart of Align's innovative method of straightening teeth is the data, and it is protecting the intangible data that poses Align significant problems.

All intellectual property is intangible, yet there is a material difference in the value the patent system holds for patents on tangible innovations and patents covering the intangible. Part II of this Article asks what it means to be intangible and analyzes the history behind patenting data, methods, and other intangible assets. Next, the Article addresses the fundamental issues with using legislation drafted before the Information Age to protect modern technology and proposes clarifying the definition of invention to reflect the purpose behind the patent system in Part III. The question of when intangible intellectual property is used within the United States, and therefore is subject to protection under the United States Patent Code, is discussed in Part IV. Domestic industry is directly impacted by electronic transmissions and other intangible, patentable assets, and Part V analyzes when the United States International Trade Commission has jurisdiction over intangible articles. Many of the issues addressed throughout this Article, but not all, can be dealt with during patent prosecution, and Part VI discusses claim drafting in the

5. The important thing to note here is that some steps occur in the United States and some steps occur in Pakistan, and that the tangible 3-D printed clear retainers themselves do not violate the method claim of the patent. *Id.* at 1287–88.

6. For example, in 2018, Align Technology had over \$2 billion in revenue. Press Release, Align Tech. Inc., Align Technology Announces Record 2018 Financial Results (Jan. 29, 2019), <http://investor.aligntech.com/news-releases/news-release-details/align-technology-announces-record-2018-financial-results>.

7. Alana Seiders, *U.S. Patent Office Sides with ClearCorrect to Reexamine Invisalign Patent Portfolio*, CLEARLYCORRECT CLEARLY BLOG (June 17, 2015), <http://blog.clearcorrect.com/post/US-Patent-Office-Sides-with-ClearCorrect-to-Reexamine-Invisalign-Patent-Portfolio.aspx>.

8. *See, e.g.*, Align Tech., Inc. v. ClearCorrect, Inc., No. 4:11-CV-00695, 2017 WL 3726048, at *2 (S.D. Tex. July 27, 2017).

9. *In re* Certain Digital Models, Digital Data, and Treatment Plans for Use in Making Incremental Dental Positioning Adjustment Appliances, Inv. No. 337-TA-833, USITC Pub. 4555 (Apr. 10, 2014) [hereinafter 833 Investigation].

Information Age. Finally, Part VII talks about protecting the intangible through private ordering, given the tremendous difficulties in otherwise protecting the intangible.

The Information Age is here, and the problems facing Information Age innovators are multi-faceted, expensive, and obstruct the public interest in building a storehouse of knowledge. It is time to take a closer look at how the Industrial Age laws protect the intangible through clarifying the legislative definitions, coming to a new understanding of patent boundaries, and arming the United States International Trade Commission with the tools it needs to protect domestic industry.

I. INTANGIBILITY

A. *The Intangible Nature of Patents Themselves*

A patent grants the patentee the right to exclude others from making, selling, using, offering to sell, or importing the patented innovation.¹⁰ The patent gives the patentee no right to make or use the invention, and there is nothing in the patent grant that a patentee can hold on to—the protection is found in the written description and claims. Patents are intangible. Despite “attributes of personal property,”¹¹ a patent is not something that can be touched. In 1926, the Eighth Circuit wrote: “Good will is property of an intangible nature. It differs from such intangibles as patents, copyrights, licenses, and franchises, because, while in a certain sense it inheres in and is used in the business, it is not subject to depreciation”¹² The Uniform Commercial Code defines “general intangible” and expressly states that “intellectual property” is an example of a “general intangible” in the Official Comment.¹³ It is no wonder, then, that when an intangible patent claims intangible subject matter, the scope of the rights granted is unclear.¹⁴

10. 35 U.S.C. § 101 (2018).

11. 35 U.S.C. § 261.

12. *Red Wing Malting Co. v. Willcuts*, 15 F.2d 626, 632 (8th Cir. 1926).

13. *See* U.C.C. § 9-102 cmt. 5(d) (AM. LAW INST. 1972).

14. To take it a step further, in 2006, a patent application was filed claiming a method of purchasing and leasing back intangible property, such as intellectual property, titled *Intangible Property Transaction and Leaseback Business Method*. This is an example of an intangible asset (the patent application) claiming an intangible innovation (a method) in the field of intangible assets (particularly intellectual property). U.S. Patent No. 260, 549 (filed Nov. 8, 2007).

B. Useful, Concrete, and Tangible

Setting forth patent-eligible subject matter, Section 101 of the Patent Act maintains textual neutrality, failing to differentiate between machines, manufactures, compositions of matter, and patents claiming methods.¹⁵ Despite the neutrality of this text, and, despite the Federal Circuit writing that “[w]hether stated implicitly or explicitly, we consider the scope of § 101 to be the same regardless of the form—machine or process—in which a particular claim is drafted[.]”¹⁶ distinctions continue to be drawn between the tangible and the intangible.

The history of such distinctions has deep roots in the United States patent system. Over thirty years ago, on January 29, 1988, Kuriappan P. Alappatt, Edward E. Averill, and James G. Larsen (collectively Alappatt) applied for a patent claiming “a means for creating a smooth waveform display in a digital oscilloscope.”¹⁷ The Patent Office rejected the patent application as drawn to non-statutory subject matter, i.e., a mathematical formula.¹⁸ Alappatt appealed to the Federal Circuit where Judge Rich wrote that “certain types of mathematical subject matter, standing alone, represent nothing more than *abstract ideas* until reduced to some type of practical application, and thus that subject matter is not, in and of itself, entitled to patent protection.”¹⁹ Judge Rich went on to find that Alappatt’s invention, however, was not a “disembodied mathematical concept which may be characterized as an ‘abstract idea,’ but rather a specific machine to produce a useful, concrete, and tangible result.”²⁰ The Federal Circuit embraced this new subject-matter specific test for patentability in 1998, holding that business method claims were patent-eligible subject matter if the claims produce “a useful, concrete

15. 35 U.S.C. § 101. Professor Holbrook addressed this issue in his 2016 article, pointing out that, with one rarely used exception, sections 101, 102, and 103 of the Patent Act of 1952 and the America Invents Act, which are the bulwark of all domestic patent protections, are textually neutral with respect to the type of invention. Under the Patent Act of 1952, there was a statutory provision differentiating between processes in the biotechnological arts and other methods. The America Invents Act eliminated this provision. See Timothy R. Holbrook, *Method Patent Exceptionalism*, 102 IOWA L. REV. 1001, 1007–08 (2017).

16. *AT&T Corp. v. Excel Commc’ns, Inc.*, 172 F.3d 1352, 1357 (Fed. Cir. 1999), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc).

17. *In re Alappatt*, 33 F.3d 1526, 1537 (Fed. Cir. 1994), *abrogated by In re Bilski*, 545 F.3d 943.

18. *Id.* at 1539.

19. *Id.* at 1543.

20. *Id.* at 1544.

and tangible result.”²¹ In 1999, the Federal Circuit re-emphasized this rule, finding that a “non-abstract” process claimed patent-eligible subject matter because it “applie[d] the Boolean principle to produce a useful, concrete, tangible result.”²²

Subsequently, the Patent Office issued Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility.²³ The Interim Guidelines informed the examiners that subject matter could be found patent eligible “if the claimed invention physically transforms an article or physical object to a different state or thing, or if the claimed invention otherwise produces a useful, concrete, and tangible result.”²⁴ Nowhere in the Interim Guidelines is the word intangible found.²⁵ The Interim Guidelines expressly and incorrectly stated that: “the opposite meaning of ‘tangible’ is ‘abstract.’”²⁶

It was not until 2010 that the Supreme Court drew a distinction between intangible and abstract.²⁷ Writing that Industrial Age processes (“inventions grounded in a physical or other tangible form”) are of a different patentable nature than Information Age processes (“software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals”), the Supreme Court acknowledged the difficulty in applying the same Industrial Age patent laws to both.²⁸ Industrial Age processes typically have tangible components and, by association, are tangible.²⁹ Information Age processes lack tangible components, and, therefore, in their intangibility, are more likely to claim nothing more than abstract ideas and, therefore, less likely to be drawn to patentable subject matter.³⁰ Importing a tangibility requirement into the patent-eligibility question, the Supreme Court essentially held that if the intangible has a tangible component, it should be treated as tangible—not intangible—even

21. *State St. Bank & Tr. Co. v. Signature Fin. Grp.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) (quoting *In re Alappat*, 33 F.3d at 1544).

22. *AT&T Corp. v. Excel Commc'ns, Inc.*, 172 F.3d 1352, 1358 (Fed. Cir. 1999).

23. *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, U.S. PAT. & TRADEMARK OFF. (Nov. 22, 2005) [hereinafter *Interim Guidelines*], <https://www.uspto.gov/news/og/2005/week47/patgupa.htm>.

24. *Id.*

25. *See id.*

26. *Id.*

27. *Bilski v. Kappos*, 561 U.S. 593, 605 (2010).

28. *Id.*

29. *Id.*

30. *Id.*

though it is an intangible process.³¹ A process may be patent eligible if “(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.”³² However, recognizing the distinction between Information Age technologies and Industrial Age technologies, the Supreme Court went on to say that:

The machine-or-transformation test may well provide a sufficient basis for evaluating processes similar to those in the Industrial Age—for example, inventions grounded in a physical or other tangible form. But there are reasons to doubt whether the test should be the sole criterion for determining the patentability of inventions in the Information Age.³³

Ultimately, the Supreme Court held that the machine-or-transformation test was a useful way of determining patent eligibility—but that an innovation that failed the machine-or-transformation test could still be patent eligible.³⁴

Patenting the intangible continued to be an issue in litigation, and in 2014, writing on the patentability of software, without using the word “software” once, Justice Thomas wrote that the method claims at issue “which merely require generic computer implementation, fail to transform that abstract idea into a patent-eligible invention.”³⁵ The patentee argued that the claims were tangible—as they recited the use of a computer—which “necessarily exist[s] in the physical, rather than purely conceptual, realm.”³⁶ The Supreme Court found that the fact that the claims recite a tangible element, a generic computer, was not enough to render the claims patent eligible.³⁷ Justice Thomas, in extrapolating what might otherwise be patentable, highlighted the lack of tangibility, stating that “[t]he method claims do not, for example, purport to improve the functioning of the computer itself. . . . Nor do they effect an improvement in any other technology or technical field.”³⁸ The Supreme Court then set forth a two-part test which first asks if the claim is “directed to [a] patent-ineligible

31. *Id.*

32. *Id.* at 602 (quoting *In re Bilski* 545 F.3d 943, 954 (Fed. Cir. 2008)).

33. *Id.* at 605.

34. *Id.* at 604–06.

35. *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 221 (2014).

36. *Id.* at 224.

37. *Id.* at 223–24.

38. *Id.* at 225.

concept” such as an abstract idea, and then asks if there is some other aspect to the claim that “transform[s] the . . . claim’ into a patent eligible application,” and merely reciting a tangible element is not enough to transform the claim.³⁹ The decision in *Alice* emphasizes the difficulty of patenting Information Age inventions using an Industrial Age patent system.⁴⁰

Just a few months later, the Federal Circuit evaluated the patent-eligibility of a method directed to collecting fees from consumers who viewed Internet advertisements.⁴¹ Judge Lourie wrote that the claimed method “recites an abstraction—an idea, having no particular concrete or tangible form.”⁴² Although the majority opinion held that “the addition of merely novel or non-routine components to the claimed idea [does not] necessarily turn[] an abstraction into something concrete,” Judge Mayer, in concurrence, asserted that an abstract idea “can escape the realm of the abstract only through concrete application.”⁴³ Taking it a step further, Judge Mayer wrote that “[t]his concrete application is new technology—taking a scientific principle or natural law and ‘tying it down’ by implementing it in a precisely defined manner.”⁴⁴ The Federal Circuit held that the abstract idea at issue was not patent eligible, despite reciting a general-purpose computer, as no claim was made to a particular machine nor was a tangible transformation performed.⁴⁵

The intangible remains difficult to patent absent a concrete or tangible element. One judge wrote that “[n]either the U.S. Supreme Court nor the Federal Circuit has set forth a bright-line test separating abstract ideas from concepts that are sufficiently concrete.”⁴⁶ The Federal Circuit wrote that “precision has been elusive in defining an all-purpose boundary between the abstract and the concrete” in finding patent ineligible a method of retaining information when users navigate forms on the internet.⁴⁷ The claims failed to recite the mechanism used to retain the information—in

39. *Id.* at 218–19, 225 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 87–89 (2012)).

40. *Id.* at 225.

41. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 712 (Fed. Cir. 2014).

42. *Id.* at 715.

43. *Id.* at 715, 722 (Mayer, J., concurring).

44. *Id.* at 722.

45. *Id.* at 717 (majority opinion).

46. *Procter & Gamble Co. v. QuantifiCare Inc.*, 288 F. Supp. 3d 1002, 1011 (N.D. Cal. 2017).

47. *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1345 (Fed. Cir. 2015).

other words, the tangibility of the claim was in question and eligibility was not found.⁴⁸ Overcoming the absence of a tangible or concrete element has proven very difficult, and even with the presence of elements that are concrete and tangible, such as a general-purpose computer,⁴⁹ scanner,⁵⁰ or interface,⁵¹ many claims are unable to overcome the barrier to patentability presented by the presence of an abstract idea. The Federal Circuit found an intangible method of recording and archiving digital images unpatentable, writing: “The specification does not describe a new telephone, a new server, or a new physical combination of the two [T]he claims are not directed to a solution to a ‘technological problem’ Instead, the claims . . . are simply directed to the abstract idea of classifying and storing digital images in an organized manner.”⁵² The claims at issue recited tangible elements, such as a telephone, but the telephone was held to be “merely a conduit for the abstract idea.”⁵³ Distinguishing between the terms tangible and abstract, the Federal Circuit found a method abstract due to the lack of any “particular concrete or tangible form or application.”⁵⁴ However, if concrete and tangible do not mean the same thing, then what exactly is the opposite of tangible? A claim “that recites concrete, tangible components” can still be abstract.⁵⁵ Abstract is not a synonym for intangible.

Again addressing the patent-eligibility of intangible processes, the Federal Circuit recently found that a process having “a concrete assignment of specified functions,” was patent eligible.⁵⁶ In their decision, the Federal Circuit referred to an earlier decision in which the patent-eligible software yielded “a tangible technological benefit.”⁵⁷ Each of these processes transformed the nature of the claim into a patent-eligible medium.⁵⁸ However, of course, a method claim that recites a concrete and tangible component may still not be

48. *Id.* at 1347–48.

49. *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 223–24 (2014).

50. *Content Extraction & Transmission, LLC v. Wells Fargo Bank, Nat’l. Ass’n*, 776 F.3d 1343, 1347 (Fed. Cir. 2014).

51. *Mortg. Grader, Inc. v. First Choice Loan Serv. Inc.*, 811 F.3d 1314, 1324–25 (Fed. Cir. 2016).

52. *In re TLI Commc’ns LLC Patent Litig.*, 823 F.3d 607, 612–13 (Fed. Cir. 2016).

53. *Id.* at 612.

54. *Versata Dev. Grp. v. SAP America, Inc.*, 793 F.3d 1306, 1333 (Fed. Cir. 2015).

55. *Id.*; see *In re TLI Commc’ns LLC Patent Litig.*, 823 F.3d at 611.

56. *Ancora Techs., Inc. v. HTC America, Inc.*, 908 F.3d 1343, 1344 (Fed. Cir. 2018), as amended, (Nov. 20, 2018).

57. *Id.* at 1350 (citing *Intellectual Ventures I LLC v. Semantic Corp.*, 838 F.3d 1307, 1320–21 (Fed. Cir. 2016)).

58. *Id.*

transformed into patent-eligible subject matter—but it certainly helps.⁵⁹ Our judicial system, despite the neutrality of the Patent Act, remains determined to differentiate between the tangible and the intangible, continuing to emphasize the importance of Industrial Age technology in the Information Age.

C. A Patent System Cemented in the Industrial Age

“An idea of itself is not patentable, but a new device by which it may be made practically useful is.”⁶⁰ The Supreme Court thus differentiated in 1874 between the tangible implementation, which the Court held obvious, and the intangible idea, which the Court found not to be patent eligible.⁶¹ This decision fit in with the actuality that most patents granted in the Industrial Age tended to include the tangible, as acknowledged by Justice Kennedy, even when claiming intangible methods.⁶² Applying the Patent Act of 1836, where the word “art” was used to refer to what is now called a “process,” the Supreme Court wrote that it was “not easy to give a precise definition of what is meant by the term ‘art,’ as used in the acts of Congress.”⁶³ Art was then held to apply “to all those cases where the application of a principle is the most important part of the invention, and where the machinery, apparatus, or other means, by which the principle is applied, are incidental only and not of the essence of his invention.”⁶⁴ The application of a principle, of course, imagines that the art will have a tangible element to it. This tangibility requirement arose again in a later opinion holding that “[a] process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.”⁶⁵ In 1890, the leading patent treatise of the era wrote that “An art or operation is an act or a series of acts performed by some physical agent upon some physical object,

59. See, e.g., *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 212 (2014) (“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 that abstract idea into a patent-eligible invention.”); *In re TLI Commc’ns LLC Patent Litig.*, 823 F.3d at 611 (“However, not every claim that recites concrete, tangible components escapes the reach of the abstract-idea inquiry.”).

60. *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498, 507 (1874).

61. *Id.*

62. *Bilski v. Kappos*, 561 U.S. 593, 605 (2010).

63. *O’Reilly v. Morse*, 56 U.S. 62, 130 (1853).

64. *Id.*

65. *Cochrane v. Deener*, 94 U.S. 780, 788 (1876).

and producing in such object some change either of character or of condition. It is also called a 'process.'"⁶⁶

Thomas Jefferson, the first United States Commissioner for Patents, believed that patent-eligible subject matter should be limited "to particular machines, not to all possible applications or uses of them."⁶⁷ This long history tying tangible outcomes to the patentability of intangible processes has proven difficult to overcome in the Information Age.⁶⁸ Judge Dyk goes into a detailed history of the definition of "process" as used in 35 U.S.C. § 101 in his dissent from *In re Bilski*, concluding that:

There is no suggestion in any of this early consideration of process patents that processes for organizing human activity were or ever had been patentable. Rather, the uniform assumption was that the only processes that were patentable were processes for using or creating manufactures, machines, and compositions of matter.⁶⁹

Firmly cementing itself in the Industrial Age patent system, the Supreme Court subsequently wrote:

[The Information] Age puts the possibility of innovation in the hands of more people and raises new difficulties for the patent law. With ever more people trying to innovate and thus seeking patent protections for their inventions, the patent law faces a great challenge in striking the balance between protecting inventors and not granting monopolies over procedures that others would discover by independent, creative application of general principles.⁷⁰

Despite this historical emphasis on how processes contain tangible elements, these opinions do not limit what processes are patent eligible—they only point out how broadly processes can be

66. 1 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* § 159 (1890).

67. DUMAS MALONE, *JEFFERSON AND THE RIGHTS OF MAN* 284 (1951).

68. *See, e.g., In re Schrader*, 22 F.3d 290, 298 (Fed. Cir. 1994) (Newman, J., dissenting). ("[T]he patent system is directed to tangible things and procedures, not mere ideas.")

69. *In re Bilski*, 545 F.3d 943, 972 (Fed. Cir. 2008) (Dyk, J., concurring).

70. *Bilski v. Kappos*, 561 U.S. 593, 606 (2010).

claimed—and emphasize that the difficulty in understanding what a process is might be allayed when the process is tied to a tangible element.⁷¹ The very neutrality of the language of section 101 makes it clear that ideas can be patented not in and of themselves, but a process is an idea, and its patent-eligibility should be determined absent an evaluation of its tangible elements.

D. Information Age Intangibility

Patent infringement has changed as technology has advanced. In the Industrial Age of technology, innovations were tangible and present—often in the same room as the infringer. The means of controlling access to the technology might have been as simple as isolating the room where the technology is located⁷² or placing the technology under lock and key.⁷³ Today, the technology may be in another country, rendering technology more difficult to protect and infringement more challenging to define. Even something as simple as reading a book has changed dramatically.⁷⁴ The Industrial Age patent system is designed to protect the tangible e-reader, but the current implementation of the system does not adequately protect the intangible advances that allow the e-reader to store documents on a

71. *In re Prater*, 415 F.2d 1393, 1403 (C.C.P.A. 1969).

72. *See, e.g.*, *Peerless Roll Leaf Co. v. H. Griffin & Sons Co.*, 29 F.2d 646, 648 (2d Cir. 1928) (The technology at issue was partitioned off from the rest of the factory, isolated, and “[a]ccess . . . was possible only by crossing a bridge between two buildings.”).

73. *See* JAMES D. NORRIS, R.G. DUN & CO., 1841-1900: THE DEVELOPMENT OF CREDIT-REPORTING IN THE NINETEENTH CENTURY 53–54 (1978) (In order to access the *Dun & Bradstreet Reports*, purchasers in 1859 had to agree to keep the reports “on the designated premises of the firm, in a secure place . . . and to keep the information confidential.” The volumes were further “equipped with lock and key.”).

74. *See, e.g.*, *Cloud Satchel, LLC v. Amazon.com, Inc.*, 76 F. Supp. 3d 553, 556–57 (D. Del. 2014), *aff’d sub nom.* *Cloud Satchel, LLC v. Barnes & Noble, Inc.*, 626 F. App’x. 1010 (Fed. Cir. 2015).

The patents are directed to systems, devices, and methods for enabling the transmission and storage of document references or “tokens,” each of which is associated with an electronic document stored in a database. This enables mobile users to access all of their electronic documents without being limited by the memory available on a mobile device. The electronic document references, which identify electronic documents stored in a database, can be passed back and forth between the central database and the portable device, or between the portable device and other devices. A device can use the electronic document reference to request delivery of the full electronic document from the database.

Id. (citations omitted).

central server.⁷⁵ The next wave of innovation is intangible, and it is time for the patent system to recognize and embrace the patentability of the intangible.⁷⁶

E. Intangible Does Not Mean Abstract

Abstract ideas are not patent-eligible subject matter.⁷⁷ Intangible innovations are not necessarily abstract and so should not be painted with the broad brush of patent ineligibility. There is no simple test for determining what abstract subject matter is⁷⁸—in the same way that there is no simple test for determining how broad or narrow a claim is.⁷⁹ Not everything intangible is abstract, and not everything abstract is intangible. A method or a process is intangible, yet James Diehr was awarded a patent for a “method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer.”⁸⁰ James Diehr’s patent was directed towards a way of performing a series of steps—hardly something one can hold in one’s hand. However, this method, directed as it is, to the tangible art of curing and molding rubber (creating something that can be held),

75. *Id.* at 556.

76. See generally Timothy R. Holbrook & Lucas S. Osborn, *Digital Patent Infringement in an Era of 3D Printing*, 48 U.C. DAVIS L. REV. 1319 (2015).

77. *Diamond v. Diehr*, 450 U.S. 175, 185 (1981) (“This Court has undoubtedly recognized limits to § 101 and every discovery is not embraced within the statutory terms. Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.”). In fact, Professors Dan Burk and Mark Lemley have said that, out of the judicially-created exceptions, “the most significant remaining exception is the rule against the patenting of abstract ideas.” Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1642 (2003).

78. See, e.g., *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 221 (2014) (“[W]e need not labor to delimit the precise contours of the ‘abstract ideas’ category in this case.”).

79. See, e.g., *O’Reilly v. Morse*, 56 U.S. 62, 62 (1853). In *O’Reilly*, where the USPTO issued a claim to Morse reading:

I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electro-magnetism, however developed, for making or printing intelligible characters, signs or letters at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer.

Id. The Supreme Court determined that the claim was too broad and, therefore, not a valid claim, stating that to grant legal force to an overly broad claim is to allow the patentee to “prevent[] others from attempting to improve upon the manner and process which he has described in his specification—and may deter the public from using, it, even if discovered.” *Id.* at 120–21.

80. U.S. Patent No. 4,344,142 col. 7 l. 1 (issued Aug. 10, 1982).

was found by the Supreme Court not to be abstract.⁸¹ As the Supreme Court stated: “In contrast, the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber.”⁸² A mathematical formula is intangible, as is a process for curing rubber, but only one is abstract.⁸³ A patent for a method of preparing steel for painting was held patentable over the argument that it was an unpatentable principle.⁸⁴ Holding that “[t]he invention consists in the subjection of a specific object to the influence of a specific force through a specific mode of application,” the Delaware District Court found that this was “a true process or art, as distinguished from a principle or effect, and as such is within the scope of the patent act, and consequently is patentable subject-matter.”⁸⁵ Again, relying on the tangible outcome of the process, the court found the intangible method patentable.

This lack of delineation between the abstract and the intangible is firmly entrenched in United States Patent Law. All claims are abstract to a certain extent—and yet the vast majority of claims are claiming the tangible.⁸⁶ In 1972, the Supreme Court decided *Gottschalk v. Benson*, which raised the question of whether a “method for converting binary-coded decimal (BCD) numerals into pure binary numerals” was patent-eligible subject matter.⁸⁷ Benson’s intangible claim to an abstract idea was held not to claim patent-eligible subject matter.⁸⁸ The main concern of the Supreme Court was the nature of the claim that was “so abstract and sweeping” as to fully preempt any other use of the algorithm in question.⁸⁹ The Supreme Court highlighted the lack of a tangible nature to the claim—writing that the claim in question could be performed without a computer and was, at its very essence, an abstract algorithm.⁹⁰ In briefly laying out the history of patent-eligible intangible processes, Justice Douglas highlighted the tangible aspects of that history.⁹¹ Justice Douglas

81. *Diamond*, 480 U.S. at 184–85.

82. *Id.* at 187.

83. *Id.* at 185 (“Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.”).

84. *Am. Chem. Paint Co. v. C.R. Wilson Body Co.*, 298 F. 310, 311 (D. Del. 1924).

85. *Id.*

86. See Alan L. Durham, *The Paradox of “Abstract Ideas,”* 2011 UTAH L. REV. 797, 843–44 (2011).

87. *Gottschalk v. Benson*, 409 U.S. 63, 64 (1972).

88. *Id.* at 68.

89. *Id.* at 68, 71–72.

90. *Id.* at 67.

91. *Id.* at 67–71.

stated that precedent demonstrated that a process claim could qualify as patent eligible, if it was “tied to a particular machine or apparatus or operate[d] to change articles or materials to a ‘different state or thing.’”⁹² However, the Supreme Court went on to state that it did not intend to “freeze process patents to old technologies, leaving no room for the revelations of the new, onrushing technology,” but acknowledged that if software was to be patentable, then “considerable problems are raised” and suggested that “considered action by the Congress is needed.”⁹³

A few years later, the Supreme Court was again faced with the question of how to patent the intangible. In *Parker v. Flook*, the question was the patentability of a mathematical algorithm used during the catalytic chemical conversion of hydrocarbons.⁹⁴ Tied to the field of hydrocarbons, Flook’s invention was neither as abstract nor as sweeping as Benson’s claim.⁹⁵ The Supreme Court wrote that “[t]he line between a patentable ‘process’ and an unpatentable ‘principle’ is not always clear,” but that any “notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance.”⁹⁶ In other words, the abstract can remain abstract, even if it claims a tangible element. Flook may have sought to limit the scope of his idea, but it remained unpatentable.⁹⁷ Finally, the Supreme Court wrote:

Neither the dearth of precedent, nor this decision, should therefore be interpreted as reflecting a judgment that patent protection of certain novel and useful computer programs will not promote the progress of science and the useful arts, or that such protection is undesirable as a matter of policy.⁹⁸

Diehr, *Benson*, and *Flook* continue to find support in the modern Supreme Court and at the Patent Office. In January 2019, the PTO announced that all examiners reviewing claims that recite judicial exceptions must evaluate “whether the claim recites additional

92. *Id.* at 71.

93. *Id.* at 71, 73.

94. *Parker v. Flook*, 437 U.S. 584, 585 (1978).

95. *Id.* at 589–90.

96. *Id.* at 589, 590.

97. *Id.* at 594.

98. *Id.* at 595.

elements that integrate the identified judicial exception into a practical application.”⁹⁹ The “practical application” language comes straight from Justice Douglas’s opinion in *Benson*, where the claim was found unpatentable because “[t]he mathematical formula involved . . . has no substantial practical application.”¹⁰⁰

The test of patentability does not turn on the tangibility of the invention—there is no statutory requirement of tangibility. In patenting the intangible, the patentee may be seeking to patent the abstract, but that is not a given. And simply because the patentee is seeking to patent the intangible does not statutorily or judicially subject the patent to heightened scrutiny. Intangibility does not “doom the claims” as can be seen from the patentability of method claims.¹⁰¹ For example, a method of obtaining “seismograms which delineate with a high degree of precision the nature of the subsurface formations in the earth’s crust”¹⁰² has been held patentable, as has a method of identifying patients at risk of ventricular tachycardia by analyzing electrocardiographic signals.¹⁰³ A method of handling audio/video source information was later found to be obvious but was not challenged for lack of subject matter eligibility.¹⁰⁴ An intangible claim is not necessarily an abstract claim, and the distinction needs to be made not on whether what is claimed is tangible or not but on whether what is claimed is abstract.

F. Intangible Manufacture

In 2007, the Federal Circuit reviewed the patent eligibility of a patent claiming a method of sending a signal with a digitally embedded watermark, a device for sending the signal, a storage medium holding the signal containing the watermark and the signal

99. *U.S. Patent and Trademark Office Announces Revised Guidance for Determining Subject Matter Eligibility*, U.S. PAT. & TRADEMARK OFF. (Jan. 4, 2019), <https://www.uspto.gov/about-us/news-updates/us-patent-and-trademark-office-announces-revised-guidance-determining-subject>.

100. *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972).

101. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016) (“[T]hat the improvement is not defined by reference to ‘physical’ components does not doom the claims.”).

102. *In re Musgrave*, 431 F.2d 882, 882 (C.C.P.A. 1970).

103. *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1054 (Fed. Cir. 1992).

104. *See Method for Handling Audio/Video Source Information*, U.S. Patent No. 5,164,839 (issued Nov. 17, 1992).

itself.¹⁰⁵ The only claims on appeal before the Federal Circuit were those claiming the actual signal.¹⁰⁶ The Patent Office rejected the claim as an abstract idea—one with no “physical attributes” and, also, for not fitting into any of the patent-eligible subject matter categories of § 101.¹⁰⁷ The Federal Circuit found that the claims on appeal covered only transitory signals and held that physical, but transitory, signals were not patent eligible as they are neither process nor product.¹⁰⁸ In its discussion of whether a signal was a manufacture or not, the Federal Circuit held that a manufacture must be tangible in nature.¹⁰⁹ In finding the signal not to be patent eligible, the Federal Circuit referred to the fleeting nature of the signal and the lack of any “semblance of permanence during transmission.”¹¹⁰ In determining whether a signal is patent eligible, the Federal Circuit seems to have turned to § 102 of the Copyright Act, rather than § 101 of the Patent Act. Under the Copyright Act, only “original works of authorship fixed in any tangible medium of expression” are copyright eligible.¹¹¹ A work is “fixed” when its embodiment is not merely transitory.¹¹² The requirements that the signal be tangible and non-transitory are requirements normally associated with copyright law and not with patent law. Judge Linn dissented in part, stating that he disagreed with limiting the definition of manufacture to “non-transitory, tangible things.”¹¹³ A few years later, the Federal Circuit went on to hold that “[d]ata in its ethereal, non-physical form is simply information that does not fall under any of the categories of eligible subject matter under section 101.”¹¹⁴

Intangible products may not meet the requirements of § 101 because they lack utility due to an absence of function or because they do nothing more than embody abstract ideas. Intangible manufactures, however, should have the chance to show that they are

105. *In re Nuijten*, 500 F.3d 1346, 1351 (Fed. Cir. 2007).

106. *Id.* (Claim 14, the only independent claim to the signal read: “A *signal* with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.”).

107. *Id.*

108. *Id.* at 1352.

109. *Id.* at 1356.

110. *Id.*

111. 17 U.S.C. § 102 (2018).

112. 17 U.S.C. § 101.

113. *Nuijten*, 500 F.3d at 1358–59 (Linn, J., dissenting in part).

114. *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014).

more than abstract ideas and have function. In other words, they should be given the same treatment given tangible manufactures and first be evaluated as patent eligible subject matter. The signal in *Nuijten* is intangible, but it takes an input material, a signal, and adds a watermark, giving the signal a new form, new qualities, and new properties.¹¹⁵ There are many difficulties with protecting intangible innovations, but rendering intangible innovations unpatentable as a class is a far too narrow interpretation of a manufacture under § 101.

II. LEGISLATING THE INTANGIBLE

Intangible advances in technology are essential to business today. Protecting such advances through the Industrial Age patent system is difficult. Numerous intangible innovations are new ways of performing well-known tasks, raising patent eligibility questions outside the issue of subject matter, yet these questions remained focused on the intangible innovations.¹¹⁶ What is patent eligible subject matter should be at the heart of the discussion—and the difficulty with answering that question is the focus of this section of the article.

Methods of doing or conducting business are intangible and vital in the way they are shaping patent policy today. It was not always clear that business methods were patent eligible subject matter. With the increase in importance of computers and software, innovators sought protection for their ideas.¹¹⁷ Copyright law was a poor fit,

115. *Nuijten*, 500 F.3d at 1358–59 (Linn, J., dissenting) (citing *Am. Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931)).

116. One notorious example of such innovation was the patent received by Amazon for its “1-Click® ordering” system. This system allowed customers to purchase items with one click and, by relying on stored information, avoid the shopping cart checkout system typical of the Internet buying experience. Many argued at the time that the patent should not have been issued because it was neither novel nor non-obvious. Regardless, Amazon received the patent, licensed it to others, and enforced it in court. The innovation is often cited as one of the reasons Amazon’s business grew as large as it did. Keith Collins, *A Patent that Helped Amazon Take Over Online Commerce Is About to Expire*, QUARTZ (Aug. 19, 2017), <https://qz.com/1057490/a-patent-that-helped-amazon-take-over-online-commerce-is-about-to-expire/>.

117. Software developers struggled to find a way to protect their innovations. Using contracts to augment intellectual property protection first gained popularity with the use of software licenses at a time when statutory protection for software was close to non-existent. *See, e.g.*, *Softman Prods. Co. v. Adobe Sys., Inc.*, 171 F. Supp. 2d 1075, 1083 (C.D. Cal. 2001) (“Historically, the purpose of ‘licensing’ computer program copy use was to employ contract terms to augment trade secret protection in order to protect against unauthorized copying at a time when, first, the existence of a copyright

contracts require privity, and so innovators sought protection for their methods from the patent system. In 1998, the Federal Circuit held business methods patentable.¹¹⁸ Congress followed suit, codifying the validity of business method patents in the First Inventor Defense Act of 1999, stating that a “method of doing or conducting business” could be infringed.¹¹⁹

Despite this affirmation, obtaining a patent on a business method remains fraught with peril. A recent study looked at patent prosecution in the Patent Office’s technology center, 3600BM, encompassing computer-implemented business methods—in other words, the genuinely intangible advances.¹²⁰ The study found an allowance rate of around 36% for this technology center,¹²¹ compared with an overall allowance rate for patent applications of around 75%.¹²² Furthermore, the patent examiner with the single lowest allowance rate, 1%, is an examiner in the business methods art.¹²³

Part of the explanation for this difficulty comes from Congress’s interest in business method patents. In the first decade after the Federal Circuit held business methods patent eligible, industry filed over 40,000 business method patent applications.¹²⁴ When those numbers were brought to the attention of Congress, alarm bells rang. Senator Kyl stated, “the expectation [is] that most if not all true business-method patents are abstract and therefore invalid.”¹²⁵ Senator Schumer opined that “certain business method patents . . . are generally of dubious quality because unlike other types of patents, they have not been thoroughly reviewed at the PTO due to a lack of the best prior art.”¹²⁶ The America Invents Act (AIA) codified the

in computer programs was doubtful, and, later, when the extent to which copyright provided protection was uncertain.”)

118. *State St. Bank & Tr. Co. v. Signature Fin. Grp.*, 149 F.3d 1368, 1377 (Fed. Cir. 1998).

119. S. 1948, 106th Cong. § 273 (1999); see First Inventor Defense Act of 1999, Pub. L. No. 106-113, 113 Stat. 1536 (1999) (codified as amended at 35 U.S.C. § 273 (2018)).

120. Mark S. Nowotarski, *Surviving Alice with Big Data*, 11 LANDSLIDE 56, 57–58 (2018).

121. *Id.* at 61.

122. Chad Gilles, *The Easiest and Most Difficult Patent Examiners—Allowance Rate and Actions Per Disposal*, BIGPATENTDATA (Mar. 29, 2019), <https://bigpatentdata.com/2019/03/the-easiest-and-most-difficult-patent-examiners-allowance-rate-and-actions-per-disposal/>.

123. *Id.*

124. *In re Bilski*, 545 F.3d 943, 992 (Fed. Cir. 2008).

125. 157 CONG. REC. S1379 (daily ed. Mar. 8, 2011) (statement of Sen. Kyl).

126. 157 CONG. REC. S1364 (daily ed. Mar. 8, 2011) (statement of Sen. Schumer).

Covered Business Method (CBM) procedures in response to this perceived “flood of poor quality business method patents and a cottage industry of business method patent litigation.”¹²⁷ Although the AIA explicitly recognized the patentability of intangible business methods, the CBM procedures provided another barrier to those seeking to protect the intangible.¹²⁸

Business methods are financial, non-technological advances—clearly Information Age, intangible innovations. CBM procedures provide an additional level of scrutiny for parties who believe that a patent claiming “covered business method” has been infringed.¹²⁹ Once a patentee has charged another with infringement, then the interested party may file a petition with the Patent Office seeking a review of the validity of the patent at issue.¹³⁰ All patents are presumed valid upon issuance.¹³¹ The covered business method patentee is not entitled to the same presumption of validity as those seeking to protect tangible advances in the art.¹³² CBM procedures allow a party charged with infringement to ask the Patent Office to review a CBM patent for validity, even once the patent has issued.¹³³ A party to whom a patent claiming a covered business method has been issued, and who wishes to protect that patent by suing an infringer, may find themselves having to reprove the validity of their issued patent, despite the presumption of validity carried by all patents. In acknowledging the patentability of Information Age technology, Congress discriminated between covered business methods and tangible advances.

The lack of clarity in defining what aspects of Information Age technology are patent eligible is not an issue peculiar to the United States. In Japan, any “highly advanced creation of technical ideas utilizing the laws of nature” is patent eligible.¹³⁴ The Japan Patent

127. *Id.* at S1363; *see* Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18, 125 Stat. 284, 329–31 (2011).

128. *See* 35 U.S.C. § 321 (2018). The AIA contains a sunset provision with respect to CBM proceedings, and no new CBM petitions can be filed after September 16, 2020. § 18(a)(3), 125 Stat. at 330.

129. § 18, 125 Stat. at 329–31.

130. *Id.* at 329–30.

131. 35 U.S.C. § 282 (2018) (“A patent shall be presumed valid.”).

132. *See* § 18, 125 Stat. at 329.

133. *Id.*

134. U.S. PATENT & TRADEMARK OFFICE, PATENT ELIGIBLE SUBJECT MATTER: REPORT ON VIEWS AND RECOMMENDATIONS FROM THE PUBLIC 18 (2017), https://www.uspto.gov/sites/default/files/documents/101-Report_FINAL.pdf (quoting

Act then excludes explicitly “inventions that are liable to negatively affect public order, morality, or public health” from patent eligibility.¹³⁵ The European Patent Convention (EPC) defines patent-eligible inventions to be those “inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.”¹³⁶ The EPC then limits patent eligible subject matter further, noting that specific categories, including business methods, discoveries, scientific methods, and computer programs, are not inventions, while plant and animal varieties are not patent eligible subject matter.¹³⁷

Following the lead of the EPC and Japan by codifying the exceptions to patent eligibility for particular inventions would help inventors of intangible innovators understand how to protect their inventions.¹³⁸ Amending the definitions outlined in § 100 would mirror the approach taken by Japan and the EPC, allow the United States to codify the guidelines set forth for United States patent examiners, and retain the language of § 101, first drafted in 1793, that has worked for over 225 years.

Currently, § 100 defines an invention as an “invention or discovery.”¹³⁹ Amending § 100 to delineate what an invention is would reduce litigation costs, increase judicial efficiency, and make it easier for Information Age innovators to make decisions about how to best protect their innovations. The current diminished level of clarity as to

TOKKYO-Ho [Patent Act], Law No. 121 of 1959, art. 2, para. 1 (Japan), *translated at* <http://www.wipo.int/edocs/lexdocs/laws/en/jp/jp206en.pdf>.

135. *Id.*

136. Convention on the Grant of European Patents, Oct. of 5, October 1973, art. 52, [hereinafter EPC Rules], https://www.epo.org/law-practice/legal-texts/html/epc/2016/e/EPC_conv_20191101_en_20191021.pdf.

137. *Id.*

138. In addition to the codified exceptions, the Japanese patent examiners have a detailed list given to them of non-statutory inventions which are not patent eligible. These guidelines contain a detailed list of excluded inventions. Under these guidelines, the excluded categories are not a “creation of a technical idea utilizing the laws of nature” and are, therefore, not statutory inventions. JAPAN PATENT OFFICE, EXAMINATION GUIDELINES FOR PATENT AND UTILITY MODEL IN JAPAN pt. III, ch. 1, § 2.1.1 (2015) [hereinafter JAPAN GUIDELINES], *translated at* https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/tukujitu_kijun/document/index/all_e.pdf. In a similar fashion, the guidelines issued to United States patent examiners state that “claims directed to nothing more than abstract ideas (such as mathematical algorithms), natural phenomena, and laws of nature are not eligible for patent protection.” U.S. PATENT AND TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE (M.P.E.P) § 2106.04 (9th ed. Mar. 2014) (latest revision Jan. 2018).

139. 35 U.S.C. § 100 (2018).

what is patent eligible yields unpredictable results, leaving patentees, potential infringers, and investors uncertain as to whether a patent issued today will be enforceable tomorrow.¹⁴⁰ One expert commentator wrote, “[i]t is simply ridiculous that after 40 years of debate, we still do not have an answer to the simple question of whether (or when) software is patentable.”¹⁴¹ The difficulties faced by those seeking to patent business methods demonstrates the lack of clarity inherent in the current patent system. Codifying a definition of “invention” under § 100 would be of great benefit to all. Congress should set forth a clear definition of an invention by amending 35 U.S.C. § 100(a) to read as follows:

The term “invention” means invention or discovery.
The following are not statutory inventions or discoveries:

- (i) The laws of nature as such
- (ii) Mere discoveries and not creations, such as laws of nature, natural phenomena, and natural things
- (iii) Those contrary to the laws of nature
- (iv) Abstract ideas in which the laws of nature are not utilized¹⁴²

140. See, e.g., JOHN P. WALSH ET AL., *Effects of Research Tool Patents and Licensing on Biomedical Innovation*, in PATENTS IN THE KNOWLEDGE-BASED ECONOMY 294 n.13 (Stephen A. Merrill & Wesley M. Cohen eds., 2003) (“Some firms have also begun concentrating on their most promising targets, because of the high cost of maintaining patents and the low value of many . . . patents . . . that may not give rights to downstream developments . . .”).

141. Dennis Crouch, *Ongoing Debate: Is Software Patentable?*, PATENTLY-O (July 27, 2012), <https://patentlyo.com/patent/2012/07/ongoing-debate-is-software-patentable.html/>.

142. This language is based on the guidelines issued to Japanese patent examiners. JAPAN GUIDELINES, *supra* note 138, at pt. III, ch. 1, § 2.1. In addition, Senators Coons and Tillis and Representatives Collins, Johnson, and Stivers set forth a proposed framework for a modified § 101 on April 17, 2019. The framework proposed defining:

[I]n a closed list, exclusive categories of statutory subject matter which alone should not be eligible for patent protection. The sole list of exclusions might include the following categories, for example:

- Fundamental scientific principles;
- Products that exist solely and exclusively in nature;

Section 101 says that to be patent eligible an invention or discovery must be useful but fails to define utility.¹⁴³ Utility has long been a requirement of the patent system, and as early as 1852, the Supreme Court stated that to be patent eligible an innovation must have a “practical result” and “special purpose.”¹⁴⁴ Utility has never meant just that the patent must work—indeed, PTO guidelines state that all claimed inventions must have specific and substantial utility—something more than merely “the use of a complex invention as landfill.”¹⁴⁵ When even the examiners struggle to understand what it means to be useful, deciding whether the risk of allowance outweighs the cost of disclosing trade secrets is a daunting determination for an innovator to make. Codifying this requirement will allow innovators to understand what is required to receive the grant of a patent.¹⁴⁶

Information Age innovations have been challenged for claiming general purpose computers,¹⁴⁷ abstract ideas,¹⁴⁸ mental steps,¹⁴⁹ and failing to claim significant post-solution transformative elements.¹⁵⁰ The Patent Office itself has acknowledged that “[t]he legal uncertainty surrounding Section 101 poses unique challenges for the

Pure mathematical formulas;
Economic or commercial principles;
Mental activities.

Press Release, Coons.Senate.gov, Sens. Coons and Tillis and Reps. Collins, Johnson and Stivers Release Section 101 Patent Reform Framework (Apr. 17, 2019), <https://www.coons.senate.gov/news/press-releases/sens-coons-and-tillis-and-reps-collins-johnson-and-stivers-release-section-101-patent-reform-framework>.

143. 35 U.S.C. § 101 (2018).

144. *Le Roy v. Tatham*, 55 U.S. (1 How.) 156, 175 (1852).

145. U.S. PATENT & TRADEMARK OFFICE, MPEP § 2107, (9th ed. Jan. 2018).

146. A proposal to revise §§ 100 and 101 was released on May 22, 2019 by Senators Tillis and Coons and Representatives Collins, Johnson, and Stivers. The proposed legislation defines what it means to be “useful.” To be useful, an innovation must now provide “specific and practical utility in any field of technology through human intervention.” Press Release, Tillis.Senate.gov, Sens. Tillis and Coons and Reps. Collins, Johnson and Stivers Release Draft Bill Text to Reform Section 101 of the Patent Act (May 22, 2019), <https://www.tillis.senate.gov/2019/5/sens-tillis-and-coons-and-reps-collins-johnson-and-stivers-release-draft-bill-text-to-reform-section-101-of-the-patent-act>.

147. *See, e.g., Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208 (2014).

148. *See, e.g., Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709 (Fed. Cir. 2014).

149. *See, e.g., Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138 (Fed. Cir. 2016).

150. *See, e.g., Mayo Collaborative Servs. v. Prometheus Labs. Inc.*, 566 U.S. 66 (2012).

USPTO.”¹⁵¹ Codifying the requirement that an invention has specific,¹⁵² substantial,¹⁵³ and practical utility¹⁵⁴ mitigates much of that uncertainty by delineating what is patent eligible subject matter. Ratifying hundreds of years of precedent, 35 U.S.C. § 100 should be amended to include a definition of “useful” that reads as follows: “The term ‘useful’ means the claimed invention has specific, substantial, and practical utility.”

Specific utility requires proof that the benefit to the public of the patent disclosure exceeds the mere use of the innovation as an “object of scientific research.”¹⁵⁵ The patent system is a balancing act between the benefit received by the public from the patent disclosure and the benefit to the patentee of receiving the exclusive right to prevent others from unauthorized use of the invention for a limited time. Specific utility reaffirms the fundamental nature of this bargain.¹⁵⁶ By codifying the requirement that an invention has specific utility, inventors claiming software implemented on a general purpose computer may find their inventions rejected for lack of specific utility.¹⁵⁷ The focus shifts from whether the claim is an abstract idea to the more fundamental question of “is the claim one that benefits the public?” A general utility is one that applies to a broad class of inventions—and software implemented on a general purpose computer may have general utility (it works) but lack specific utility in the absence of a disclosure of a particular computer or some other transformative post-solution step. The codification of this language clarifies the difficulties faced by those seeking Information Age

151. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019).

152. *See, e.g., In re Kirk*, 376 F.2d 936 (C.C.P.A. 1967).

153. *See, e.g., In re Fisher*, 421 F.3d 1365 (Fed. Cir. 2005).

154. In January 2019, the USPTO released guidelines directing examiners to determine whether a claim that is directed to a judicial exception has “integrated the exception into a practical application.” A “practical application” is further defined as one that “will apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception.” 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. at 53.

155. *Brenner v. Manson*, 383 U.S. 519, 535 (1966).

156. *Fisher*, 421 F.3d at 1371 (Specific utility requires the provision to the public of a “well-defined and particular benefit.”).

157. *See generally* Timothy R. Holbrook, *Patent Disclosures and Time*, 69 VAND. L. REV. 1459 (2016) (The requirement of utility also allows for regulation of the timing of an application—preventing those with the mere idea from patenting the invention until it actually has been proven to work.).

patents, but such clarity also offers insight into ways to better protect those innovations as well.

The proposal detailed by this Article also requires inventions to have practical utility.¹⁵⁸ In reiterating the patentability of business method patents, Judge Rich wrote that the question of patentability should not turn on the four categories of subject matter outlined in § 101, but rather on “the essential characteristics of the subject matter, in particular, its practical utility.”¹⁵⁹ “Practical utility’ is a shorthand way of attributing ‘real-world’ value to claimed subject matter. In other words, one skilled in the art can use a claimed discovery in a manner which provides some immediate benefit to the public.”¹⁶⁰ Setting forth a test for “practical utility” is considerably more difficult than asking whether an invention works or not.¹⁶¹ Codification of this requirement recognizes the already existing unwritten requirement. In applying the “practical utility” test to intangible innovations, the focus shifts from the question of whether the claim is a concrete advancement, to the determination of what the benefit to the public of the claim is. The practical application test was first used in 1849 by the Northern District of New York Circuit Court in holding that “the person who first reduces the idea to practical application and use is entitled to the patent.”¹⁶² The claimed invention was a new application of a principle—and the practical application of the idea was held to be patentable.¹⁶³ In 1852, the Supreme Court held that “[a] new property discovered in matter, when practically applied, in the construction of a useful article of commerce or manufacture, is patentable.”¹⁶⁴ Practical and tangible are neither synonyms nor

158. In recognition of the many issues facing examiners of intangible Information Age innovations, in January 2019 the Patent Office issued guidance to its examiners on approaching eligibility issues under 35 U.S.C. § 101. Examiners were instructed to use a two-step method before rejecting claims for lack of subject matter eligibility. If the claim specifically recites subject matter that is proscribed by the defined categories of “judicial exceptions” then the examiner is to determine whether the claim “integrates the recited judicial exception into a practical application of that exception.” 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. at 53.

159. *State St. Bank & Tr. Co. v. Signature Fin. Grp.*, 149 F.3d 1368, 1375 (Fed. Cir. 1998), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

160. *Nelson v. Bowler*, 626 F.2d 853, 856 (C.C.P.A. 1980).

161. The earlier proposed framework stated that proposed legislation would “[c]reate a ‘practical application’ test to ensure that the statutorily ineligible subject matter is construed narrowly.” Coons.State.gov, *supra* note 142.

162. *Foote v. Silsby*, 9 F. Cas. 373, 381 (C.C.N.D.N.Y. 1849) (No. 4916), *aff’d*, 55 U.S. (1 How.) 218 (1852).

163. *Id.*

164. *Le Roy v. Tatham*, 55 U.S. 156, 175 (1852).

antonyms. The Industrial Age decisions focused on timely practical and tangible innovations. As the advances have shifted from the Industrial Age to the Information Age, the over 150 years of case law on what is a practical application contains many examples of practical utility of intangible innovations.¹⁶⁵

Defining invention and utility clarifies the bargaining process. A patent is a bargain whereby the public grants the inventor a limited set of rights in return for learning the intimate details of the invention. With the constantly shifting background of patent eligibility, and the substantial cost of obtaining a patent—both monetary and informational costs—many Information Age innovators are choosing to find other ways to protect their ideas and removing the benefit from the public granted by the patent system. Amending § 100 allows the United States to utilize better the Industrial Age laws to protect Information Age technology and upholds the patent bargain for the public and the innovators.

III. PROTECTING THE INTANGIBLE

In 2007, Apple and Burst.com settled a lawsuit over infringement of Burst.com's patent portfolio by Apple. Burst.com patented a method of faster-than-real-time transmission of data that paved the way for Windows' Media Player and Apple's iPod.¹⁶⁶ Burst.com's patent portfolio contained patents that received data, compressed the data, and transmitted the data.¹⁶⁷ The valuable technology involved in this litigation was data. Downloading a movie from Netflix, a book from Overdrive, or a song from iTunes involves transmitting compressed data. It is without question that an intangible asset (a patent) protecting intangible assets (data) has value. The question is how to best protect that value and promote innovation through the patent system.

165. See, e.g., *Diamond v. Diehr*, 450 U.S. 175, 184 (1981) (holding that an intangible method of curing and molding rubber articles which resulted in cured and molded rubber was patentable).

166. See Katie Marsal, *Apple Settles Burst.com Patent Suit for \$10 Million*, APPLEINSIDER (Nov. 21, 2007, 7:55 PM), https://appleinsider.com/articles/07/11/21/apple_settles_burst_com_patent_suit_for_10_million.

167. *Id.*

A. Circumnavigating the Patent System

Innovation in the Information Age focuses on technology without geographic boundaries. Industrial Age technology was restricted by the location of the machinery and devices that made life more comfortable. Today, life is made easier by the very erosion of the geographic barriers that limit enforcement of § 271. In order to infringe a United States patent, the infringer must avail themselves, without permission, of the patented technology within the United States.¹⁶⁸ The patent boundaries of the United States delineate the geographic reach of United States patent law. Outside these boundaries, infringement under United States law cannot be found.¹⁶⁹ Cloud computing, compartmentalization of technology, and the eroding connection between geography and technology reveals the flaws in the Industrial Age laws, as the intention behind the patent system is frustrated by the judicial implementation of the patent laws.¹⁷⁰ It is time to ameliorate these discrepancies and to enforce the purpose behind the patent system. If an invention is controlled from within the United States, its financial benefits accrue within the United States, and sufficient prefatory acts exist, then the invention is being used within the United States and can be found to infringe United States patents.

Burst.com's patents claimed both the method of faster-than-real-time transmission and the means of performing the transmission.¹⁷¹ If Apple had stored the compressed data outside the United States, then under the current interpretation of the patent laws, Apple would not have infringed any method claim that included the step of storing

168. See 35 U.S.C. § 271 (2018).

169. See, e.g., *Dowagiac Mfg. Co. v. Minn. Moline Plow Co.*, 235 U.S. 641, 650 (1915) ("The right conferred by a patent under our law is confined to the United States and its Territories and infringement of this right cannot be predicated of acts wholly done in a foreign country." (citation omitted)).

170. *M-I Drilling Fluids UK Ltd. v. Dynamic Air Ltd.*, 890 F.3d 995, 1008 (Fed. Cir. 2018) ("What is particularly troubling in this case is that if U.S. law does not apply to infringing activity on a U.S.-flagged ship in international water, then it is possible no law applies."); *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1373 (Fed. Cir. 2009) ("It cannot be that the legislators intended to enable avoidance of process patents by this ploy, while correcting it for machine patents. A statutory interpretation that results in all process inventions being seriously devalued, is not free of the charge of 'absurd result.'"); *Ocean Sci. & Eng'g, Inc. v. United States*, 595 F.2d 572, 574 (Ct. Cl. 1979) ("Perhaps the patent bar will note the possible loophole in the coverage of the U.S. patent laws and will invite the attention of Congress to it.").

171. Marsal, *supra* note 166.

the data.¹⁷² Burst.com's patents would, accordingly, have been worth considerably less, and perhaps the research and development put into Burst.com's technology would have been used for other purposes.

Contrast this potential outcome with the outcome under British law. Dr. Julian Menashe received a patent claiming a networked gaming system for an interactive casino game in which there were multiple computers in different locations.¹⁷³ William Hill operated an interactive casino game in which the networked gaming system involved computers in multiple countries.¹⁷⁴ In the United Kingdom, where Menashe sued Hill, the courts found that a user gambling at a computer in the United Kingdom used the patented method for online gambling in the United Kingdom, although the server accessed by the gaming system was located overseas.¹⁷⁵ The courts found that the unauthorized use occurred within the United Kingdom patent boundaries, regardless of the geographic boundaries of the location of the server.¹⁷⁶

Consider a similar case under the United States patent system. Rehncohl holds a patent on an invention using a communications network to facilitate transactions between suppliers and consumers.¹⁷⁷ Rehncohl patented a method of facilitating such transactions and the apparatus used to facilitate these transactions.¹⁷⁸ Various Canadian and Irish corporations operated websites that use Rehncohl's technology.¹⁷⁹ Users within the United States access the websites, but all data is maintained on international servers.¹⁸⁰ The domestic users execute transactions using international resources benefiting by receiving information from the international servers.¹⁸¹ Locating the code on international servers, however, insulates the international corporations from charges of infringement under United States patent law for the method of using

172. Apple has numerous Data Center Locations around the world, including in the United States, Denmark, and Hong Kong. *Apple Data Center Locations*, BAXTEL.COM, <https://baxtel.com/data-centers/apple#locations> (last visited Feb. 10, 2020).

173. *Menashe Bus. Mercantile, Ltd. v. William Hill Organisation Ltd.* [2002] EWCA (Civ) 1702, [2003] 1 W.L.R. 1462 (Eng.).

174. *Id.*

175. *Id.*

176. *Id.*

177. *Renhcol, Inc. v. Don Best Sports*, 548 F. Supp. 2d 356, 358 (E.D. Tex. 2008).

178. U.S. Patent No. 6,260,019 (issued July 10, 2001).

179. *Renhcol*, 548 F. Supp. 2d at 358–59.

180. *Id.* at 358.

181. *Id.* at 359.

the system.¹⁸² The system may be infringed in other ways, even with part of the system located overseas, but the method of facilitating transactions—using international servers controlled from the United States and benefitting the domestic use—falls outside the United States patent code.¹⁸³ To allow such circumnavigation of the patent boundaries hinders the progress of science and technology.

Geographic boundaries are imposing fewer restrictions on Information Age innovations, frustrating the protections offered by the patent system to patentees. The case law on extraterritoriality is complicated, evolving, and murky.¹⁸⁴ Courts analyzing patent infringement impacted by extraterritoriality have chosen not to address the issue of extraterritoriality,¹⁸⁵ have relied on narrow issues of statutory construction,¹⁸⁶ or held that the actions took place “outside of the territorial reach of any patent jurisdiction in the world.”¹⁸⁷ A straightforward standard is needed to eliminate categories, set aside the patchwork blueprint for circumnavigating United States patent boundaries, and delineate when a patented method is used within the United States.¹⁸⁸

Whoever without authority controls a patented method within the United States and benefits domestically from that method is a domestic user of that invention, regardless of whether the method

182. *Id.* at 366.

183. *Id.*

184. *See infra* Section IV.B.

185. *See, e.g.,* Life Techs. Corp. v. Promega Corp., 137 S. Ct. 734, 737 (2017) (focusing on the definition of component in § 271(f), rather than on what aspects of the patent infringement occurred extraterritorially); Transocean Offshore Deepwater Drilling, Inc. v. GlobalSantaFe Corp., 400 F. Supp. 2d 998 (S.D. Tex. 2005) (determining that a mobile offshore drilling rig was to be used in the Gulf of Mexico but not addressing the question of whether such use actually was within the United States and treating the location of the drilling rig as within the United States with no discussion of the question of extraterritoriality).

186. *See, e.g.,* Microsoft Corp. v. AT&T Corp., 550 U.S. 437, 442 (2007) (discussing the definition of component in 35 U.S.C. § 271(f)).

187. *WesternGeco L.L.C. v. ION Geophysical Corp.*, 791 F.3d 1340, 1352 (Fed. Cir. 2015), *vacated*, 136 S. Ct. 2486 (2016).

188. Others have written about the concerns of applying United States law to foreign activities. *See, e.g.,* Melissa Feeney Wasserman, Note, *Divided Infringement: Expanding the Extraterritorial Scope of Patent Law*, 82 N.Y.U. L. REV. 281 (2007). The most straightforward standard would be to find that methods that are controlled within the United States and where the benefit accrues within the United States are within the United States for purposes of 35 U.S.C. § 271(a). In the same breath, if one step of a patented method occurs within the United States, but the benefit accrues elsewhere, then no domestic use has occurred, and United States patent law does not govern.

covers the use of tangible or intangible assets. The consistent erosion of patent boundaries has led to confusion, increased costs, and a weakening of the patent system. It is time to strengthen the patent system and give United States patentees the full protection of their intellectual property rights.

B. Circumscribing the Patent System

The public policy behind the protection of intellectual property seeks to balance competing interests. Traditionally, agreements regulated the sharing of intellectual property itself, securing for the owners of the intellectual property the exclusive right to control their intellectual property as envisioned by the Constitutional Convention of 1787.¹⁸⁹ Patents are territorial rights, giving patentees the ability to file for patents in different countries and to seek patent protection where available. When the primary focus of innovation was tangible in nature, such a strict interpretation of territoriality may have made sense, but in the Information Age, such a rigid categorical reliance on geographic boundaries makes little sense.

The territorial limitations in United States patent law evolved in a time of patenting the tangible. In 1856, the Supreme Court wrote that the U.S. patent laws “do not, and were not intended to, operate beyond the limits of the United States.”¹⁹⁰ At issue in *Brown v. Duchesne* was a patented method of constructing boats.¹⁹¹ A French schooner sailed, under the French flag, into Boston Harbor.¹⁹² The schooner had been made in France using the method patented in the United States.¹⁹³ The patentee claimed infringement when the schooner was in a United States port, even though the unauthorized use of the method had occurred in France.¹⁹⁴ The Supreme Court held that on board a foreign-flagged ship in United States waters, the patent laws of the country whose flag the ship flies apply.¹⁹⁵

Not ten years later, in 1865, the question of patent boundaries arose again.¹⁹⁶ In *Gardiner v. Howe*, an American ship on the high

189. U.S. CONST., art. 1, § 8, cl. 8 (“The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries . . .”).

190. *Brown v. Duchesne*, 60 U.S. (19 How.) 183, 195 (1857).

191. *Id.* at 184.

192. *Id.* at 193.

193. *Id.* at 188.

194. *Id.* at 188.

195. *Id.* at 198.

196. *Gardiner v. Howe*, 9 F. Cas. 1157, 1157 (C.C.D. Mass. 1865) (No. 5,219).

seas engaged in the unauthorized use of a patented method.¹⁹⁷ The court found that “[t]he patent laws of the United States afford no protection to inventions beyond or outside of the jurisdiction of the United States.”¹⁹⁸ However, the court held that unauthorized use of a patented invention infringes a United States patent if the unauthorized use occurs on “the decks of American vessels on the high seas, as much as it does to all the territory of the country.”¹⁹⁹ The “floating island” doctrine was thus born, wherein “[a] ship, which bears a nation’s flag, is to be treated as a part of the territory of that nation. A ship is a kind of floating island.”²⁰⁰ Therefore, under this concept, any use of a patented invention on a United States-flagged ship occurs within the United States.

In 1943, the United States government engaged in the unauthorized use of a patent after purchasing and using radio receivers from the Marconi Wireless Telephone Company of America.²⁰¹ A number of patents covered the receivers, and during the term of the patent, the United States manufactured and built radio receivers without authorization.²⁰² Ten such receivers were assembled and used at the United States Naval Radio Station at the American Legation in Peking.²⁰³ This use was found to be within the United States.²⁰⁴

Relying on territoriality, Deepsouth Packing found a way to circumvent patent boundaries after it was found to have infringed Laitram’s patent on a machine for deveining shrimp.²⁰⁵ Deepsouth Packing made parts of the deveining machines in the United States, then sold the parts to foreign buyers along with instructions on how to assemble the machines once outside the United States.²⁰⁶ The

197. *Id.*

198. *Id.* at 1158.

199. *Id.*

200. *Patterson v. Eudora*, 190 U.S. 169, 176 (1903) (citations omitted).

201. The patent infringement suit specifically addresses the time period from “March 8, 1913, when plaintiff first gave notice of infringement to the defendant, to August 16, 1915, when the patent expired.” *Marconi Wireless Tel. Co. of Am. v. United States*, 99 Ct. Cl. 1, 5 (1942), *aff’d in part, vacated in part on other grounds*, 320 U.S. 1 (1943).

202. *Marconi Wireless Tel. Co. of Am.*, 99 Ct. Cl. at 5.

203. *Id.* at 38.

204. *Id.* at 68.

205. *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 523–24 (1972).

206. *Id.* at 523 n.5 (“Deepsouth is entirely straightforward in indicating that its course of conduct is motivated by a desire to avoid patent infringement. Its president wrote a Brazilian customer:

Supreme Court held that this was not an unauthorized use within the United States and, therefore, no infringement of Laitram's patent occurred by Deepsouth's exportation.²⁰⁷ Congress amended the patent code in 1984 to render such behavior infringement under § 271.²⁰⁸

Each of the above scenarios involved tangible aspects of the alleged infringement. In 1979, the validity of the doctrine of the "floating island" was challenged in the United States Court of Claims in a case alleging infringement of an intangible invention.²⁰⁹ Bascom patented a method of finding underwater objects.²¹⁰ The United States government used Bascom's patented technology without authorization on the high seas, outside the territorial reach of the United States.²¹¹ The Court of Claims suggested that if the Patent Act was strictly construed, such use might not be found to be within the United States, and recommended that the "patent bar . . . note the possible loophole in the coverage of the U.S. patent laws and . . . invite the attention of Congress to it."²¹² The Information Age nature of the invention was explicitly highlighted by the language of the court in addressing the intangible processes carried out. Bascom was denied relief on other grounds, leaving the question of the floating island doctrine out to sea.²¹³

Congress has historically recognized the territorial nature of patent law and the accompanying limitations. In an age of continually

'We are handicapped by a decision against us in the United States. This was a very technical decision and we can manufacture the entire machine without any complication in the United States, with the exception that there are two parts that must not be assembled in the United States, but assembled after the machine arrives in Brazil.'

(citation omitted)".

207. *Id.* at 527 ("[I]t is not an infringement to make or use a patented product outside of the United States . . . [T]o secure the injunction it seeks, Laitram must show a § 271(a) direct infringement . . . that Deepsouth 'makes,' 'uses,' or 'sells' the patented product within the bounds of this country." (citations omitted)).

208. *See* 130 CONG. REC. H10525 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier).

209. *Ocean Sci. Eng'g, Inc. v. U.S. Eng'g*, 595 F.2d 572, 574 (Ct. Cl. 1979) (In addressing the floating island doctrine, the Court of Claims stated, "Perhaps the patent bar will note the possible loophole in the coverage of the U.S. patent laws and will invite the attention of Congress to it. Meanwhile, it is well to adjudicate cases on other grounds when possible"); *see also* *Decca, Ltd. v. United States*, 544 F.2d 1070 (Ct. Cl. 1976).

210. *Ocean Sci. Eng'g*, 595 F.2d at 573.

211. *Id.*

212. *Id.* at 574.

213. *Id.* at 584.

eroding geographic boundaries, the argument could be made that given all the repeated codified expansions and limitations to the territorial reach of patent law, those areas left unaddressed must lie outside the patent boundaries. The numerous changes and amendments to the patent system reflect the fact that patent boundaries have expanded over time while technology has, simultaneously, eroded geographic boundaries.²¹⁴

The policies behind the protection of intellectual property do not support the enforcement of patent boundaries when the boundaries are being used primarily to frustrate public legislation. Patentees suffer the effects of such maneuvers. Patent law is inherently territorial, and boundaries have a role in the commercialization of intellectual property and products that embody intellectual property. However, a balance must be struck between the territorial limitations on the enforcement of patent law and protecting the public's interest in the promotion of the progress of science and the useful arts. The law needs to be applied as the policies behind it dictate, and patentees need to know what the boundaries are. A patented invention controlled from within the United States, and accruing domestic benefit, is used within the United States, even if it is only available for use and the actual use will take place, outside the traditional patent boundaries.²¹⁵

Whether the actions at question are over land, under sea, or geographically distant, if the action was controlled from within the geographic limits of the United States, and the benefit accrues within the United States, then the invention is being used within the United States. Those who seek to avoid charges of unauthorized use, not the patentees themselves, are setting the norms. Maintaining a balance between the public's interest in access to technology, and the patentee's interest in controlling that access promotes the progress of science and the useful arts. Circumnavigating and circumscribing patent boundaries raises numerous concerns and must be limited in its reach.

There is presently a divide in the way that the courts evaluate extraterritoriality in method claims, system claims, and machine claims. Many patents include both method and apparatus claims, and

214. For example, Congress responded to the Court's *DeepSouth* decision in 1984 by codifying as infringement the exportation of the components of a patented invention for indirect infringement internationally. See 35 U.S.C. § 271(f) (2018). In 1988, Congress codified as infringement the importation of a product made internationally by a domestically patented process, subject to certain limitations. *Id.* § 271(g).

215. See *Hughes Aircraft Co. v. United States*, 29 Fed. Cl. 197, 239–41 (1993).

patentees often assert both together, but even so, it is time to put an end to that divide and ask not what type of claim was drafted, but where the patented invention was used.²¹⁶ An invention is used in the location from where it is controlled and where it derives the benefit.²¹⁷ If a patented process is practiced so that some steps are performed domestically and some steps are not, then it cannot be that the practitioner can be found not to be using the invention in any country. The Supreme Court has written that patent infringement under United States law cannot be found when the acts predicated the finding of infringement are “wholly done in a foreign country.”²¹⁸ However, when steps occur within and outside the United States, then the unauthorized use does not wholly occur in any one country. To find no liability under domestic patent law devalues domestic method patents.²¹⁹ If an unauthorized use is controlled from within the United States and the benefit accrues within the United States, then the use takes place within the United States.

216. Before the Federal Circuit was created in 1982, the Seventh Circuit addressed an analogous issue of divided enforcement in *General Foods Corporation v. Carnation Company*. 411 F.2d 528 (7th Cir. 1969). In *Carnation*, the patented method was used in one district, while sales of the product were made in another district. *Id.* at 530. *Carnation* argued that just as each claim must be considered separately for validity and infringement, venue must also be determined separately with respect to each claim. *Id.* The *Carnation* court wrote that:

To hold as *Carnation* would have us do would create an intolerable situation. It would mean that an action for patent infringement in a situation such as we have here would be tried piecemeal, some claims in one jurisdiction and others in another. Confusion would be engendered and a multiplicity of suits invited.

Id. at 532. The analogy holds true when a court finds that system and machine claims are used domestically, while method claims are not. It is true that patent law is territorial. However, this division leads to a madness, whereby claims granted protection by the Patent Office are, in fact, practiced under no legal regime or, even more confusingly, under a mixed regime, whereby one country’s laws apply to one aspect of an invention and another country’s laws govern a different aspect of the same invention.

217. *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1317 (Fed. Cir. 2005) (“The use of a claimed system . . . is the place at which the system as a whole is put into service, *i.e.*, the place where control of the system is exercised and beneficial use of the system obtained.”).

218. *Dowagiac Mfg. Co. v. Minnesota Moline Plow Co.*, 235 U.S. 641, 650 (1915).

219. *See, e.g.*, *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1373 (Fed. Cir. 2009) (Newman, J., dissenting in part) (citation omitted) (noting that “[a] statutory interpretation that results in all process inventions being seriously devalued is not free of the charge of ‘absurd result.’”).

1. Origins of the Control and Benefit Test

In 1958, the Court of Customs and Patent Appeals decided *Bac v. Loomis*.²²⁰ The technology at issue involved a system for determining the location of a moving craft using two fixed points, and radio signals transmitted between the fixed points and the craft.²²¹ An early test of the invention involved setting up radio transmitting stations at Montauk, Long Island, and Fenwick Island, Delaware, and a monitoring station at Manahawkin, New Jersey.²²² An aircraft in Bermuda was then tracked using signals sent from New York and Delaware.²²³ Similar tests were run using stations located in the United States and Canada.²²⁴ The Patent Office Board of Patent Interferences (Board), upon hearing the facts of the case, stated that:

We are inclined to view the operation of an integrated instrumentality, a substantial portion of which is within the United States, and which is operated by and for residents of the United States, as not removed from the United States by reason of the projection of some elements of the instrumentality beyond the political boundaries of the United States because of the space requirements of the instrumentality in its field of practical application.²²⁵

Neither the Board nor the Court of Customs and Patent Appeals, upon appeal, went further with this inquiry, deciding the case on other grounds.²²⁶ The invention, controlled from within the United States, was found to be within the United States, despite the location of the craft outside the United States.²²⁷ This precedent establishes the idea that patent sovereignty and the accompanying patent boundaries can be extended to inventions controlled from the United States, even when such inventions are both within and without the United States.

220. *Bac v. Loomis*, 252 F.2d 571 (C.C.P.A. 1958).

221. *Id.* at 572.

222. *Id.* at 574.

223. *Id.*

224. *Id.*

225. *Rosen v. NASA*, 152 U.S.P.Q. (BNA) 757, 767 (B.P.A.I. Sept. 30, 1966) (quoting prior interference involving Patent No. 2,419,525).

226. *Id.* (citing *Bac*, 252 F.2d at 577).

227. *See id.*

A few years later, in *Decca*, the United States was accused of patent infringement of a radio-based navigation system.²²⁸ The navigation system worked by broadcasting radio signals to aircraft and ships, allowing each craft to determine its location and navigate from there.²²⁹ The United States anticipated using the navigation system worldwide, but at the time of the infringement suit had only three broadcast stations for use with the system: two based in the United States and one based in Norway.²³⁰ The craft receiving the signals were not necessarily within the United States. The question before the court was whether the system was used within the United States, and therefore potentially infringing the patent.²³¹ In answering the question, the court realized that there were different ways to find United States patent sovereignty.

The alleged infringing navigation system transmitted signals to ships and aircraft bearing the United States flag.²³² The Court of Claims declined to apply the “law of the flag” to the unauthorized use, stating, in dicta, that they thought “a decision founded on the fiction that for purposes of the Patent Laws, United States ships and planes wherever found, are United States territory, would be founded on water.”²³³

However, the court went on to discuss the question of control. Extending the line of cases addressing United States patent sovereignty, the Court of Claims found that a master broadcasting station controlled the navigation system.²³⁴ The master broadcasting station, located in Washington, D.C., monitored all stations, worldwide, and, thus, according to the court, “the necessarily scattered and changing position of receivers, with those actually functioning for the most part at sea, in or over the territory of no sovereign, have [no] necessary connection with the location of the . . . system for purposes of the United States Patent Laws.”²³⁵

[T]he whole . . . system must be deemed . . . to be a unity and the location of that unity must be deemed to be in United States territory. Here it has planted

228. *Decca Ltd. v. United States*, 544 F.2d 1070, 1072 (Ct. Cl. 1976).

229. *Id.* at 1074.

230. *Id.*

231. *Id.* at 1072–73.

232. *Id.* at 1072.

233. *Id.* at 1074; *see also* United Nations Convention on the Law of the Sea art. 94, Dec. 10, 1982, 1833 U.N.T.S. 397.

234. *Id.* at 1074–75.

235. *Decca Ltd.*, 544 F.2d at 1074.

several of its feet, and use of United States territory is indispensable to it. The location of facilities in some foreign countries is also essential to the plan, but the selection of any single other country is, apparently, not essential. Any one such country could readily be abandoned for another.²³⁶

Once again, the patent boundaries were measured by the location from where the invention was controlled, not the location of the actual invention itself.

Continuing in the line of extraterritoriality and Information Age technology, in *Rosen v. National Aeronautics and Space Administration*, the invention in question was the subject of a patent application entitled Method and Apparatus for Orienting a Satellite.²³⁷ The National Aeronautics and Space Administration (NASA) awarded Hughes a contract to build satellites incorporating the invention.²³⁸ At no point before filing for a patent was the invention reduced to practice since satellites using the invention “could not be made by Hughes or by anyone outside of Government, and only by Government in a multimillion dollar venture.”²³⁹ The invention had to be used in outer space in order to be actually reduced to practice, given the claim language of the patent.²⁴⁰ Under the facts, in this case, proof of actual reduction to practice within the United States was required for patentability purposes.²⁴¹ The court found that the invention had been actually reduced to practice after NASA launched a satellite incorporating the technology.²⁴² “[A]t the time of the successful orbital maneuvers, [said satellite] was irretrievably located 22,000 miles in space and over South America.”²⁴³ Actual reduction to practice had occurred—but had it occurred “within the United States?”

The Patent Office Board of Patent Interferences (Board) found that the satellite containing the invention had been controlled from NASA’s Goddard Space Flight Center, located in Maryland.²⁴⁴ Thus, the invention was controlled “within the United States” and the Board

236. *Id.* at 1075.

237. *Rosen v. NASA*, 152 U.S.P.Q. (BNA) 757, 758 (B.P.A.I. Sept. 30, 1966).

238. *Id.*

239. *Id.* at 763.

240. *Id.* at 768.

241. *See id.* at 760.

242. *Id.* at 768.

243. *Id.* at 766.

244. *Id.* at 768.

viewed “the operation of . . . the satellite and its control point . . . as not removed from the United States by reason of the satellite being necessarily distant from the several states of the United States.”²⁴⁵ In other words, as long as control remains within the United States, the United States patent laws extend to the invention.²⁴⁶ Sovereignty and the patent boundaries are determined by the location of the control point, and not the location of the invention itself.

In 1973, Hughes sued the United States government for patent infringement on their patent for a spacecraft control system.²⁴⁷ At issue was the liability of the government for multiple spacecraft used in a variety of international projects.²⁴⁸ Although the spacecraft was not operated within the domestic boundaries of the United States, the United States government was found liable for infringement.²⁴⁹

Two of the satellites were a joint project between the Federal Republic of Germany and the United States, built in Germany and launched from Cape Canaveral, Florida.²⁵⁰ “NASA’s main role following launch was to provide tracking and data acquisition services during some phases of the mission.”²⁵¹ After launch, “the attitude control systems were first activated in space shortly after separation from the launch vehicles.”²⁵² The Court of Federal Claims found that “NASA’s launch of both of the spacecraft constituted a use of the patented invention.”²⁵³

A joint project between the United States and the European Space Agency (ESA) to launch a series of satellites resulted in more charges of infringement by Hughes.²⁵⁴ Two satellites were “designed and constructed by NASA at Goddard Space Center” under this contract and launched from Cape Canaveral, Florida.²⁵⁵ The Court of Federal Claims found that NASA launched the satellite from Florida as part of “a joint program and not as a disinterested party.”²⁵⁶ The launch site was controlled by the United States, and the United States

245. *Id.*

246. *See, e.g., id.*

247. *Hughes Aircraft Co. v. United States*, 29 Fed. Cl. 197, 201 (Ct. Cl. 1993).

248. *Id.* at 243.

249. *Id.*

250. *Id.* at 228, 234.

251. *Id.* at 234.

252. *Id.* (citation omitted).

253. *Id.* at 235.

254. *Id.* at 235–37.

255. *Id.* at 237.

256. *Id.*

benefited from the satellite.²⁵⁷ These combined to make the use one within the United States, even if the actual infringement did not occur until outer space.²⁵⁸

The AMPTE UKS program provides an interesting contrast to the Cape Canaveral launched satellites.²⁵⁹ The AMPTE UKS satellites were built overseas under various agreements and launched by NASA.²⁶⁰ NASA did not track the satellites nor did the United States government receive any further benefit other than that of being part of a joint project.²⁶¹ The Court of Federal Claims found no infringement within the United States as the satellite was only temporarily present within the United States and, therefore, 35 U.S.C. § 272 provided a complete defense to a charge of infringement.²⁶²

In another joint program, a satellite was built by the United Kingdom and launched by NASA.²⁶³ The launch took place off the coast of Africa but was tracked by engineers at Goddard Space Center in Greenbelt, Maryland.²⁶⁴ The Court of Federal Claims found a connection with the United States too tenuous for the spacecraft to fall within United States patent boundaries.

“Use” has a broad definition, as Judge Turner wrote in the *Hughes* decision.²⁶⁵ That breadth expands the patent boundaries of the United States. Expansion is not unlimited, however. Focusing on the word use, the court found that a “device may be ‘used’ in many different ways, and all uses that rely on the teachings of a patent constitute infringement.”²⁶⁶ The invention at issue here, an attitude control

257. *Id.*

258. *Id.*

259. *See id.* at 237–41.

260. *Id.* at 239.

261. *Id.* at 239–40.

262. *Id.* at 241.

263. *Id.* at 242.

264. *Id.*

265. *Id.* at 226 (“A device may be ‘used’ in many different ways . . .”).

266. *Id.* at 226. Patent infringement suits against the government arise under 35 U.S.C. § 1498 and not under 35 U.S.C. § 271. Under § 1498:

Whenever an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, the owner’s remedy shall be by action against the United States in the United States Court of Federal Claims for the recovery of his reasonable and entire compensation for such use and manufacture.

35 U.S.C. § 1498 (2018).

system for a satellite, “cannot be activated until the spacecraft separates from the launch vehicle in space.”²⁶⁷ However, at the time of the launch, the attitude control system must necessarily, due to the nature of the invention, be present on the satellite.²⁶⁸ The Court of Federal Claims found that the very presence of the invention may be enough to bring the invention within domestic patent boundaries if control and benefit remain within the United States.²⁶⁹

Technology has eroded geographic boundaries. Patentees face unprecedented rates of encroachment on their intellectual property rights. Unauthorized use is categorically determined to be either domestic or not. Such strict categorization, when combined with the erosion of technological boundaries, devalues the patent system. The combination of control and benefit and a connection to the territorial grounds of the United States bring the invention within the United States patent boundaries and subject to United States sovereignty.

C. *Resetting Patent Boundaries*

Geographic boundary limitations have resulted in direct limitations on the rights of patentees in a world that knows few technological boundaries.²⁷⁰ These limitations have induced potential infringers to expand the scope of their activities ever further, and transactions that are controlled from the United States and benefit those in the United States are characterized as extraterritorial transactions. Bringing a suit for infringement when the site of the infringement is unclear is an expensive gamble. Applying the traditional normative justifications for the protection of patentees’ interest to such transactions can help determine where the transactions are taking place, and, therefore, what laws apply. Clarifying the location of the use will lead to less circumnavigation of the patent boundaries. Allowing potential infringers to avoid the United States patent laws by locating a server or a single step in another country will have a chilling effect on risk-averse innovators who are already struggling with the question of what is patent eligible

267. *Hughes Aircraft Co.*, 29 Fed. Cl. at 226.

268. *See generally id.*

269. *See id.* at 226–27.

270. “As you read this there are about 2,000 satellites orbiting above our heads . . . By 2025 as many as 1,100 satellites could be launching each year—up from 365 in 2018.” Tate Ryan-Mosley, et al., *The Number of Satellites Orbiting Earth Could Quintuple in the Next Decade*, MIT TECH. REV. (June 26, 2019), <https://www.technologyreview.com/s/613746/satellite-constellations-orbiting-earth-quintuple/>.

subject matter in the first place. Tailoring the inquiry to determine why and how the invention is being used, where the innovation is controlled from, and where the benefit of the invention is derived will delineate the patent boundaries and more accurately reflect the realities of the Information Age. Today's intangible innovations flow smoothly across geographic boundaries and raise many questions that are more readily addressed in the world of tangible innovations. The answers to those questions, however, should not be different based on the tangible nature of the invention. Resetting the patent boundaries to reflect the intentions behind the patent laws requires the evaluation of several relevant factors:

- Where will the invention be perceived as being practiced by the users?
- Does the unauthorized user know of the patent at the time of the unauthorized use?
- What are the terms of the arrangement leading to the question of whether the invention is being practiced within the United States?
- What is the nature of the intellectual property and “the character of the commercial embodiment”?²⁷¹
- How is the pricing of the agreement structured, what aspects are occurring where, and to whom does the financial benefit of the invention accrue?²⁷²
- What is the commercial relationship between the site where potential infringement could occur and the site where control of the invention is retained?
- What is the established profitability of the invention; how commercially successful is it, and what is its current popularity?

271. *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified sub nom. Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295 (2d Cir. 1971).

272. *See Adams v. Burke*, 84 U.S. 453, 456 (1873) (“[W]hen the patentee, or the person having his rights, sells a machine or instrument whose sole value is in its use, he receives the consideration for its use and he parts with the right to restrict that use . . . That is to say, the patentee or his assignee having in the act of sale received all the royalty or consideration which he claims for the use of his invention in that particular machine or instrument, it is open to the use of the purchaser without further restriction . . .”); *cf. Microsoft Corp. v. Dak Indus. (In re Dak Indus.)*, 66 F.3d 1091, 1095 n.2 (9th Cir. 1995) (“Because we look to the economic realities of the agreement, the fact that the agreement labels itself a ‘license’ and calls the payments ‘royalties’ . . . does not control our analysis.”).

These factors are discussed in the subsequent subsections.

1. Perception of Use

Where the user of the innovation perceives the innovation as being used should factor significantly into the location of the use of the innovation. To determine the perception of use, a court must ascertain the intent of the parties in practicing the innovation, as well as the location of the benefit received and the control over the invention. Taken together, these reflect the perceived location of the innovation and, therefore, guide the courts in delineating the nature and scope of the use and determining which patent laws apply to the alleged infringement.

If the location of the invention is unambiguous, then the courts should apply the relevant laws, and treat the infringement as domestic or international. It is common, however, particularly in the realm of the intangible, for the location of the use of the innovation to be challenging to determine and to differ from at least one parties' characterization of the use. Even when a contract is expressly entered into in another country, or steps are taken to locate elements of the invention extraterritorially, the circumstances surrounding the use may contradict the first interpretation of the invention's situs,²⁷³ and so courts must look to the substance of the use, not merely the strict geographic constraints.

O'Brien patented a radio-based navigation system.²⁷⁴ The system worked by broadcasting radio signals to ships and aircraft, allowing each craft to determine its location and navigate from there.²⁷⁵ The signals were sent from a device within the United States to a ship bearing a United States flag via a broadcast tower in Norway.²⁷⁶ The essence of the invention required that steps of the invention must take place outside of the United States and that the method of using the invention must involve steps outside the United States.²⁷⁷ The United States Court of Claims determined that the invention was used within the United States as the navigator receiving the signals was operating within the United States and retaining the benefit of the invention.²⁷⁸

273. *See generally* Hughes Aircraft Co. v. United States, 29 Fed. Cl. 197 (Ct. Cl. 1993); Decca Ltd. v. United States, 544 F.2d 1070, 1074 (Ct. Cl. 1976).

274. *Decca Ltd.*, 544 F.2d at 1074.

275. *Id.*

276. *Id.*

277. *Id.*

278. *Id.*

The perception of use was that the benefit was retained within the United States, and the court held that, despite having extraterritorial components, the patented system was used within the United States.²⁷⁹

The question of perception of use has been addressed by other countries and can be informative as to the application here. As discussed in Section 0 above, the United Kingdom courts found that a user gambling at a computer in the United Kingdom used the patented method for online gambling in the United Kingdom, despite the fact that the server was located overseas.²⁸⁰ The overseas location of the server was not apparent to the user, and all benefit reaped from the unauthorized use occurred within the United Kingdom patent boundaries, regardless of the geographic boundaries of the location of the server.²⁸¹

In order to determine the location of the infringing use of the invention, the court must apply both an objective and subjective standard to determine where the user perceived the use to have occurred, where the benefit accrued, and where control of the use remained. The subjective nature may be difficult to determine from the evidence, and the courts may be forced to extrapolate the subjective nature from an evaluation of the relevant terms of the use. Merely labeling a transaction as a domestic or international transaction or use cannot control.

2. Knowledge of Patent

To use an invention within the United States, without authorization, is to infringe the invention, even when such use is innocent and the user lacks any knowledge of the patent. To be vicariously liable for another's unauthorized use of an invention, the party who is responsible for another's indirect infringement must have known or must have been willfully blind of the existence of the patent.²⁸² To find an unauthorized use occurs within the United States (when not every step occurs), or element of the patent exists within the geographic boundaries of the United States, that same heightened standard must apply. It is essential to distinguish between those seeking to circumnavigate United States patent

279. *Id.*

280. *Menashe Bus. Mercantile Ltd. v. William Hill Org. Ltd.*, [2002] EWCA (Civ) 1702 [33]–[35], [2003] 1 W.L.R. 1462 (Eng.).

281. *Id.* at [33]–[34].

282. *See Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766, 768 (2011).

boundaries and innocent parties. In order to find patent infringement within the United States, when extraterritoriality exists, it is reasonable to ask whether a potential infringer knew or should have known of the patent at issue.²⁸³ Users should not be required to perform an international patent search when practicing an invention across territorial boundaries unless those users are seeking to circumnavigate the territorial reach of United States patent law. Vicarious liability can be found when an accused infringer took “deliberate actions to avoid confirming a high probability of wrongdoing and who can almost be said to have actually known the critical facts.”²⁸⁴ If a user knows, or should have known, of a United States patent and takes steps to circumnavigate the protection of United States patent laws, then that user should be held to the same standard as one infringing the patent entirely within the United States. Geographic boundaries are continually eroding, and patent boundaries should not be held to the same rigid definitions as geographic boundaries.

In 1993, the International Trade Commission (ITC) investigated the importation of disk drives containing sputtered carbon coated disks.²⁸⁵ In that investigation, the named respondents manufactured sputtered carbon coated disks in the United States and shipped those disks overseas for assembly into disk drives.²⁸⁶ When respondents did so, they did so with the knowledge that most of the assembled disk drives would be imported into the United States, infringing U.S. Patent No. Re 32,464.²⁸⁷ In a statement of the additional views of

283. In *Global-Tech Appliances, Inc. v. SEB S.A.*, a recent vicarious liability case, the Supreme Court took a number of things into account in reaching the determination that the alleged infringer should have been aware of the United States patents on the device. The Supreme Court looked at the fact that the patented device was “an innovation in the U.S. market,” a “superior product,” and one for which sales “had been growing for some time.” *Id.* at 770. The infringer was aware of this, having performed “market research” and “gather[ed] information as much as possible.” *Id.* at 770–71. The infringer then “cop[ied] all but the cosmetic features” of the patented device. *Id.* at 771. In addition, the infringer copied an “overseas model” of the patented device knowing “that the product it was designing was for the U.S. market” and “that products made for overseas markets usually do not bear U.S. patent markings.” *Id.* Finally, the infringer chose “not to inform the attorney from whom [the infringer] sought a right-to-use opinion that the product to be evaluated was simply a knockoff of [the patented device].” *Id.*

284. *Id.* at 769.

285. *In re Certain Sputtered Carbon Coated Disks & Prods. Containing Same, Including Disk Drives*, Inv. No. 337-TA-350, USITC Pub. 2701, Inv. No. 337-TA-350 (May 27, 1993) [hereinafter 350 Investigation].

286. *Id.*

287. *Id.*

three commissioners, the ITC wrote that there must be a nexus between the unfair acts, such as patent infringement, that give rise to jurisdiction under § 337, and the importation, sale for importation or domestic sale after importation.²⁸⁸ The Commissioners wrote that in order for the respondents who shipped the disks overseas to be held responsible for the unfair act, the respondents must have known or should have known that the goods would be subsequently exported to the United States.²⁸⁹ In other words, whether the manufacturer of the sputtered carbon coated disk drives was located within the United States made no difference in the culpability of the manufacturer.²⁹⁰ Culpability instead depends on whether the manufacturer knew or should have known that the manufacturer's sale would lead to the goods being domestically and unlawfully imported.²⁹¹ Knowledge of the patents supplies the nexus between the territoriality of the unauthorized use and the situs of every step along the way.

Knowledge of the patent may also allow a party not to be an unauthorized user of a domestic method. If post-publication a party uses a method to create the disclosed invention, but before the patent issues the party exports the product, then there is no unauthorized use within the United States.²⁹² Similarly, practicing a patented method wholly abroad that would infringe within the United States, and not importing the product of that process, even when the party is enjoined from unauthorized domestic use, does not implicate United States patent law.²⁹³ In each of these scenarios, the party used knowledge of the patent to avoid unauthorized domestic use of the technology but did not seek to circumvent domestic geographic boundaries.

United States Patent No. 8,070,847 is directed to a method of straightening patient's teeth without using traditional metal braces.²⁹⁴ The patented method requires taking an impression of the patient's teeth, creating a computer model of the impression, and using a 3-D printer to print a series of retainers that are then worn by

288. *Id.* (providing additional views from Vice Chairman Watson and Commissioners Anne E. Brunsdale and Carol T. Cranford).

289. *Id.*

290. *Id.*

291. *See id.*

292. *See Johns Hopkins Univ. v. CellPro, Inc.*, 152 F.3d 1342, 1366 (Fed. Cir. 1998).

293. *Int'l Rectifier Corp. v. Samsung Elecs. Co.*, 361 F.3d 1355, 1360 (Fed. Cir. 2004).

294. U.S. Patent No. 8,070,847 (issued Dec. 6, 2011).

the patient to straighten her teeth.²⁹⁵ A dentist living within the United States who takes an impression of her patient's teeth, uploads the impression to the internet, pays a Pakistani company to create a computer model of the impression in Pakistan, downloads the computer model, and prints the retainers in her domestic office should be found to infringe the patent.²⁹⁶ Under *NTP v. RIM*, in order for this to be an unauthorized use, every step must occur within the United States.²⁹⁷ Such method exceptionalism cannot make sense.²⁹⁸ If the dentist knows, or should know, of the patent and is intentionally circumnavigating the domestic patent boundaries, then that creates the nexus for unlawful domestic use. To find otherwise takes the teeth out of United States patent law in the Information Age.

3. The Terms of the Agreement

The terms of the agreement should be carefully examined in determining where infringement of the patent occurs. A transaction that takes place in a foreign country but contemplates delivery of the product into the United States is placing the patented invention on sale within the United States.²⁹⁹ Such a sale, if unauthorized, is infringement of the United States patent, even if the sale takes place overseas. Similarly, a sale that occurs within the United States for a device assembled abroad and sold internationally is not a sale under United States patent law because the terms of the agreement dictate delivery overseas and never contemplate the invention being brought within the United States patent boundaries.³⁰⁰ The determining factor is not the "location of the offer, but rather the location of the future sale that would occur pursuant to the offer."³⁰¹ In each of these scenarios, the terms of the agreement control the location of the infringement. By analogy, if the terms of the agreement expressly provide for control of the invention to be domestic and the benefit of

295. *ClearCorrect Operating, LLC v. Int'l Trade Comm'n*, 810 F.3d 1283, 1287 (Fed. Cir. 2015).

296. *Id.*

297. *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1318 (Fed. Cir. 2005).

298. *See Holbrook*, *supra* note 15, at 1008 ("Notwithstanding the statute's textual neutrality, the courts created rules unique to claimed methods that do not have a textual justification in the Patent Act itself.").

299. *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1310 (Fed. Cir. 2010).

300. *M2M Sols. LLC v. Motorola Sols., Inc.*, No. 12-33-RGA, 2016 WL 70814, at *20 (D. Del. Jan. 6, 2016).

301. *Transocean Offshore Deepwater Drilling, Inc.*, 617 F.3d at 1309.

the invention to also remain within the United States, then the invention should be considered to be used within the United States, regardless of the location of the steps and device. Because this example contemplates the use and not the sale, the terms should only be examined for guidance but remain a critical part of the determination when an intangible invention crosses geographic boundaries.

Looking at this factor through the eyes of the dentist—if the dentist performs, without authorization, a step or a series of steps outside the United States geographic boundaries, the terms of the agreement can help differentiate between the dentist contemplating delivery of the final product within the United States and the dentist contemplating delivery outside the United States. If the benefit is domestic and the control over the device remains within the United States, as dictated by the language of the transaction, then the transaction should fall under the protection of the United States patent system, regardless of the location of each step along the way.³⁰²

The terms of the agreement dictate the location of the sale of an article, and, by analogy, they should also provide guidance as to the location of the use of the article. A method may be used across geographic boundaries.³⁰³ If such use is governed by terms and conditions that dictate that the benefit is contemplated to be domestic, and that control remains within the geographic boundaries of the United States, then the use should be found to be within the United States as well, regardless of where each step takes place.³⁰⁴ Under that scenario, the terms of the transaction indicate that the method is being used within the United States as well, even if a step takes place outside the geographic boundaries.

The Federal Circuit has repeatedly emphasized the importance of the terms of the agreement over the actual location of the infringement—stating that to do otherwise would be to elevate form over substance.³⁰⁵ In 2004, GlowProducts, a Canadian company, sold and shipped products, including artificial, lighted “ice cubes,” from a Canadian website to customers located in the United States.³⁰⁶

302. See, e.g., *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 769 F.3d 1371, 1381–82 (Fed. Cir. 2014); *M2M Sols., LLC*, 2016 WL 70814, at *18–19.

303. The Federal Circuit has expressed great skepticism as to whether it is possible to sell a method or not. See *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005). If it is not possible to sell a method, then it is certainly not possible to sell one across geographic boundaries.

304. *Id.* at 1317.

305. *Litecubes, LLC v. N. Light Prods., Inc.*, 523 F.3d 1353, 1370 (Fed. Cir. 2008).

306. *Id.* at 1357–58.

Vanderschuit owns a patent on an artificial, lighted “ice cube” and sued GlowProducts for patent infringement.³⁰⁷ GlowProducts sold the infringing “ice cubes” from their British Columbia facility,³⁰⁸ but the language of the transactions clearly stated that the destination for the purchased products was the United States and included shipping charges for the destinations specified by the purchases.³⁰⁹ The sales were, therefore, found to be United States sales.³¹⁰ The terms of the deal dictated the location of the infringing sale.

In 2005, two American companies signed a contract in Norway for the sale of an offshore drilling rig.³¹¹ The contract, signed outside the United States geographic boundaries, explicitly stated that the oil rig was for use in the Gulf of Mexico.³¹² Before the rig was delivered, a suit for patent infringement was brought based solely on the contract executed and signed in Norway.³¹³ At the time the parties entered into the contract, the vessel was under construction in Singapore, and during the time between the sale of the vessel and the delivery of the offshore drilling rig to the Gulf of Mexico, the seller modified the vessel so that it no longer used the patented technology, the sale was found to be governed by United States patent law.³¹⁴

307. *Id.* at 1357.

308. *Id.* at 1358.

309. Brief of Defendant-Appellant at 6, *Litecubes, LLC v. N. Light Prods., Inc.*, 523 F.3d 1353 (Fed. Cir. 2008) (No. 2006-1646).

310. *Id.*; *Litecubes*, 523 F.3d at 1371.

311. Maersk Contractors USA, Inc.’s Response Brief in Opposition to Transocean’s Motion for Partial Summary Judgment on Infringement at 12, *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, No. H-07-2392, 2009 WL 8712584, at *1 (S.D. Tex. Jul. 28, 2009) (No. H-07-02392), 2009 WL 1612927.

312. *Id.* The parties disagreed, however, whether the rig could be used outside of the Gulf. *Id.* Transocean asserted the contract limited permissible use to the Gulf of Mexico; Maersk, on the other hand, asserted the Drilling contract permitted use “in places other than the Gulf of Mexico.” *Id.*

313. Transocean sued Maersk for patent infringement in July 2007. *Id.* at 9. The rig at issue, however, was not delivered to Maersk until January 2009. *Id.* at 13. Furthermore, the oilrig was modified before it was delivered to the Gulf of Mexico, and Transocean continued to assert that its infringement claim was based on the “rig that was the subject of the sale or offer for sale between Maersk and Statoil” the version of the oilrig before it was modified. Brief of Plaintiff-Appellant at 55, *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010) (No. 2009-1556), 2009 WL 5070048.

314. To make this even more interesting, the patents on the technology in question have been declared invalid in Norway and severely curtailed by the European Union, so limited suits could have been brought in the country where the transaction actually took place. *Amicus Curiae* Brief of Ministry of Foreign Affairs of Denmark in Support of Petitioner at 3, *Maersk Drilling USA, Inc. v. Transocean Offshore Deepwater Drilling, Inc.*, 134 S. Ct. 2333 (2014) (No. 13-43), 2013 WL 4049457.

Emphasizing again that the language of the transaction controls the location of the infringement when two companies entered into a contract within the United States for the sale of a patented invention manufactured and delivered overseas, the sale was found to be outside the scope of the domestic patent laws.³¹⁵ The District of Delaware focused on the language included in the contract, stating that the accused products, manufactured abroad, would be shipped to a contract manufacturer, also abroad, to determine that the terms of the transaction controlled the location of the sale, which was found to be outside both the United States geographic boundaries and the United States patent boundaries.³¹⁶ A similar outcome arose from a contract between two U.S. companies entered into in the United States for the sale “of a patented invention with delivery and performance *outside* of the United States.”³¹⁷

Infringement differentiates neither between the types of infringing uses nor the nature of the goods themselves.³¹⁸ If an unauthorized party makes, uses, sells, offers to sell or imports the innovation, then that party infringes the patent.³¹⁹ When the Federal Circuit looked to the language of the transaction to expand the definition of “within the United States” for purposes of selling or offering to sell, the definition similarly expanded for use.³²⁰ If the terms of the transaction state that the benefit of the invention remains within the United States, then the invention is more likely to be within the United States patent boundaries, even if a step or element occurs outside the United States geographic boundaries. The terms are not controlling but can help determine the location of the potential infringement.

4. The Nature of the Intellectual Property and the Character of Its Commercial Embodiment

The nature of the intellectual property and the character of its commercial embodiment need to be considered in determining whether an unauthorized domestic use has occurred or not. Software

315. See *M2M Sols. LLC v. Motorola Sols., Inc.*, No. 12-33-RGA, 2016 WL 70814, at *18 (D. Del. Jan. 6, 2016).

316. *Id.* at *20.

317. *Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 657 (E.D. Tex. 2013).

318. See generally 35 U.S.C. § 271 (2018).

319. *Id.*

320. *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1308–10 (Fed. Cir. 2010).

provides an example of the inherent nature of the intellectual property and the character of its commercial embodiment. Software itself is intangible. However, when software is saved to a physical object, such as a disk, USB drive, or external hard drive, then there is a tangible object. The commercial embodiment of each of these types of intellectual property is very different, and that character needs to be taken into account in determining whether an act that takes place across geographic boundaries falls under the United States patent system or not.

The character of the commercial embodiment and the nature of the intellectual property should not allow infringers to avoid errors in claim drafting. If the claims are drafted so that the act can never take place within the United States, then that is an unenforceable claim—regardless of the nature of the invention.³²¹ If the claimed commercial embodiment is a telephone system that requires two different local networks in two different countries, then the control and benefit are in neither country, and no domestic use of the invention has occurred. If the claimed commercial embodiment, on the other hand, is a telephone system that uses a domestic network to send a signal to an extraterritorial network and then uses the domestic network to receive the signal domestically, that is an embodiment that could be used domestically. Poor claim drafting cannot be overcome by a claim for control and benefit from within the United States. The claimed invention is what is protected.

In 2005, the United States Court of Appeals for the Federal Circuit heard arguments in *NTP v. RIM*, better known as the BlackBerry case.³²² The main issue in the litigation focused on whether an invention was within the United States “if a component or step of the patented invention is located or performed abroad.”³²³ The invention in question was a system and a method for the wireless exchange of email.³²⁴ The unlicensed competing system and method both relied on a Canadian server.³²⁵ The remainder of the system was located within the United States, and all other steps of the method of delivering the email were located within the United States.³²⁶

321. See, e.g., *Tech. Patents, LLC v. Deutsche Telekom AG*, 573 F. Supp. 2d 903 (D. Md. 2008), *aff'd*, *Tech. Patents, LLC v. T-Mobile (UK) Ltd.*, 700 F.3d 482 (Fed. Cir. 2012).

322. *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

323. *Id.* at 1315.

324. *Id.* at 1287.

325. *Id.* at 1290.

326. *Id.* at 1314–15.

The Federal Circuit held that “[t]he use of a claimed system . . . is the place at which the system as a whole is put into service, *i.e.*, the place where control of the system is exercised and beneficial use of the system obtained.”³²⁷ In other words, the location of one component in Canada did not remove the system from being used within the United States. If the system is controlled from and the benefit of the system is within the United States, then according to the Federal Circuit, the system is within the United States.³²⁸ In differentiating between the tangible and intangible, the Federal Circuit reached a different conclusion with regard to the method of using the system, holding that “the concept of ‘use’ of a patented method or process is fundamentally different from the use of a patented system or device.”³²⁹ The Federal Circuit held that a “process cannot be used ‘within’ the United States . . . unless each of the steps is performed within this country.”³³⁰ This is a distinction without meaning.

An innovative system invention falls within United States patent boundaries if it is controlled from within the United States, even if every component is not within the United States.³³¹ Under this holding, if a method is at issue, it cannot be within United States patent boundaries unless every step of the method occurs within the United States. In differentiating between method and system claims, the Federal Circuit flew in the face of the plain language of 35 U.S.C. § 271(a), which states that the unauthorized use of an invention within the United States is patent infringement.³³² Under 35 U.S.C. § 101, patentable inventions include processes, machines, manufactures, and compositions of matter.³³³ Users of systems and methods who are located in the United States, who control and derive benefit from those systems and methods, even if a component or step is located overseas, use those devices in the United States. The distinction made between methods and systems by the courts is one example of the non-textually driven wedge between patenting the intangible and tangible.³³⁴

327. *Id.* at 1317.

328. *Id.*

329. *Id.*

330. *Id.* at 1318.

331. *See id.*

332. 35 U.S.C. § 271(a) (2018).

333. 35 U.S.C. § 101.

334. Professor Holbrook’s article, *Method Patent Exceptionalism*, argues that neither 101 nor 271 differentiate between methods and other types of inventions, nor should such a differentiation be made. *See generally* Holbrook, *supra* note 15.

A potential domestic infringer who accesses a website in Ireland is using that website in the United States. A potential domestic infringer who mails a USB drive to Ireland containing a piece of software that the Irish user then makes a copy of, installs the copy in Ireland, runs the program, and mails back a USB drive containing the results is not using the Irish component of the software in the United States.³³⁵ It is not an unauthorized domestic use if the potential infringer controls the USB drive and benefits from the use of the software in Ireland.³³⁶ Current network technology makes using the Irish website in the United States seamless. The user does not need to know, nor does the user usually care, exactly where the software is located, as long as the user retains the benefit of using the software. In the United Kingdom, the courts expressly recognized this—finding that “a server in Antigua was ‘used’ in the U.K. when bets were placed over a computer network from a U.K. client, even though the processing at the heart of the patented gaming system actually occurred in Antigua.”³³⁷ Physically mailing the USB device is not seamless, and the installation of the software in Ireland is not controlled from within the United States. The character of the commercial embodiment is fundamentally different in each of these scenarios.

Sending email, using software across a network, controlling a method from within the United States, and retaining the domestic benefit all are examples of intellectual property embodied in a fashion that defies geographic boundaries. As such, the question should not be where each step of the method or each component of the system is located—but rather, the focus should turn on where the control and benefit are retained. Commercial embodiments of intellectual property that require the user to cross geographic boundaries to perform the process physically are less likely to be used or controlled from within the United States.

5. The Pricing Structure and Accrual of Financial Benefit

Under trademark law, one of the main factors that comes into play in determining whether domestic laws cover an international act of

335. See generally *Eolas Techs., Inc. v. Microsoft Corp.*, 399 F.3d 1325 (Fed. Cir. 2005) (discussing whether exported software code is a component of a patent invention).

336. See generally *id.*

337. Mark A. Lemley et. al, *Divided Infringement Claims*, 6 SEDONA CONF. J. 117, 128 (2005).

trademark infringement is the impact of the alleged infringer's conduct on domestic commerce.³³⁸ This factor relies heavily on where the infringer accrued financial benefit from the alleged infringement.³³⁹ If the infringer accrues financial benefit domestically, then even the international act may be covered by the domestic trademark laws. If an unauthorized user accrues domestic financial benefit because of a process that occurs across geographic boundaries, that domestic financial benefit should be taken into consideration in determining whether a domestic use of the invention has occurred.

There are limits to the importance of this factor, however. Under copyright law, an international infringement that results in business transactions taking place within the United States is not enough to render the copyright domestically infringed.³⁴⁰ Despite the domestic exchange of money, if all potential unauthorized use occurs extraterritorially, then the infringement itself is not domestic.³⁴¹ A domestic financial benefit is not enough to find a domestic infringement.³⁴² The accrual of financial benefit is one aspect of the transaction to be considered, but it is not enough, in and of itself, to render the use to be one within the United States patent boundaries.³⁴³ Otherwise, domestic companies with an international presence could find themselves liable for domestic patent infringement based on international transactions, simply because the corporate headquarters are located in Delaware.

On the other hand, changing the pricing structure so that all financial benefit accrues outside the United States is not enough to lead to a determination that the asserted unauthorized use did not occur within the United States, either. The benefits of unauthorized use are not merely monetary. Unauthorized use can impact the income to the patentee through a diversion of sales, loss of licensing opportunities, a decrease in the market value of the license arrangement, depression in value of the product, or other non-monetary detriments.³⁴⁴

338. *Vanity Fair Mills, Inc. v. T. Eaton Co.*, 234 F.2d 633, 642–43 (2d Cir. 1956), *cert. denied*, 352 U.S. 871 (1956).

339. *See id.* at 644.

340. *See Omega S.A. v. Costco Wholesale Corp.*, 776 F.3d 692, 695 (9th Cir. 2015).

341. *See id.*

342. *Quantitative Fin. Software, Ltd. v. Infinity Fin. Tech., Inc.*, No. 97 CIV. 7879 (LMM), 1998 WL 427710, at *2 (S.D.N.Y. July 28, 1998).

343. *See id.*

344. Melissa Feeney Wasserman, *Divided Infringement: Expanding the Extraterritorial Scope of Patent Law*, 82 N.Y.U. L. REV. 281, 303 (2007).

6. Commercial Relationship Between the Sites of Use and Control

There are many times when the sites of the use, control, and extraterritorial steps are all connected commercially. To determine the situs for an infringing use of networked technology, of technology used outside of traditional geographic boundaries, and of technology that benefits from its extraterritorial nature, the commercial relationship between sites of use and control must be considered. When seeking a patent on operating a naval base “located offshore, preferabl[y] in international waters”,³⁴⁵ a patent on a pneumatic conveyance system for offshore oil drilling rigs,³⁴⁶ or a patent on a “refrigeration apparatus for cooling containers and food in the microgravity conditions of outer space,”³⁴⁷ it is clear that the benefit is accruing somewhere besides the location of the actual invention. In these scenarios, the commercial relationship between the sites of use and benefit may help determine where the invention is being used for purposes of 35 U.S.C. § 271.

In 2003, Constellation Services, Inc., a commercial space services company, received a patent titled: “Method and apparatus for supplying orbital space platforms using payload canisters via intermediate orbital rendezvous and docking.”³⁴⁸ One anticipated use of this patented method is to deliver goods to the International Space Station.³⁴⁹ To practice the patent, a party would launch a supply canister into orbit using a launch vehicle, dock the canister to an intermediate space vehicle, and transfer the canister to the International Space Station.³⁵⁰ If the method delivers goods to the United States module, then current law says that this method is delivering goods to the United States. If the method delivers goods to the Russian, Canadian, Japanese, or European module or laboratory,³⁵¹ then the only tangible connection to the United States

345. U.S. Patent No. 5,189,978, col. 2, l. 54–56 (issued March 2, 1993).

346. *M-I Drilling Fluids UK Ltd. v. Dynamic Air Ltd.*, 890 F.3d 995, 998 (Fed. Cir. 2018).

347. U.S. Patent No. 4,738,113 (issued Apr. 19, 1988).

348. U.S. Patent No. 6,669,148 (issued Dec. 30, 2003).

349. *Id.* at col. 1.

350. *Id.* at col. 4, l. 17–31.

351. “The station is a venture of international cooperation among NASA, the Russian Federal Space Agency, Canadian Space Agency, Japan Aerospace Exploration Agency, or JAXA, and 11 members of the European Space Agency, or ESA: Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom.” NASA, *Nations Around the World Mark 10th Anniversary of International Space Station*, NASA: INTERNATIONAL SPACE STATION

could potentially be the launch from the United States.³⁵² There is no way for every step of this method to occur within the United States.³⁵³ The use of the “intermediate space vehicle to position the supply canister relative to the space platform” must occur in outer space, which is not subject to United States patent law.³⁵⁴ Congress has extended United States patent law “to applicable activities conducted in outer space.”³⁵⁵ Inventions in outer space are expressly “within the United States” if the invention is “made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States” unless the “space object . . . is specifically identified and otherwise provided for by an international agreement” or the space object is registered to a foreign state.³⁵⁶ However, this does not take into account the positioning of the supply canister, which is taking place in outer space.

Microsoft produces, distributes, and hosts software worldwide.³⁵⁷ Its data centers, services, and facilities are located around the globe.³⁵⁸ Machalek invented software that extracted relevant data from a customer relationship management database and imported it into spreadsheets.³⁵⁹ Machalek sued Microsoft for its unauthorized use of Machalek’s software.³⁶⁰ If Microsoft controlled the use of its software from within the United States and benefited from that use, even if the software was stored on a non-domestic server, Microsoft was engaging in unauthorized domestic use of Machalek’s invention.³⁶¹ Microsoft’s ownership and the ongoing commercial

(Nov. 17, 2008), http://www.nasa.gov/mission_pages/station/main/10th_anniversary.html/.

352. There are less than two dozen launch sites worldwide that operate on a regular basis, and of these, four are in the United States. *Space Launch Sites Around the World*, SPACE TODAY ONLINE, <http://www.spacetoday.org/Rockets/Spaceports/LaunchSites.html> (last visited Mar. 20, 2020).

353. U.S. Patent No. 6,669,148, col. 4, l. 17–31 (issued Dec. 30, 2003).

354. *Id.* at col. 10, l. 1–2.

355. JOSEPH R. BIDEN, INVENTIONS IN OUTER SPACE, S. REP. NO. 101-266, at 6 (1990).

356. 35 U.S.C. § 105(a) (2018).

357. *See generally Facts About Microsoft*, MICROSOFT (Feb. 11, 2020, 1:48 PM), <https://news.microsoft.com/facts-about-microsoft/>.

358. *Id.*

359. *MasterMine Software, Inc. v. Microsoft Corp.*, No. 13-cv-971, 2015 WL 12778417, at *1 (D. Minn. Aug. 5, 2015).

360. *Id.*

361. *See id.* at *11 (“[W]here users located in the United States control and derive beneficial use from a device located overseas that infringes a claimed system, those

relationship between the location of the software and the location of the user provides a basis for finding the method is controlled from within the United States. If Microsoft benefits from this use, then the method is being domestically used without authorization.

The reverse is also true. Microsoft licenses software such as Microsoft Office to individuals.³⁶² In order to use that software, the individual must activate the software with Microsoft's Product Activation technology.³⁶³ Foreign software licensees may activate the software through the Microsoft Clearinghouse located in the United States.³⁶⁴ Microsoft controls this system from within the United States, and the system extends a domestic benefit to Microsoft and the user. The method of activation is being used within the United States, even when the activating party is outside the United States.³⁶⁵

The focus must remain on the location from where the technology is controlled and the location where the benefit is derived. If a Pakistani company creates an electronic catalog in Pakistan by crawling the web to visit websites located in the United States, that company is not creating the catalog within the United States. The visit to a domestic website by a Pakistani computer or computer operator seeking information to be used and stored in Pakistan remains a Pakistani use of the website.³⁶⁶ The visit is controlled from Pakistan, and the benefit is accrued in Pakistan.

Transocean Offshore Deepwater Drilling, Inc. (Transocean), an Anglo-Australian company, holds several United States patents for methods and apparatus for offshore drilling.³⁶⁷ As the name suggests, much of offshore drilling takes place outside the geographic boundaries of the United States, and the value and benefit of this technology require protection beyond the strict geographic boundaries of the United States. Transocean learned that its patented technology was being used, without permission, in the Gulf of Mexico—in an area

users use the infringing device in the United States and commit direct infringement.” (quoting *Renhcol Inc. v. Don Best Sports*, 548 F. Supp. 2d 356, 360 (E.D. Tex. 2008)).

362. See MICROSOFT LICENSING, <https://www.microsoft.com/en-us/licensing/default> (last visited Mar. 20, 2020).

363. See *Product Activation and Key Information*, MICROSOFT LICENSING, <https://licensingapps.microsoft.com/product-activation> (last visited Mar. 20, 2020).

364. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F. Supp. 2d 147, 156 (2009).

365. *Id.*

366. *CNET Networks, Inc. v. Etilize, Inc.*, 528 F. Supp. 2d 985, 991 (N.D. Cal. 2007).

367. *Transocean Offshore Deepwater Drilling, Inc. v. GlobalSantaFe Corp.*, No. H-03-2910, 2006 WL 3813778, at *1 (S.D. Tex. Dec. 27, 2006).

located within the United States Exclusive Economic Zone (EEZ).³⁶⁸ The courts found this use within the United States, and Transocean was able to pursue its claim of infringing use by the unauthorized parties.³⁶⁹ WesternGeco owns several patents on a device for and a method of gathering information about the ocean floor.³⁷⁰ The device and method were used, without authorization, in the Chukchi Sea, also located in the United States EEZ; however, this use was not found to be within the United States.³⁷¹ There is no easy way to differentiate between the location of the infringement in these two cases. The focus of the issue ought not to be whether the use has occurred in the EEZ or not, but rather what is the relationship between the commercial site of the use, the EEZ, and the commercial site receiving the benefit of the use, and from where that use is controlled. In the case of aquatic exploration and offshore mining, it is often easier to determine the location of the benefit than the location of the use itself.

There are many examples of patents that have domestic value in their extraterritorial use. Allowing unauthorized users to benefit from the extraterritorial aspects, while sheltering the same users from § 271, undermines the very values of our patent system. When there is a commercial relationship between the sites of use and control, the use should be found to be domestic. When the value of the invention is its extraterritorial application, to hold otherwise would be to remove all potential protections from such inventions, and to discourage innovation in the ever-expanding technological reaches of our physical world.

368. The United States EEZ was established by Presidential Proclamation in 1983 and includes all waters adjacent to the United States territorial seas extending 200 nautical miles from the territorial seas. The EEZ is “an area beyond the territory and territorial sea of the United States in which all States enjoy the high seas freedoms of navigation, overflight, the laying of submarine cables and pipelines, and other internationally lawful uses of the sea.” Proclamation No. 5030, 48 Fed. Reg. 10605 (Mar. 10, 1983).

369. *GlobalSantaFe Corp.*, 2006 WL 3813778, at *1.

370. *WesternGeco, LLC v. ION Geophysical Corp.*, 791 F.3d 1340, 1343 (Fed. Cir. 2015).

371. *WesternGeco LLC v. ION Geophysical Corp.*, 869 F. Supp. 2d 793, 796 (S.D. Tex. 2012), *rev'd in part on other grounds*, No. 4:09-CV-1827, 2012 WL 1708852 (S.D. Tex. May 15, 2012) (“[T]his Court has held that the high seas, including the Chukchi Sea, and the United States’ Exclusive Economic Zone (‘EEZ’), including the EEZ in the Gulf of Mexico, are not U.S. territories or possessions for purposes of the Patent Act.”).

7. Intent

Proof of an incentive to practice a patent without authorization must be more than proof of knowledge—known or should have known—of the United States patents. There must be a nexus between knowledge of the United States patents and an intention to circumvent the territorial limitations of United States patent law. United States patent laws should not be construed to penalize domestic companies or companies that contribute significantly to the domestic economy as compared to foreign competitors. However, any company that seeks to circumvent United States patent boundaries by playing games should be subject to United States patent laws if the unauthorized use is controlled within the United States, the financial benefit accrues within the United States, and there is an incentive to avoid becoming an authorized user of the patented technology.

“Power Integrations and Fairchild are direct competitors in the power supply controller chip market.”³⁷² Power Integration owns several patents on power supply controller chips,³⁷³ which ensure that the power supply functions properly.³⁷⁴ Power Integration sued Fairchild for patent infringement.³⁷⁵ In the suit, Power Integration argued that Fairchild made international chip sales to induce domestic infringement.³⁷⁶ The Federal Circuit found that, although no single piece of evidence was individually sufficient to show intent, the evidence as a whole provided a basis for a potential finding of induced infringement.³⁷⁷ In other words, knowledge of the patent and intent to profit were not enough; there also had to be an intention on Fairchild’s part to profit off of the unauthorized domestic use of the international product sales. In finding such a basis, the Federal Circuit looked at Fairchild’s actions concerning its chips.

Fairchild promoted its chips as complying with regulations specific to the United States, including the California Energy

372. *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 843 F.3d 1315, 1320 (Fed. Cir. 2016).

373. Fairchild is also the holder of several patents in this space, but this discussion focuses on Fairchild’s unauthorized use of Power Integrations’ patented technology. See *List of Patentees*, U.S. PATENT AND TRADEMARK OFFICE, <https://www.uspto.gov/web/offices/com/sol/og/2017/week45/OG/patentee/alphaS.html> (last visited Mar. 7, 2020).

374. *Power Integrations Inc.*, 843 F.3d at 1321.

375. See *id.* at 1324.

376. See *id.* at 1324–25.

377. See *id.* at 1334.

Commission and Energy Star Level 5 standards.³⁷⁸ These standards are specific to the United States, and in fact, are less stringent than the European Union's standards.³⁷⁹ In addition, Fairchild states that it stands behind its products and indemnifies its customers against suits for infringement of United States patents.³⁸⁰ Fairchild further targeted customers in the United States through its advertising and its website.³⁸¹ As a whole, the Federal Circuit found this could be enough evidence to show an intent to induce domestic infringement.³⁸²

An indemnification agreement should not be enough to establish that control and benefit lie within the United States. Absent evidence that the primary purpose of the indemnification agreement was to result in unauthorized use of the invention within the United States, it is reasonable to assume that the primary purpose of the indemnification agreement exists for some purpose other than to maintain control and reap domestic benefit. However, an indemnification agreement may be indicative of an overall intent. Insufficient in and of itself—it may be significant in light of other activities on the part of the unauthorized user.

Nor should designing a product to comply with United States regulations be enough to establish either that Fairchild controls the use of its products within the United States or that Fairchild benefits from the use of those products. However, again, this may be indicative of other actions on the part of Fairchild that may lead to a finding of control and benefit within the United States. The relationship between the parties using Fairchild's chips and Fairchild must be examined in light of all of these questions before a determination can be made. If Fairchild conditions its profits, even downstream, on the sale of goods within the United States, then Fairchild is benefitting financially from the domestic use. The indemnification clause may be

378. Power Integrations' Non-Confidential Opening Brief at 50–51, *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 843 F.3d 1315 (Fed. Cir. 2015) (No. 15-1329), 2015 WL 6061894.

379. *Power Integrations Inc.*, 843 F.3d at 1334 (“The jury also heard testimony that, while other countries initially adopted the United States energy efficiency standards, certain countries had established different, more stringent standards of their own.”).

380. *Litigation Update*, FAIRCHILD SEMICONDUCTOR, <https://www.fairchildsemi.com/about/media/litigation-update/> (last visited Feb. 11, 2020) (“We stand behind our products. Our worldwide terms and conditions of sale include industry-standard indemnification for patent infringement. For products subject to injunctions, we have been forced to limit this indemnification.”).

381. Power Integrations' Non-Confidential Opening Brief, *supra* note 378, at 37; *Litigation Update*, *supra* note 380.

382. *Power Integrations*, 843 F.3d at 1334.

further proof of a relationship between Fairchild and the end-user that results in Fairchild's control over the unauthorized domestic use of the power supply controller chip. Compliance with regulations should be examined in the light of the relationship between the parties—not seeking to penalize international companies seeking to maximize the market for a product, but rather seeking to disincentivize companies seeking to circumvent patent boundaries while profiting off of unauthorized domestic use. Evidence of active steps taken to control domestic use supports a finding that a party intends the domestic use and is seeking to circumnavigate the United States patent boundaries. Such use must be found to be within the United States.

Intent separates those who are genuinely seeking to circumnavigate the United States patent system and yet still practice domestically from those who are practicing part of the patented technology domestically with a focus on the overseas application of the method. Intent distinguishes the patent boundaries.

8. Economic Realities

Even after analyzing all of the issues described above, whether an invention falls within the boundaries of the United States will turn on the economic realities of the invention and its use. Delineating the economic realities is a tricky proposition and a strict categorization of an invention can lead to strained results and could lead to technology covered by no countries' laws.

It cannot make sense to allow computer servers to go the way of commercial ships—flagged and established in countries with minimal legal protections for the parties. Companies may choose to register vessels in countries other than the country where the company is based, or even where the ship is docked.³⁸³ That registration allows the ship to fly a nation's flag with which nation the ship has only a

383. See H. Edwin Anderson, III, *The Nationality of Ships and Flags of Convenience: Economics, Politics, and Alternatives*, 21 TUL. MAR. L.J. 139, 162 (1997) (“One of the premises of the principle of freedom of the high seas is that all states have the right to grant nationality to a vessel in accordance with national and international law . . . [T]he flag state, the state granting nationality to a vessel, has exclusive jurisdiction over that vessel on the high seas to the extent permitted by international law.”); see also Tom Hamburger & Kim Geiger, *Foreign Flagging of Offshore Rigs Skirts U.S. Safety Rules*, L.A. TIMES (June 14, 2010), <http://articles.latimes.com/2010/jun/14/nation/la-na-oil-inspection-20100615> (Companies can register vessels “in unlikely places such as the Marshall Islands, Panama and Liberia—reducing the U.S. government’s role in inspecting and enforcing safety and other standards.”).

tenuous nexus. International maritime law generally holds that the law of the country whose flag the ship flies governs a ship.³⁸⁴ These “flags of convenience” may shelter a vessel from the laws of the country where the vessel is located.³⁸⁵ Ships that sail under a nation’s flag “shall be subject to its exclusive jurisdiction on the high seas.”³⁸⁶ The result of extending this notion to computer servers, used in so many method patents, may lead to a poor fit between the patent laws of a country and the server technology. The Marshall Islands, for instance, is a popular country in which to register ships and oil rigs.³⁸⁷ There is no patent law in the Marshall Islands. In fact, “[t]he only intellectual property-related legislation relates to locally produced music recordings.”³⁸⁸ The Marshall Islands may, therefore, provide a patent shelter for servers.³⁸⁹ If the placement of a server in the Marshall Islands removes all liability for unauthorized use of methods that access the Marshall Island servers, then the patent system is broken. The domestic user does not know and, in fact, has no ability to gain knowledge, of the server location, yet the domestic user is benefitting from the access the internet gives to the international servers. Such a use weakens domestic patent protection.

The “law of the flag” is a poor fit for the technological advances made possible by the internet and cloud computing. The economic realities of the internet dictate the idea that a user should only be liable in one location.³⁹⁰ Otherwise, a user of a patented method sitting in Oklahoma could find themselves subject to being charged with unauthorized use of a patent in jurisdictions all over the world. The economic realities of network technologies dictate that a party should be held accountable for unauthorized use of the technology in

384. *United States v. Jho*, 534 F.3d 398, 405–06 (5th Cir. 2008) (“The traditional statement of the doctrine provides that a merchant ship is part of the territory of the country whose flag she flies, and that actions aboard that ship are subject to the laws of the flag state.”).

385. *See Anderson*, *supra* note 383, at 162; *Spector v. Norwegian Cruise Line, Ltd.*, 545 U.S. 119, 126 (2005) (“Despite the fact that the cruises are operated by a company based in the United States, serve predominantly United States residents, and are in most other respects United States-centered ventures, almost all of [Norwegian Cruise Line’s] cruise ships are registered in other countries, flying so-called flags of convenience.”).

386. United Nations Convention on the Law of the Sea art. 92, Dec. 10, 1982, 1833 U.N.T.S. 397. UNCLOS art. 92.

387. *See Hamburger & Geiger*, *supra* note 383.

388. U.S. DEP’T OF STATE, 2012 INVESTMENT CLIMATE STATEMENT - MARSHALL ISLANDS (June 2012), <http://www.state.gov/e/eb/rls/othr/ics/2012/191946.htm>.

389. *See, e.g.*, U.S. Patent No. 7,525,207 (issued Apr. 28, 2009).

390. *See Lemley et al.*, *supra* note 337, at 120–23.

the location where the technology is controlled from, and the benefit is received.³⁹¹ If the practice of a single step of a method could lead to liability, then our unwitting domestic user could find themselves facing international prosecution. On the other hand, requiring every step to be practiced domestically would allow our strategic domestic user to circumvent United States patent boundaries by choosing to use an international server for the unauthorized practice of a domestically patented technology. Neither of these scenarios leads to a desirable outcome for either our domestic user or the patentee.

Medical diagnostic patents are a growing area of intangible innovation. Many medical diagnostic tests involve taking a sample of blood from a patient, analyzing the blood, thinking about the result, and changing the patient's prescription based on the result.³⁹² Neither doctor nor patient is concerned about where the blood is tested—only where the patient is. A party who wishes to avoid any potential patent infringement could circumvent the domestic patent system by sending the blood, or the electronic data representing the results of the blood draw, overseas, and then import the relevant data. It should make no difference whether the physical blood or the electronic picture of the blood is sent overseas. Nor should it make a difference that the diagnostic step may occur outside the United States. The test is controlled from within the United States, the benefit is derived from within the United States, and the use should also be found to be within the United States. Taking a pragmatic approach to the question of economic realities of the use of the patented invention can help the parties determine where the use has occurred.

IV. EXCLUDING THE INTANGIBLE

Regulating and protecting American industry and trade has long been a critical factor in the United States economy. Domestic industry is protected through a variety of methods, including seizures of harmful items at the border and the use of tariffs and subsidies.³⁹³

391. *See id.*

392. *See, e.g.*, Method of Treating IBD/Crohn's Disease and Related Conditions Wherein Drug Metabolite Levels in Blood Cells Determine Subsequent Dosage, U.S. Patent No. 6,355,623 (issued Mar. 12, 2002).

393. For example, the Customs and Border Patrol (CBP) has the ability to seize the individual electronic devices of anyone seeking to enter the United States and search any information that CBP would like to search. CBP can also keep the electronic device for an unspecified amount of time because of the potential harm of the intangible property accessed through the electronic device. The harms of that intangible property on domestic industry can be quite extensive, yet, CBP is not

Section 337 of the Tariff Act of 1930 gives the United States International Trade Commission (ITC) the power to protect United States domestic industry from unfair methods of competition and unfair acts regarding the importation and sale of articles in the United States.³⁹⁴ However, § 337 sets forth no definition of article nor sets up a certain standard for what is a violation.³⁹⁵ Violations were left to the ITC to determine.³⁹⁶

Central to the mission of the ITC is its mandate to protect domestic industry and promote trade through its power to exclude imports that violate domestic intellectual property rights or injure a domestic industry.³⁹⁷ Section 337 actions give the ITC the power to investigate complaints brought by owners of United States intellectual property who allege that they are subjected to unfair competition due to the importation of infringing products into the United States.³⁹⁸ The complainant is neither asserting its intellectual property against another company nor is the complainant initiating a lawsuit. The ITC is entrusted with the task of determining whether an ITC complainant has established: (1) unfair competition or an unfair act; (2) importation, sale for importation, or sale after importation into the United States of the accused products; and (3) the existence of a domestic industry relating to the product in question. In investigations that are not based upon the alleged infringement of enumerated federal statutory intellectual property rights, a complainant also must prove (4) that the alleged unfair act has caused or threatens to cause injury.³⁹⁹ The ITC's mission is to protect domestic industry, not to protect the complainant's intellectual property rights.⁴⁰⁰ To draw distinctions between the tangible elements and the intangible elements in an allegation of intellectual property infringement is to misunderstand the mission of the ITC.

reviewing personal data for its impact on domestic industry, and instead they are looking for signs of criminal behavior.

394. 19 U.S.C. § 1337 (2018).

395. 2 F.R.D. 239, 254 (1976).

396. *Id.*

397. *About the USITC*, U.S. INT'L TRADE COMMISSION, https://www.usitc.gov/press_room/about_usitc.htm (last visited Nov. 20, 2020).

398. 19 U.S.C. § 1337 (2018).

399. *Id.*

400. *About the USITC*, *supra* note 397.

A. Articulating A Definition of Article

“Congress has deemed it illegal to import articles that infringe patents and impact domestic industry. The role of the ITC is to protect trade and domestic industry. When domestic industry is harmed by patent infringement, and a complaint is filed at the ITC,” then there should be no difference in the type of article being imported—tangible or intangible.⁴⁰¹

On being asked to exclude intangible articles, the Commission has repeatedly found jurisdiction.⁴⁰² The Supreme Court has held that such an interpretation should be accorded deference if it meets the two-part test set forth in *Chevron U.S.A. v. Natural Resources Defense Council*.⁴⁰³ Under this test, the first question asked is “whether Congress has directly spoken to the precise question at issue.”⁴⁰⁴ If Congress has not spoken then “the question for the court is whether the agency’s answer is based on a permissible construction of the statute.”⁴⁰⁵

Accordingly, the ITC’s definition must be viewed through the *Chevron* lens. If congressional intent is clear, then the agency “must give effect to the unambiguously expressed intent of Congress.”⁴⁰⁶ However, if the statute is silent or leaves a gap for the agency to fill, the court must determine whether the agency’s interpretation is proper.⁴⁰⁷ When the Tariff Act of 1930 was enacted, the Information Age had not yet begun. The term “article” is broad in scope and is not restricted to items creatable and contemplable at the time of the enactment of the Tariff Act of 1930.⁴⁰⁸ There is no reason now to restrict article to goods of a tangible nature. Statutory silence is not the same thing as a lack of coverage.⁴⁰⁹

Congress has not directly answered whether intangible goods qualify as articles under § 337, giving the ITC discretion in reaching

401. Elizabeth I. Winston, *Standard Essential Patents at the United States International Trade Commission*, in *THE CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST, AND PATENTS* 449 (Jorge L. Conteras ed., 2017).

402. See, e.g., 833 Investigation, *supra* note 9.

403. See *Chevron U.S.A. v. Nat. Res. Def. Council*, 467 U.S. 837, 842 (1984).

404. *Id.*

405. *Id.* at 843.

406. *Id.*

407. *Id.*

408. See, e.g., *Schick X-Ray Co., Inc. v. United States*, 59 Cust. Ct. 108, 112 (Cust. Ct. 1967) (hydraulic hospital table for use with X-ray equipment was an article).

409. *Diamond v. Chakrabarty*, 447 U.S. 303, 315–16 (1980).

a definition,⁴¹⁰ but such discretion must be exercised in a manner consistent with the congressional policy underlying the Tariff Act of 1930, as amended in the Trade Act of 1974.⁴¹¹ The second question raised by *Chevron* is whether interpreting the term “article” to include both the intangible and the tangible is a permissible construction of the statute.⁴¹² To effectuate congressional intent, the term should be given its broadest possible meaning.

When a statute uses a term throughout, that use carries a presumption that Congress “intended that the term have the same meaning in each of the pertinent sections or subsections of the statute.”⁴¹³ Therefore, to define the term “article,” the ITC should undertake a reasoned analysis as to how other agencies have interpreted the term as used in the Trade Act of 1974, and ensure that any definition implemented by the ITC is consistent with the definition implemented by other agencies.⁴¹⁴ Under the *Chevron* test, the ITC has a great deal of freedom in determining what the definition of article is—and finding that an article includes the intangible is a “permissible construction of the statute.”⁴¹⁵

In 1998, the ITC found that the legislative history of § 337 supported the conclusion that intangible items are articles covered by § 337.⁴¹⁶ The ITC stated that:

[I]n passing the 1988 amendments to section 337, Congress stated that the predecessor version of section 337 “was designed to cover a broad range of unfair acts” and that the purpose of the 1988 amendments was “to strengthen the effectiveness of section 337 in

410. See 19 U.S.C. § 1337(c) (2018) (“Each determination under subsection (d) or (e) shall be made on the record after notice and opportunity for a hearing in conformity with the provisions of subchapter II of chapter 5 of title 5.”); Sapna Kumar, *Regulating Digital Trade*, 67 FLA. L. REV. 1909, 1938 (2015) (“The ITC interpreted ‘articles’ through formal adjudication, in accordance with §§ 556 and 557 of the Administrative Procedure Act.”).

411. See *Sec. & Exch. Comm’n v. Sloan*, 436 U.S. 103, 118 (1978) (quoting *Volkswagenwerk Aktiengesellschaft v. Fed. Mar. Comm’n*, 390 U.S. 261, 272 (1968)).

412. *Chevron*, 467 U.S. at 843.

413. *SKF USA, Inc. v. United States*, 263 F.3d 1369, 1382 (Fed. Cir. 2001).

414. *Former Emps. of Elec. Data Sys. Corp. v. U.S. Sec’y of Labor*, 29 Ct. Int’l Trade 1334, 1343 (citing *Terry v. Principi*, 340 F.3d 1278, 1385 (Fed. Cir. 2003)) (“The same term cannot have different meanings in related statutes.”).

415. *Chevron U.S.A. v. Nat. Res. Def. Council*, 467 U.S. 837, 843 (1984).

416. In the Matter of Certain Hardware Logic Emulation Sys. and Components Thereof, Inv. No. 337-TA-383, USITC Pub. 1998-3154 (Jan. 1999) [hereinafter 383 Investigation].

addressing the growing problems being faced by U.S. companies from the importation of articles which infringe U.S. intellectual property rights.”⁴¹⁷

The ITC focused on the ITC’s responsibility to “effectively remedy[] violations of section 337.”⁴¹⁸ Such a “remedy would be rendered significantly less effective if it did not extend to electronic transmissions of software.”⁴¹⁹

Congress did not codify a definition of the term “article.” Looking contextually at the term “article” in the Trade Act of 1974, the definition remains unclear. The use of the term article may have been chosen for the very reason that it is unclear, allowing for an uncommon breadth in interpretation. The term article should be interpreted consistently within the Tariff Act of 1930, as amended in the Trade Act of 1974. Under the Tariff Act, the Department of Labor (Labor), the ITC, and the CBP are each authorized to regulate international trade.⁴²⁰ In fulfilling its regulatory role, each agency has relied on a definition of the term. Labor and CBP have both interpreted “article” to cover the tangible and intangible⁴²¹—rendering such an interpretation a reasonable interpretation of section 337.

1. Customs and Border Patrol

Customs has held that “the transmission of software modules and products to the United States from a foreign country via the Internet is an importation of merchandise into the customs territory of the United States in that the software modules and products are brought in to the United States from a foreign country.”⁴²² According to Customs, therefore, software is merchandise and a good, even if not covered by the HTSUS.⁴²³ Articles, such as merchandise and goods, are both tangible and intangible. Telecommunications, however, have been expressly exempted from tariff duties, potential evidence of Congressional intent to avoid regulating the entry of digital

417. *Id.* at 28-29. (quoting S. Rep. 100-71, 100th Cong., 1st Sess., at 128).

418. 383 Investigation, *supra* note 416, at 29.

419. *Id.*

420. 19 U.S.C. § 1337 (2018).

421. *See* Kumar, *supra* note 410, at 1912, 1930.

422. Customs Ruling HQ 114459 (Sept. 17, 1998), <http://www.faqs.org/rulings/rulings1998HQ114459.html>.

423. *Id.*

information through electronic transmission.⁴²⁴ Regulation of the entry of digital information is still monitored by CBP, who can seize the individual electronic devices of anyone seeking to enter the United States and search for information stored therein.⁴²⁵ CBP can also keep the electronic device for an unspecified amount of time because of the potential harm of the intangible property stored on the electronic device.⁴²⁶ The harms of that intangible property on domestic industry can be quite extensive, yet CBP is not reviewing personal data for its impact on domestic industry, and instead, they are looking for signs of criminal behavior.⁴²⁷ CBP has a demonstrable interest in intangible data entering the United States.⁴²⁸

2. Department of Labor⁴²⁹

The definition of the term “article” as used in the Trade Act of 1974 has been extensively discussed outside the context of the ITC and in the context of the Department of Labor (Labor). The Trade Act of 1974 has been amended over the years to allow Labor to provide trade adjustment assistance benefits to workers who have lost their jobs.⁴³⁰ In order to qualify for assistance under the Trade Adjustment

424. *See* Former Emps. of Gale Grp., Inc. v. U.S. Sec’y of Labor, 403 F. Supp. 2d 1299, 1302 (Ct. Int’l Trade 2005) (“The HTSUS does not consider telecommunications transmissions as goods and are thus exempted from duty.”) (citing HTSUS, General Note 3(e) (2004)); Customs Ruling HQ 114459, *supra* note 422 (citing Customs Ruling HQ 960179 (Apr. 17, 1997), <http://www.faqs.org/rulings/rulings1997HQ960179.html>).

425. U.S. CUSTOMS & BORDER PROT., CPB DIRECTIVE 3340-049A, BORDER SEARCH OF ELECTRONIC DEVICES § 1 (2018), <https://www.cbp.gov/sites/default/files/assets/documents/2018-Jan/CBP-Directive-3340-049A-Border-Search-of-Electronic-Media-Compliant.pdf>.

426. *Id.* at § 5.4.1.

427. *Id.* at § 1.

428. *Id.*

429. This Section examines the Trade Adjustment Assistance for Workers and Alternative Trade Adjustment Assistance programs (collectively referred to herein as TAA) administered by the U.S. Department of Labor, which was most recently extended and amended in October 2011. *See* 19 U.S.C. §§ 2271–2331 (2012) (*amended by* To Extend the Generalized System of Preferences, and For Other Purposes, Pub. L. No. 112-40, 125 Stat. 401 (2011) (containing Title II, Trade Adjustment Assistance Extension Act of 2011)).

430. “The Trade Adjustment Assistance (TAA) Program is a federal program that provides a path for employment growth and opportunity through aid to US workers who have lost their jobs as a result of international trade.” N.Y. EMP’T SERVS. SYS., TRADE ADJUSTMENT ASSISTANCE – ELIGIBILITY AND INTAKE OSOS GUIDE 1 (2019), <https://www.labor.ny.gov/workforicenypartners/osos/TAA-OSOS-Guide-1-Intake-Eligibility.pdf> [hereinafter OSOS GUIDE].

Assistance program (TAA), there are several requirements, including the specific requirement that the workers must have lost their jobs because of the shift of production overseas of articles or as the result of increased imports of articles.⁴³¹

Neither the Trade Act nor the TAA contains a definition of the word “article.” However, workers are only rendered eligible for TAA if the shift of production overseas of articles has an economic effect on the domestic workers.⁴³² If the shift overseas is not a shift of articles, but rather a shift of services, then the displaced workers are not eligible for assistance.⁴³³ Reflective of the issue facing the ITC, the claims based on articles have changed significantly over the years, transitioning from traditional tangible items with a set commercial value to intangible items with an uncertain commercial value. The judicial interpretation of the term article in the TAA context is instructive, if not determinative, in the ITC context. Assistance is now offered under the TAA to workers if their jobs have been affected by the shift overseas of intangible articles, as well as tangible.⁴³⁴ Intangible articles render workers eligible for assistance if such articles would render workers eligible if embodied in a physical medium. Furthermore, the commercial value of articles is no longer a consideration in determining what an “article” is for purposes of deciding whether assistance is available.⁴³⁵

Until 2006, the Department of Labor routinely denied assistance to workers whose jobs were affected by the shift overseas of intangible articles. In January of 2006, the Court of International Trade (CIT) held that the “Trade Act does not define the term ‘articles’ within the statutory language, and specifically absent is a tangibility requirement.”⁴³⁶ The CIT went on to find that a requirement “that software code must be on a physical medium to be an article”

431. 19 U.S.C. § 2272 (2018) (e.g., “imports of articles like or directly competitive with articles”).

432. 19 U.S.C. § 2481, 2272 (2018) (“imports of articles or services like or directly competitive with articles produced or services supplied by such firm have increased”); *Fortin v. Marshall*, 608 F.2d 525, 525–26 (1st Cir. 1979).

433. *See, e.g., Fortin*, 608 F.2d at 528 (“[T]he term ‘article’ as used throughout the Trade Act, was not meant to include services . . .”).

434. *Lands’ End, A Subsidiary of Sears Roebuck and Company, Business Outfitters CAD Operations*, Dodgeville, Wisconsin: Notice of Determination on Remand, 71 Fed. Reg. 18357, 18357 (Apr. 11, 2006).

435. *Former Emps. of Merrill Corp. v. United States*, 29 Ct. Int’l Trade 874, 881 (2005).

436. *Former Emps. of Comput. Scis. Corp. v. Sec’y. of Labor*, 414 F. Supp. 2d 1334, 1340 (Ct. Int’l Trade 2006).

incongruous with recent technology.⁴³⁷ According to the CIT, “the plain language of the Trade Act does not require that an article must be tangible.”⁴³⁸

Labor subsequently issued three administrative decisions that changed the Agency’s definition of the term “article.” In a series of decisions reversing earlier denials of assistance,⁴³⁹ Labor found that “there are tangible and intangible articles” and clarified that “[s]oftware and similar intangible goods that would have been considered articles for the purposes of the Trade Act if embodied in a physical medium will now be considered to be articles regardless of their method of transfer.”⁴⁴⁰

The articles included financial software, coded in India, sent back into the United States and packaged and sold here;⁴⁴¹ software produced in Mexico; and computerized embroidery and logo designs.⁴⁴² Each of these represented intangible articles, and until the CIT remanded the rejections to Labor, denial of assistance was automatic.⁴⁴³ Labor, upon remand from the CIT, found that an intangible article “that would have been considered an article if embodied in a physical medium” was an article for purposes of the TAA.⁴⁴⁴ Labor also found that when Mexican workers were “being trained in the production of new software” and “the production of such software now occurs in Mexico,” the Mexican workers were “engaged in the production of an article” and therefore the displaced American workers were entitled to assistance for the shift of software production, intangible articles, overseas.⁴⁴⁵ Finally, Labor looked at

437. *Id.* at 1342.

438. *Id.* at 1343.

439. The earlier “negative determination was based on the findings that the subject worker group provided business and information consulting, specialized application software, and technology outsourcing support to customers in the financial services industry, and that the workers did not produce an article within the meaning of Section 222 of the Trade Act of 1974.” Computer Sciences Corporation, Financial Services Group, East Hartford Connecticut: Notice of Revised Determination on Remand, 71 Fed. Reg. 18355, 18355 (Apr. 11, 2006).

440. *Id.*

441. *Id.*

442. Electronic Data Systems Corporation I Solutions Center, Fairborn, Ohio: Notice of Revised Determination on Remand, 71 Fed. Reg. 18355, 18356 (Apr. 11, 2006).

443. Computer Sciences Corporation, 71 Fed. Reg. 18355 at 18355; Electronic Data Systems Corporation I Solutions Center, 71 Fed. Reg. 18355 at 18356.

444. Computer Sciences Corporation, 71 Fed. Reg. 18355 at 18355.

445. Electronic Data Systems Corporation I Solutions Center, 71 Fed. Reg. 18355 at 18356.

workers “engaged in computerizing embroidery and logo designs” and found they were producing articles, as well, despite the lack of a physical medium.⁴⁴⁶ Labor found that “the workers’ firm produced an intangible article (digitized embroidery designs) that would have been considered an article if embodied in a physical medium” and that since articles can be both intangible and tangible, the workers were eligible to receive assistance.⁴⁴⁷ After this decision, assistance under the TAA was extended to workers whose jobs were affected by the shift overseas of intangible articles, as long as such articles would have been considered articles if embodied in a physical medium.⁴⁴⁸

These Administrative law cases set forth the change in understanding by Labor to the definition of “article” in the Trade Act of 1974. In 2006, the CIT recognized a change in the Agency’s policy and summarized the holdings of the three decisions discussed above, while not going so far as to adopt the holdings as CIT rulings, inherently sanctioned a definition of article that includes tangible and intangible items.⁴⁴⁹

Reiterating Labor’s policy shift and the applicable interpretation of the term “article” by Labor, the CIT found that article included both tangible and intangible goods “regardless of their method of transfer.”⁴⁵⁰ The former employees of Merrill Corporation sought assistance under the TAA after their jobs producing financial documents were eliminated.⁴⁵¹ The employees were initially denied assistance because they were “engaged in the production of an intangible—rather than tangible—article” and subsequently denied assistance because the items produced by Merrill lacked commercial value.⁴⁵² Chastising Labor, the CIT held that a “distinction between tangible and intangible articles appears nowhere in the Trade Act...[and t]he distinction between tangible and intangible articles is contrary to the purpose of the Trade Act.”⁴⁵³ The CIT held that any distinction

446. Lands’ End, A Subsidiary of Sears Roebuck and Company, Business Outfitters CAD Operations, Dodgeville, Wisconsin: Notice of Determination on Remand, 71 Fed. Reg. 18357, 18357 (Apr. 11, 2006).

447. *Id.*

448. *Id.*

449. Former Emps. of IBM Corp., Glob. Servs. Div. v. U.S. Sec’y of Labor, 462 F. Supp. 2d 1239, 1241 (Ct. Int’l Trade 2006).

450. *Id.*

451. Former Emps. of Merrill Corp. v. United States, 29 Ct. Int’l Trade 874, 876 (2005).

452. Former Emps. of Merrill Corp. v. United States (*Merrill II*), 483 F. Supp. 2d 1256, 1267 (Ct. Int’l Trade 2007).

453. *Id.*

between “tangible and intangible articles is ‘arbitrary’ and ‘manifestly contrary to the statute.’”⁴⁵⁴ The purpose of the Trade Act is “to provide adequate procedures to safeguard American industry and labor against unfair or injurious import competition, and to assist industries, firm [sic], workers, and communities to adjust to changes in international trade flows.”⁴⁵⁵

The Trade Act does not define article, nor does it limit the definition to tangible items only. Labor’s regulations support the conclusion that software code, regardless of the mode of importation, including code imported via the Internet, is an article under the Trade Act. Electronic transmissions of all kinds are articles, tangible or intangible.

3. United States International Trade Commission

In enacting the Trade Act of 1974, Congress neglected to define the word “article” leaving interpretation of the term up to the agencies implementing the Trade Act of 1974. The ITC has exercised domain over numerous articles, without providing a comprehensive definition of the term, which may have been chosen because it “is itself a nebulous concept seemingly employed . . . for the very reason that it possesses an indefinite and neutral meaning.”⁴⁵⁶

The frequent use of the undefined word article throughout the Trade Act “suggests . . . an intention that it assume the meaning and coloration appropriate to its specific context and best suited to effectuate the Congressional plan.”⁴⁵⁷ The Commission was first tasked with formally adjudicating its jurisdiction over software in the 383 Investigation.⁴⁵⁸ At that time, the ITC treated software as an article of importation regardless of its mode of importation but decided not to exclude the software.⁴⁵⁹ Instead, the Commission issued a cease and desist order that prohibited “the importation (including via electronic transmission), sale, offer for sale, lease, loan, other transfer, duplication, or distribution (including electronic

454. *Id.* (quoting *Chevron U.S.A. v. Nat. Res. Def. Council*, 467 U.S. 837, 844 (1984)).

455. 19 U.S.C. § 2012(4) (2000).

456. *Close & Stewart v. United States*, 268 F. Supp. 466, 468 (Cust. Ct. 1967).

457. *Id.* at 469.

458. 383 Investigation, *supra* note 416, at 28.

459. *Former Emps. of Comput. Scis. Corp. v. U.S. Sec’y of Labor*, 414 F. Supp. 2d 1334, 1342 (Ct. Int’l Trade 2006) (citing Commission Opinion on Remedy, the Public Interest, and Bonding, USITC Pub. 1998-3089, at 28–29 (Mar. 30, 1998), *in* 383 Investigation, *supra* note 416, at 29).

distribution) of imported software and other components that contributorily infringe the patents in issue.”⁴⁶⁰

Focusing on the fact that § 337 exists to protect domestic companies from the importation of articles that infringe domestic intellectual property rights, the Commission found that electronically or physically, both infringe on these rights. “Congress has delegated broad authority to the ITC to determine what constitutes an ‘article’ for purposes of Title 19 of the United States Code.”⁴⁶¹ CBP may have difficulty regulating electronic transmissions into the United States,⁴⁶² but the question of what CBP can do is a different question from what the ITC can do to protect domestic industry. Electronic transmission of respondents’ software is not substantively different from storing the software on a medium and shipping the medium into the United States. The ease of circumventing an exclusion order by electronic transmissions, or the difficulty of CBP’s enforcement of that exclusion order of that software do not affect the scope of the Commission’s jurisdiction or cause the Commission to limit the reach of its remedial orders. It makes little sense to find harm to domestic industry by the importation of a CD-ROM or disk containing respondents’ software, a component of an emulation system, but not by the use of that very same component imported in machine-readable form by electronic transmission.

The legislative history of § 337 reflects debate by members of both houses and witnesses at hearings using the term “articles” synonymously with “goods,” “merchandise,” and “commodities.”⁴⁶³ As noted above, CBP has found that intangible articles are goods and merchandise.⁴⁶⁴ Furthermore, § 337 has been amended a dozen times, and no amendment has suggested any congressional intent to limit

460. 383 Investigation, *supra* note 416, at 21.

461. *Former Emps. of Comput. Scis. Corp.*, 414 F. Supp. 2d at 1342 (citing 19 U.S.C. §§ 1332, 3005 (2012)).

462. It may be difficult, but it is not impossible. In China, for instance, the government has implemented what is known colloquially as the Great Firewall of China. The Great Firewall of China restricts access to electronic transmissions inside China. Charles Riley, *The Great Firewall of China Is Nearly Complete*, CNN (Dec. 30, 2014, 1:10 PM) <http://money.cnn.com/2014/12/30/technology/china-internet-firewall-google/> (“Beijing often describes what is known colloquially as the ‘Great Firewall’ as a critical national security tool. ‘I can choose who will be a guest in my home,’ China’s top Internet regulator Lu Wei said earlier this year.”).

463. *See, e.g., Hearings, Second Session on Intellectual Property and Trade Before Subcomm. on Courts, Civil Liberties & the Admin. of Justice of the H. Comm. on the Judiciary*, 99th Cong. (1986), https://ipmall.law.unh.edu/sites/default/files/hosted_resources/lipa/patents/Intellectual%20Property%20and%20Trade,%20Subcomm.%20%28Feb.%2019,%20Apr.%2023,%20May%2021,%201986%29%20Part%20A.pdf.

464. *See* Customs Ruling HQ 114459, *supra* note 422.

the definition “articles” to include only tangible articles. Limiting articles of commerce to tangible items arbitrarily excludes a broad range of infringing products and restricts the ability of the ITC to perform its intended function.

The language of § 1337 refers to “sale for importation,” “importation,” and “sale after importation,” all of which can cover electronic data transmissions of commercial value.⁴⁶⁵ Statutory construction supports the concept that articles are “imported items that are bought and sold in commerce,” whether those articles are tangible or intangible.⁴⁶⁶ Despite this, the Federal Circuit has held that the jurisdiction of the ITC does not extend to the transmissions of digital data.⁴⁶⁷ So holding, locks “the International Trade Commission into technological antiquity.”⁴⁶⁸ The mission of the ITC is to “investigate and make determinations in proceedings involving imports claimed to injure a domestic industry or violate U.S. intellectual property rights,”⁴⁶⁹ and there is no dispute that the intangible is covered by the patent statute and can, itself, be infringed. Furthermore, such infringement can injure a domestic industry. In order to exclude the intangible and protect domestic industry, any reasonable definition of article under § 337 must include both the tangible and intangible.

B. Remedies

The ITC is not an agency established to protect intellectual property rights holders, but rather to protect the domestic industry using intellectual property rights and both its scope of interest and the scope of available remedies is limited by such.⁴⁷⁰ Central to the mission of the ITC is its ability to protect domestic industry and promote trade by regulating “imports claimed to injure a domestic

465. 19 U.S.C. § 1337 (2018).

466. 833 Investigation, *supra* note 9, at 40.

467. *ClearCorrect Operating v. Int’l Trade Comm’n*, 810 F.3d 1283, 1290 (Fed. Cir. 2015) (“Here we conclude that the literal text by itself, when viewed in context and with an eye towards the statutory scheme, is clear and thus answers the question at hand. ‘Articles’ is defined as ‘material things,’ and thus does not extend to electronic transmission of digital data.”).

468. *Id.* at 1310 (Newman, J., dissenting).

469. *About the USITC*, *supra* note 397.

470. The jurisdiction of the ITC arises *in rem*, which allows remedies when *in personam* jurisdiction may not exist. *See generally* *Suprema, Inc. v. Int’l Trade Comm’n*, 796 F.3d 1338, 1346–47 (Fed. Cir. 2015); Kumar, *supra* note 410, at 1912.

industry or violate U.S. intellectual property rights.”⁴⁷¹ If unlawful activities are found, then the ITC may issue a general exclusion order (GEO) directed to all articles that violate the U.S. intellectual property rights and injure a domestic industry; the ITC can issue a limited exclusion order (LEO) directed to only the specific articles that are named in the complaint and violate the U.S. intellectual property rights; and/or the ITC can issue a cease and desist order directed to the persons engaging in the violations of the U.S. intellectual property rights.⁴⁷² Each of these allows the ITC to protect domestic industry in a different and compelling fashion.⁴⁷³ The Trade Act of 1974 specifically gave the ITC the power to issue cease and desist orders because:

[T]he existing statute, which provides no remedy other than exclusion of articles from entry, is so extreme or inappropriate in some cases that it is often likely to result in the Commission not finding a violation of this section, thus reducing the effectiveness of section 337 for the purposes intended.⁴⁷⁴

Cease and desist orders expanded the ITC’s power, giving the Commission the ability to regulate infringing methods for the first time, an essential part of the imposition of import restrictions.⁴⁷⁵

The ITC addressed the question of tangible versus intangible articles head-on in the 510 investigation.⁴⁷⁶ In the 510 investigation, Trend Micro complained that Fortinet, Inc. (Fortinet) was committing unfair acts and harming domestic industry by its “importation into the United States, the sale for importation into the United States, or the sale within the United States after importation of certain systems for detecting and removing computer viruses or worms, components

471. *About the USITC*, *supra* note 397.

472. *About Section 337*, U.S. INT’L TRADE COMMISSION, https://www.usitc.gov/intellectual_property/about_section_337.htm (last visited Mar. 6, 2020).

473. *Certain Welded Stainless Steel Pipe & Tube*, Inv. No. 337-TA-29, USITC Pub. 863 (Feb. 22, 1978) (Final) (“Prior to 1974 the sole power of the Commission in section 337 cases was to recommend to the President an exclusion order.”).

474. REPORT OF THE COMM. ON FIN. TOGETHER WITH ADDITIONAL VIEWS ON H.R. 10710, TRADE ACT OF 1974, S. REP. NO. 93-1298, at 198 (1974).

475. *See id.*

476. In the Matter of Certain Systems for Detecting and Removing Viruses or Worms, Components Thereof, and Products Containing Same, Inv. No. 337-TA-510, USITC Pub. 3936 (Aug. 2007) [hereinafter 510 Investigation].

thereof, and products containing same.”⁴⁷⁷ The ITC determined that Fortinet was in violation of section 337 and fashioned a two-part remedy for this violation.⁴⁷⁸ First, the ITC issued an exclusion order barring the “importation of infringing antiviral software in a tangible medium.”⁴⁷⁹ Second, acknowledging CBP’s determination not to regulate electronic technology—and Fortinet’s technology which transmits updates to the software electronically—the ITC issued a cease and desist order barring “the electronic transmission of the infringing antivirus software module by Fortinet.”⁴⁸⁰ Absent the two-part remedy, the detrimental impact on domestic industry would continue hampering the ITC’s ability to protect trade, as Fortinet would remain free to transmit electronically and unfairly the infringing software.

Congress does not need to give the ITC additional statutory authority to regulate intangible articles. In choosing the broad word “articles” and not using “articles of manufacture” or other limiting language, Congress gave a broad swath of rights to the ITC, and that original statutory authority should be respected.

V. CLAIMING THE INTANGIBLE

Careful claim drafting can help innovators avoid many of the issues faced by those seeking to protect Information Age technology. Drafting claims tying the intangible to the tangible helps Information Age technology fit under the protection of Industrial Age laws. An example of claim drafting that addresses many of these problems can be found in the 2019 patent issued to Bose for a streaming audio player using a cloud-based service to transmit and respond to spoken user queries.⁴⁸¹ The claim was carefully drafted to keep all elements of the patented method within the United States.⁴⁸² The method claimed receiving data from the cloud—but does not require any steps that occur only in the cloud.⁴⁸³ As a result, all steps can occur within

477. *Id.*

478. *Id.*

479. *Id.*

480. *Id.*

481. Claim 21 reads: “The streaming audio player of claim 20, wherein the first digital audio data comprises a response to the spoken user query that is received from a cloud-based service.” U.S. Patent No. 10,200,004 (filed July 6, 2018) (issued Feb. 5, 2019).

482. *See id.*

483. *See id.*

the United States, avoiding many of the issues addressed by this Article.

In 1975, James Diehr and Thomas Lutton sought to patent a process for curing rubber.⁴⁸⁴ Humans could use a mold press to cure rubber, but the use of a digital computer rendered the cure more efficient and more accurate.⁴⁸⁵ The Supreme Court found that this method claimed patent-eligible subject matter as it claimed “a process for molding rubber products.”⁴⁸⁶ The process was software, but since the result was a tangible one, the Supreme Court found the process patentable.⁴⁸⁷

Almost fifty years later, Blue Spike patented a method of monitoring and analyzing signals.⁴⁸⁸ These patents claim the use of software to compare works of art, such as songs, video, or images and differentiate between the various works.⁴⁸⁹ Humans can compare works of art, but the software renders such a comparison faster and more accurately.⁴⁹⁰ In the course of one of many of Blue Spike’s patent infringement suits, the Northern District of California found that the patents were drawn to abstract ideas, and, furthermore, that the innovation consisted of merely using “routine computer components and methods . . . to accomplish this task with, in certain circumstances, greater efficiency than a human mind could achieve.”⁴⁹¹ The court did go on to say that if the patent disclaimed what a human could do, and only claimed the benefits of the computer-

484. Brief for Petitioner at 2, *Diamond v. Diehr*, 450 U.S. 175 (1981) (No. 79-1112).

485. *Id.* at 2–3. (“Rubber products produced in a mold press are cured in the press for a specified time. . . . The time needed to obtain a good cure depends in part on the temperature inside the press, which is regulated by a thermostat. . . . It is possible, using well-known time, temperature, and cure relationships, to calculate when to open the press and remove the cured product. . . . The disadvantages of this practice are that erring on the side of caution will usually lead to overcuring the rubber, while keeping the mold open for more than a ‘reasonable’ time will often result in undercuring. . . . [The] claimed invention employs a digital computer to overcome these drawbacks.”).

486. *Diamond*, 450 U.S. at 191.

487. *Id.* at 192–93.

488. Blue Spike holds a number of such patents. See U.S. Patent No. 8,712,728 (issued Apr. 29, 2014); U.S. Patent No. 8,214,175 (issued July 3, 2012); U.S. Patent No. 7,949,494 (issued May 24, 2011); U.S. Patent No. 7,660,700 (issued Feb. 9, 2010); U.S. Patent No. 7,346,472 (issued Mar. 18, 2008).

489. Brief of Appellee Google Inc. at 6, *Blue Spike, LLC v. Google Inc.*, No. 2016-1054 (Fed. Cir. Oct. 14, 2016).

490. *Id.* at 33.

491. *Blue Spike, LLC v. Google Inc.*, No. 14-CV-01650-YGR, 2015 WL 5260506, at *6 (N.D. Cal. Sept. 8, 2015).

implemented comparison, then perhaps the claim would be patent eligible⁴⁹²—but that would lead to an exceptionally narrow claim indeed.

There has been a tremendous sea change in the fifty years between Diehr's invention and Blue Spike's invention. As Justice Stevens noted in his dissent to *Diehr*, patenting software would have been nigh near impossible before 1968.⁴⁹³ A method of curing rubber, on the other hand, was patentable, as the Supreme Court noted in 1881 when it stated that there was no doubt that a process could be patentable, giving as one example Goodyear's patent for a process of vulcanizing rubber.⁴⁹⁴ The patenting of software to perform a process that was, itself, clearly patentable, represented a shift in the judicial views of patentable subject matter—but a shift made palatable by the tangible and timeless subject matter of the software. Even though the machines in *Diehr* were routine, and the art of curing rubber was well-known, the incorporation of software and the advantages and efficiencies brought by the software resulted in patent-eligible subject matter. Blue Spike, on the other hand, was seeking to patent a method of using intangible software to accomplish an intangible result—that of comparing signals. Although both Blue Spike and Diehr patented software that performed human tasks, only Blue Spike's technology is abstract, as Diehr's process uses software to generate a tangible product.⁴⁹⁵ The tangible nature of the outcome of the process is the dividing line between the patentability of Diehr's software and the patentability of Blue Spike's software.⁴⁹⁶

However, not all innovations can be so claimed,⁴⁹⁷ and for those innovations, care needs to be taken that the rights of those who seek to patent the intangible are not abrogated by a rigid categorical approach to patent protection. Patent attorneys routinely include

492. *Id.*

493. *Diamond v. Diehr*, 450 U.S. 175, 195 (1981) (Stevens, J., dissenting).

494. In 1844, Charles Goodyear was issued a patent for a method of vulcanizing rubber. U.S. Patent No. 3633 (issued June 15, 1844).

495. *Diehr*, 450 U.S. at 192.

496. *Id.* at 192–93.

497. Mark A. Lemley et al., *Divided Infringement Claims*, 33 AIPLA Q.J. 255, 271 (2005) (“Computer networking and software inventions routinely present such challenges, and client- or service-centered claiming strategies have long been employed by those who focus on such technologies. It is important to note, however, that as communications technologies support ever increasing bandwidth, virtually any innovation that employs computation or decision-making is susceptible to placement of a particular component or step with an independent vendor or outside the United States in a way that may avoid traditional infringement remedies.”).

system and method claims in the same application.⁴⁹⁸ It cannot make sense to place a higher value on system claims to devices that can be used domestically and internationally than on method claims. Nor should claim drafting be entirely ignored by the courts. Finding a device used domestically is not a way to fix a claim drafting error. Instead, such a determination recognizes the fact that the end-user benefits domestically from a method that crosses geographic boundaries, and therefore, an unauthorized use harms the patent system—even if every step does not occur domestically.

The spirit and intention of patent protection extend as thoroughly to method claims as they do to system claims. Unauthorized use occurs within the United States, regardless of the type of invention, if the use is controlled within the geographic boundaries and domestic benefit accrues from that use. Domestic industry is harmed by those who unfairly import electronic transmissions, just as much as it is harmed by those who unfairly import media on which data is recorded. Limiting the scope of the ITC to tangible data will result in claims being drafted to reflect this unfair restriction on the mission of the ITC. That should not have to be the case.

PurePredictive, Inc. is a small company that specializes in machine learning innovations and automating advanced analytics through the use of artificial intelligence (AI).⁴⁹⁹ Open-source software company H2O runs a machine learning platform.⁵⁰⁰ PurePredictive sued H2O for patent infringement.⁵⁰¹ Applying *Alice*, the court found that the software was an abstract idea, as PurePredictive was unable to show that “its claims improve the functioning of a computer-related technology rather than use computers as a tool.”⁵⁰² Using machine learning to improve analytics remains an intangible, abstract idea, leaving PurePredictive to satisfy the second factor of the *Alice* test. PurePredictive’s innovation uses software to render more efficient and accurate well-known analytic models and is “simply an implementation of the basic concept of predictive analytics.”⁵⁰³

498. See, e.g., Jefferson Perkins, “System” Travels Abroad, “Method” Gets Grounded: Transnational Reach and Acts of Infringement of Different U.S. Patent Claim Types After *NTP v. RIM* (Fed. Cir.), DUPAGE COUNTY BAR ASS’N (Dec. 2005), <https://www.dcba.org/mpage/vol181205art5>.

499. PUREPREDICTIVE, <http://www.purepredictive.com/about/> (last visited Mar. 5, 2020).

500. PurePredictive, Inc. v. H2O.AI, Inc., No. 17-cv-03049-WHO, 2017 WL 3721480, at *2 (N.D. Cal. 2017).

501. *Id.* at *1.

502. *Id.* at *5 (citing *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 222, 224 (2014)).

503. *Id.* at *7.

AI systems seem sure to become further embedded in many industries as well as into daily life around the world. How to best protect these inventions is a complicated issue and an increasingly important area. As argued by Professor Asay in *Artificial Stupidity*, AI is one field where there may not be a current solution to promote innovation while also promoting disclosure.⁵⁰⁴ AI is commonly used to accomplish well-known tasks in new computer-aided manners, as the PurePredictive example shows.⁵⁰⁵ When the innovation is the use of an intangible assist, enforcing a patent on a new method of accomplishing a non-novel concept has proven a complicated task under the modern interpretation of the patent laws. The number of issued patents in the field of Machine Learning shot up 34% between 2013 and 2017, rendering AI one of the fastest growing areas of patent grants.⁵⁰⁶ Enforcing that patent in federal courts by meeting the two-part *Alice* test, however, remains nothing more than an abstract idea for many artificial intelligence developers.⁵⁰⁷ *Alice* states that an innovation claiming an abstract idea, like artificial intelligence, may be patent-eligible if that innovation claims an “inventive concept” that transforms the abstract idea into one that is patent eligible.⁵⁰⁸ As PurePredictive learned, when the inventive concept is using AI to accomplish a human task with greater efficiency and speed, proving that the inventive concept is not well known in the art is immensely difficult.⁵⁰⁹

In drafting a patent, a good prosecutor will always take into consideration not only who owns the patent, but who will be using the patent, and who the patentee may wish to prevent from using the patent. AI, as a field, has at least as one goal: to render a device

504. Clark Asay, *Artificial Stupidity*, 61 WM. & MARY L. REV. 1187, 1195 (2020).

505. PUREPREDICTIVE, *supra* note 499.

506. Louis Columbus, *Roundup of Machine Learning, Forecasts and Market Estimates*, FORBES (Feb. 18, 2018), <https://www.forbes.com/sites/louiscolumbus/2018/02/18/roundup-of-machine-learning-forecasts-and-market-estimates-2018/#2906357f2225>.

507. See, e.g., Asay, *supra* note 504, at 1203 (citing Jonathan Stroud & Derek M. Kim, *Debugging Software Patents After Alice*, 69 S.C. L. REV. 177, 178, 191, 205, 218 (2017)); Susan Y. Tull & Paula E. Miller, *Patenting Artificial Intelligence: Issues of Obviousness, Inventorship, and Patent Eligibility*, 1 J. ROBOTICS ARTIFICIAL INTELLIGENCE & L. 313, 315–16 (2018) (discussing subject matter problems in the context of medicinal products).

508. *Alice*, 573 U.S. at 222, 225–26.

509. See *PurePredictive, Inc. v. H2O.AI, Inc.*, No. 17-cv-03049-WHO, 2017 WL 3721480, at *7 (N.D. Cal. 2017).

autonomous.⁵¹⁰ Machine autonomy can make detection of infringement very difficult, and render nigh near impossible a determination of who the infringer is.⁵¹¹ Patents must be drafted taking into consideration both the possibility of infringement being difficult to detect and who will be considered the infringer. Furthermore, a patent prosecutor may seek to narrow the patent and, thus, limit the protection for the artificial intelligence innovation by tying the invention to the tangible and avoiding falling down *Alice's* rabbit hole.⁵¹² A narrower patent is generally a less valuable patent.⁵¹³ This limited protection, combined with the increasing cost of patent litigation, and concerns over the enforceability of these patents in the judicial system, may disincentivize artificial intelligence innovators from even applying for patents on their innovations in the first place.

Careful claim drafting can ameliorate many of the issues articulated in this article. Finding an invention used domestically cannot rescue a patent prosecutor who has made an error in claim drafting. The invention remains that claimed by the patentee and nothing more. The intention is to determine what that invention is, where the invention is controlled from, and who benefits from the invention.

VI. TRADE SECRETS AND PRIVATE ORDERING

Innovation in the Information Age evolves rapidly—and, as this Article points out, is often poorly protected by the Industrial Age laws. Given the tremendous difficulties in protecting the intangible in the patent system, it can be foreseen that many innovators will turn to trade secrets and private ordering for protection instead. Trade secrets and private ordering creates tremendous barriers to entry in these fields and is not in the public's best interest. At the moment, for instance, autonomous vehicles are a rapidly developing field of innovation. Many developers in this field are relying on trade secret laws and private ordering to protect their valuable technology.⁵¹⁴

510. See, e.g., Rodney Brooks, *Intelligence Without Representation*, 47 ARTIFICIAL INTELLIGENCE 139, 145–47 (1991).

511. See generally Tabrez Y. Ebrahim, *Artificial Intelligence Inventions & Patent Disclosure*, 125 PENN. STATE L. REV. 1 (2020).

512. *Alice*, 573 U.S. at 221.

513. See John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. 435, 440 (2004).

514. Lucas Dahlin et al., *Autonomous Cars Are Driving the Reinvention of IP Protection*, TECHCRUNCH (Feb. 7, 2019), <https://techcrunch.com/2019/02/07/autonomous-cars-driving-reinvention-of-ip-protection/>.

Private ordering can be a significant stumbling block for competitors seeking to enter new markets and defeats the value of our patent system. Without the public disclosure required by the patent laws, competitors do not have the information to design around other autonomous cars, and are, perhaps, more reluctant to enter a field where the start-up costs are high.⁵¹⁵ Fewer competitors means fewer choices for consumers, and fewer choices may mean higher costs.⁵¹⁶ There are other potential issues as well—including “the temptation of competitors to shortcut the multi-million-mile learning process by hiring away valued employees and encouraging theft of the learned data.”⁵¹⁷ Furthermore, trade secret protection requires a tremendous amount of security and a small pipeline of talent, which can also increase the costs.

Trade secret protection and private ordering carry significant limitations. Cummins, one of the largest American manufacturers of diesel engines, is an innovator in many fields, including natural gas-fueled engines.⁵¹⁸ Cummins sells engines all over the world and has joint ventures to sell, manufacture, and maintain engines in numerous countries, including Russia,⁵¹⁹ China,⁵²⁰ and the Middle East.⁵²¹ Trade secret protection and contracts are not adequate for Cummins. Cummins needs to have its partners be able to manufacture and maintain its engines and to do so must share internal information about those engines. A contract only provides so much protection. Breach of a non-disclosure agreement can result in charges against the breacher—but once the information is disseminated, the non-disclosure agreement has lost its effectiveness. Protection against trade secret theft is a real issue—particularly if combined with international facilities. Between 2008 and 2012, at least “58 defendants [were]

515. *Id.*

516. *Id.*

517. *Id.*

518. *See Cummins Engines*, CUMMINS, <https://www.cummins.com/cummins-engines> (last visited Nov. 8, 2020).

519. Cummins Inc., *Cummins and Russian Manufacturer KAMAZ Form Joint Venture to Produce Mid-Range Engines*, BUSINESSINSIDER (Jan. 24, 2006), <https://markets.businessinsider.com/news/stocks/cummins-and-russian-manufacturer-kamaz-form-joint-venture-to-produce-mid-range-engines-444950>.

520. *Cummins and JAC Form Joint Venture Partnership*, CUMMINS INC. (May 11, 2018), <https://www.cummins.com/news/releases/2018/05/11/cummins-and-jac-motors-form-joint-venture-partnership>.

521. PDamon, *Cummins in New Middle East Joint Venture*, DIESEL PROGRESS (Mar. 29, 2016), <https://dieselprogress.com/news/industry-news/cummins-new-middle-east-joint-venture/1842/>.

charged in Federal Court related to Chinese espionage,” including espionage charges for selling “biotech trade secrets from Dow Chemical and Cargill Inc. to China”⁵²² and theft of source code for American Semiconductor’s wind turbine.⁵²³ American Semiconductor was so concerned about theft of its intellectual property that it “went to great lengths to lock down its software and allow access only by its own employees.”⁵²⁴ American Semiconductor learned of the theft after its partner began using an unreleased version of the operation software.⁵²⁵ The strength of the patent system is the protection it provides to those who disclose the relevant information to the public. For many of these international companies, and even domestic companies, participating in numerous joint ventures, that protection is worth the disclosure. The problem, as this Article points out, may be getting that protection in the first place.

There is a strong public policy in promoting the protection of science and the useful arts through the patent system. The patent system grants patentees the right to exclusive use of their innovation for a limited time in return for describing their innovations and enabling others to practice the art. However, as the limitations on the rewards given to Information Age innovations shrink, the incentives for disclosure diminish as well. Innovations are increasingly being protected by trade secrets and private ordering—narrowing the dedication to the public of the description of the invention.

Using trade secret as a form of protection and relying on private ordering presents a different set of problems for the owners of the intellectual property. However, such use also expands the protection of intellectual property far beyond the scope envisioned by the patent system. The balance between promotion of science and the useful arts, the reward granted innovators, and our Industrial Age laws is currently undermining the public policy central to our patent system. In the Information Age, innovators deserve protection based on the patent-eligibility of the invention, not the tangible nature of the invention.

522. Michael P. Collins, *Ah, Let Me Count the Ways China is Stealing Our Secrets, Part 1*, MANUFACTURING.NET (Feb. 16, 2012), <https://www.manufacturing.net/blog/2012/02/ah-let-me-count-ways-china-stealing-our-secrets-part-1>.

523. Garrett M. Graff, *China’s 5 Steps for Recruiting Spies*, WIRED (Oct. 31, 2018), <https://www.wired.com/story/china-spy-recruitment-us/>.

524. *Id.*

525. *Id.*

CONCLUSION

There is a problem, and it needs to be fixed. In 2025, it is estimated that there will be over 75 billion devices connected to the Internet of Things.⁵²⁶ Each of these devices will be trafficking in the intangible—through their transmissions of data as well as the methods of using the devices. Without the clarifications detailed in this Article, domestic innovators will find themselves in the Wild West—looking to private ordering to protect their innovation, innovating overseas, or seeking ways to ensure that if their innovations cannot be protected, then their innovations cannot be copied. There is a substantial public interest in building the public storehouse of knowledge. It is time to recognize that the United States Patent Code and the Trade Act of 1974 do not discriminate between protection of the intangible and the tangible.

If the internet is to be free of borders as many have argued, then the public interests in promoting innovation and protecting domestic industry must be re-evaluated.⁵²⁷ With the erosion of geographic boundaries, the increase in intangible innovation, and the seamless integration of technology that exists outside the misunderstood boundaries of domestic patent and trade policies, technology will soon bloom with no guidelines and no public regulation, promoting the interests of those developing the technology, not those consuming it. A company seeking to protect the intangible and promote the public interest in disclosure faces many obstacles. At the PTO, the company seeking to patent the intangible must prove that their innovation is not abstract.⁵²⁸ A suit for patent infringement on a method is held to a different standard than a suit for patent infringement on a system. At the ITC, the e-reader holding the data can be excluded, but not the data the e-reader downloads.⁵²⁹ The internet should be free of borders—but geographic boundaries should not undercut the value of the intangible to patentees.

Statutory language requires no differentiation between method claims, machine claims, and system claims. If the subject matter is

526. SAM LUCERO, IHS TECHNOLOGY, IOT PLATFORMS: ENABLING THE INTERNET OF THINGS 5 (2016).

527. Editorial Board, *Keep the Internet Free of Borders*, N.Y. TIMES (Aug. 10, 2015), <https://www.nytimes.com/2015/08/10/opinion/keep-the-internet-free-of-borders.html>.

528. *Interim Guidelines*, *supra* note 23.

529. *See* Cloud Satchel, LLC v. Amazon.com, Inc., 76 F. Supp. 3d 553, 556–57 (D. Del. 2014), *aff'd sub nom.* Cloud Satchel, LLC v. Barnes & Noble, Inc., 626 F. App'x. 1010 (Fed. Cir. 2015).

patent eligible, then it should be subject to the same protection regardless of the type of claim or the category of the patent. Clarification can best occur by amending § 100 to define invention and utility clearly.⁵³⁰ Our patent boundaries need to be reset and evaluated in light of where the invention will be perceived as being practiced by the users; does the unauthorized user know of the patent at the time of the unauthorized use; what are the terms of the arrangement leading to the question of whether the invention is being practiced within the United States; what are the nature of the intellectual property and the character of the commercial embodiment; how is the pricing of the agreement structured, what aspects are occurring where, and to whom does the financial benefit of the invention accrue; what is the commercial relationship between the site where potential infringement could occur and the site where control of the invention is retained; what is the established profitability of the invention; how commercially successful is it and what is its current popularity; and what are the economic realities of the potential infringement. The ease with which intangible information crosses geographic boundaries and the very nature of the domestic industry in intangible technology demonstrates how vital the ITC's role is in information-age technology. The ITC is unable to fulfill its mission of protecting domestic industry without having the ability to exclude all articles, tangible or intangible, that are harming domestic industry and are the subject of unfair acts.

At a recent Senate hearing, it was said that “If it ain't tangible, it ain't patent eligible.”⁵³¹ This needs to be fixed. Much of modern innovation focuses on data—an intangible asset fraught with value and judgment. The Industrial Age laws can protect both public interest and promote innovation in the Information Age.

530. See *supra* Section II.

531. *The State of Patent Eligibility in America: Part 1: Hearing Before the S. Comm. on the Judiciary Subcomm. on Intellectual Prop.*, 116th Cong. (2019) (statement of Robert A. Armitage, Consultant on IP Strategy & Policy).

