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Before *Mayo* & After *Alice*: The Changing Concept of Abstract Ideas

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BEFORE *MAYO* & AFTER *ALICE*: THE CHANGING CONCEPT OF ABSTRACT IDEAS

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ABSTRACT

Mayo v. Prometheus and Alice v. CLS are landmark Supreme Court decisions which respectively introduced and then instituted a new, two-step patent-eligibility test. Step One tests the patent claims for abstractness, while Step Two tests for inventive application. This new test was so demanding that in the one-year period after Alice was decided, over 80 percent of all challenged patents had one or more claims invalidated. In fact, at the Federal Circuit over the same time period, only one recorded case of a successful Alice defense exists—DDR Holdings v. Hotels.com.

This note explains DDR's success as an inconsistency in the Federal Circuit's application of Alice, and also as the first time that the Federal Circuit placed greater emphasis on the claim steps "as an ordered combination" than individually under Alice Step Two. To resolve this inconsistency with the Federal Circuit's other decisions, a possible resolution is proposed which takes into account the "unexpected effects" uniquely present in DDR's ordered combination of steps. The logical implication of DDR is that claims may be saved from invalidation if the individual steps are unconventional, or if the steps as an ordered combination produce "unexpected effects." A four-box matrix is presented to visually represent the realm of logical possibilities when the conventionality of the individual steps is squared off against the expectedness of the effects of the ordered combination of steps.

This note also briefly explores the 19th century historical underpinnings of the two-part abstractness and inventive concept test, and

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shows how the concept of abstractness evolved over a trilogy of Supreme Court cases in the 20th century. It brings to light and questions the Mayo Court's unreasoned decision to select—and the Alice Court's blind decision to endorse—Flook's "inventive application" abstractness standard, when before Mayo, there existed at least four distinct patent-eligibility standards (arranged in ascending order of exigency)—practical application (Le Roy v. Tatham); scope-limited practical application (Gottschalk v. Benson); process application (Diamond v. Diehr); and inventive application (Parker v. Flook). The Court's decision is especially questionable because it was Diehr's "process application" standard that was latest-in-time, and because Diehr had explicitly denounced Flook's "inventive application" standard.

INTRODUCTION

In *Alice v. CLS*,[1] the Supreme Court established that the two-step inquiry articulated in *Mayo v. Prometheus*[2] was not just a one-off inquiry specific to the facts of that case.[3] Rather, it was "a *framework* for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts."[4] The framework comprises two steps. First, it asks if the disputed claims were

1. 134 S. Ct. 2347 (2014).
2. 132 S. Ct. 1289 (2012).
3. *Compare Alice*, 134 S. Ct. 2347, *with* Ass'n. of Molecular Pathology v. Myriad Genetics, 133 S. Ct. 2107 (2013) (where the Court did not apply *Mayo*'s two-step test to assess subject matter eligibility).
4. *Alice*, 134 S. Ct. at 2355 (emphasis added).

directed to a patent-ineligible concept, such as an abstract idea.[5] If so, the second step asks if the claim's elements contain an inventive concept sufficient to transform the patent-ineligible idea into a patent-eligible application of that idea.[6]

Alice, with its two-step framework, led to a massive wave of invalidations at the Patent Trial and Appeal Board (PTAB) and at the courts below.[7] As of its first anniversary on June 19, 2015, *Alice* was applied to a total of 272 decisions and opinions—198 from the PTAB, 63 from United States District Courts, and 11 from the Court of Appeals for the Federal Circuit.[8] Out of the 345 patents that were challenged before these three tribunals, 286 had at least one claim invalidated, representing a shocking 82.9 percent invalidation rate.[9] Even more, within the same one-year timeframe, the Federal Circuit (citing *Alice*) upheld just one patent while invalidating 15, for a 93.75 percent invalidation rate.[10]

Through a five-part discussion, this note attempts to explain the stunning results at the Federal Circuit and, using the court's reasoning and language, distill the key characteristics of a patent that it would likely uphold as patent-eligible. Because the only patent that the Federal Circuit has upheld as patent-eligible in its decisions that cite *Alice* is a software patent, this note's scope of analysis is confined to the Federal Circuit's seven precedential software-related patent decisions issued within one year of *Alice*.[11]

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5. *Id.*

6. *Id.*

7. The Patent Trial and Appeal Board (PTAB) was statutorily created as part of the America Invents Act. 35 U.S.C. § 6 (2012). It reviews, on appeal, adverse examiner decisions, post-issuance challenges to patents, and interferences. *Id.* The timeline can be very short. For example, petitions for Post-Grant Reviews – a procedure by which third parties may challenge the (subject matter) validity of issued claims – must be filed no later than 9 months after the patent's issue/reissue date, and the Board's final determination must be made within one year of instituting review. 35 U.S.C. § 321 (2012).

8. Statutorily, the Court of Appeals for the Federal Circuit is the *only* venue for dissatisfied parties to appeal the final written decisions of the PTAB in Post-Grant and Inter Partes Reviews. 35 U.S.C. § 141(c) (2012).

9. Jasper L. Tran, *Software Patents: A One-Year Review of* Alice v. CLS Bank, 97 J. Pat. & Trademark Off. Soc'y 532, 540.

10. Upheld: DDR Holdings v. Hotels.com, 773 F.3d 1245, 1256-58 (Fed. Cir. 2014) (one patent). Invalidated: WildTangent v. Ultramercial, 772 F.3d 709, 714-15 (Fed. Cir. 2014) (one patent); Digitech Image Techs. v. Elecs. for Imaging, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (one patent); Planet Bingo v. VKGS, 576 F. App'x 1005, 1008-09 (Fed. Cir. 2014) (nonprecedential opinion) (two patents); buySAFE v. Google, 765 F.3d 1350, 1355 (Fed. Cir. 2014) (one patent); *In re* BRCA1- and BRCA2-Based Hereditary Cancer Test Patent Litigation, 774 F.3d 755, 764-65 (Fed. Cir. 2014) (three patents); Content Extraction & Transmission v. Wells Fargo Bank, 776 F.3d 1343, 1350-51 (Fed. Cir. 2014) (four patents); AllVoice Developments US, LLC, v. Microsoft, 612 F. App'x 1009, 1017-19 (Fed. Cir. 2015) (one patent); OIP Techs. v. Amazon, 788 F.3d 1359, 1362-64 (Fed. Cir. 2015) (one patent); Ariosa Diagnostics v. Sequenom, 788 F.3d 1371, 1379-80 (Fed. Cir. 2015) (one patent).

11. The discussion includes Internet Patents Corp. v. Active Network, 790 F.3d 1343 (Fed. Cir. 2015), which was decided one year and five days after *Alice*, 134 S. Ct. 2347 (2014).

Part I introduces the concept of abstract ideas, and explains how the term was originally understood in the 19th century. Part II discusses jurisprudence pre-*Mayo* and *Alice*. Part II-A explains how the abstract idea concept changed in the 20th century, as the Supreme Court began to look beyond the form of the patent's claims and deeper into its substance. This was when the Court began to introduce additional qualifications such as an "inventive concept" to distinguish the non-abstract from the abstract. In Part II-B, in a case about business method patents, the Court revisits subject matter eligibility for the first time in the 21st century after a three-decade hiatus. Part III frames *Mayo* and *Alice*'s two-step subject matter eligibility test as an unexplained choice the Court made between two unresolved patent-eligibility standards from the 1980s. Part IV examines the impact of *Alice* on software patent-eligibility at the Federal Circuit, with particular emphasis on a comparison of the recent opinions of *DDR Holdings v. Hotels.com*[12] and *Ultramercial v. Hulu*.[13] *DDR* is important because it is the only software patent case at the Federal Circuit to have survived a section 101 invalidity challenge. *Ultramercial*, like *DDR*, also concerns a method of internet advertising, but while the court upheld the patents in *DDR*, it invalidated those in *Ultramercial*. These two cases show how different analytical approaches to similar facts lead to opposite results. Part V proposes a reconciliation of *DDR* and *Ultramercial* by focusing on the "unexpected result" that was found in *DDR*. For this purpose, I propose a taxonomy of four logically possible combinations to categorize claims based on how courts have treated them in Step Two of the *Alice* analysis. The combinations are expressed as a four-box matrix to help practitioners and analysts quickly visualize the strength of their patent portfolio against subject matter eligibility challenges.

I. What is an Abstract Idea?

Section 101 of the Patent Act offers a seemingly broad definition of patent-eligibility:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.[14]

The Supreme Court has stated that this language should be broadly construed, noting that Congress "intended statutory subject matter to 'include anything under the sun that is made by man.'"[15] Yet, given such a broad

12. 773 F.3d 1245 (Fed. Cir. 2014).
13. 772 F.3d 709 (Fed. Cir. 2014).
14. 35 U.S.C. § 101.
15. Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979 (1952); H.R. Rep. No. 82-1923 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399). Patents

construction, why is it that within the one year following *Alice*, the Federal Circuit invalided over 90 percent of the patents brought before it for being directed to ineligible subject matter? It appears that not everything under the sun is patent-eligible.

Since at least 1852, the Court has laid down exceptions to the rule. In *Le Roy v. Tatham*, the Court stated that "[a] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."[16] The following year, in *O'Reilly v. Morse*, the Court stated that "[t]he mere discovery of a new element, or law, or principle of nature, without any valuable application of it to the arts, is not the subject of a patent."[17] Three judicial exceptions were thus created, and patents directed to laws of nature, physical phenomena, or abstract ideas fell outside the statutorily permissible subject matter for patents (i.e. process, machine, manufacture, and composition of matter). The abstract idea exception caused the patents in *Alice*, and in all but one of the software cases before the Federal Circuit in the past year, to be invalidated.

Just how broad is this abstract idea exception, and what exactly is an abstract idea? Professor Kevin Collins has proposed four types of abstract ideas:[18] ideas on the workings and thoughts of the human mind;[19] ideas that are not sufficiently disclosed in the specifications;[20] ideas that are divorced from the material world;[21] and ideas that are so broad as to be "insufficiently

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directed to a process, machine, manufacture, or composition of matter collectively known as statutory subject matter is said to be directed to subject matter that is patent-eligible.

16. 55 U.S. 156, 175 (1852).

17. 56 U.S. 62, 132 (1854).

18. Kevin Emerson Collins, *Bilski and the Ambiguity of "An Unpatentable Abstract Idea"*, 15 LEWIS & CLARK L. REV. 37 (2011).

19. *Id.* at 46-48. Professor Collins uses the phrase "embodiments" to distinguish the physical implementation of an idea (an "embodiment" of that idea) from an idea as it exists in the purely mental state. *Id.* at 46-48. He explains that a mousetrap inventor cannot obtain rights to exclude others from performing the "idea-like mental processes" of building better mousetraps, but can obtain such rights for "roughly the set of things or methods that embody the knowledge . . . conveyed by a patent specification." *Id.* at 47. Thought of in terms of infringement, the individual mousetraps that infringe a mousetrap claim are the physical manifestations or embodiments of the inventor's idea. *Id.*

20. *Id.* at 50-53 (discussing *O'Reilly*, 56 U.S. at 112, in which Morse claimed the use of electro-magnetism to print characters "at any distances," without limit to "the specific machinery . . . described in the foregoing specification and claims."). Contrary to Professor Collins' framing of the claim deficiency as being one of an impermissible claim of a principle (electromagnetism), the *O'Reilly* Court explicitly stated that it was invalidating the claim because it was "too broad." Specifically, the Court found that *Morse* had claimed "an exclusive right to use a manner and process which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent." In today's parlance then, the problem with *Morse's* claim (as framed by the Court), was one of enablement, not of abstractness.

21. *Id.* at 55; *see also In re* Bilski, 545 F.3d 943 (Fed. Cir. 2008) (en banc) (holding that business method patents were abstract because they could be "performed without using sufficiently physical, machine-like technology and without causing sufficient change to the material world.").

applied."[22] Professor Collins' final classification is of particular relevance since it most resonates with *Alice*, where the Court held that "generic computer implementation" was not enough to transform a claim over a "fundamental economic practice" into a patent-eligible application of that idea.[23]

As with any formal definition, line drawing quickly becomes a central concern. How much "application" must be added to a natural law—like $E=MC^2$, the heat of the sun, or the law of gravity—to transform the claimed use of the natural law from a patent-ineligible (abstract) idea into patent-eligible subject matter? Professor Collins relies on the Supreme Court's "famous trilogy on the patent eligibility of computer software"—*Gottschalk v. Benson*,[24] *Parker v. Flook*,[25] and *Diamond v. Diehr*[26]—to delineate where the Court draws that line. He ultimately concludes that "[b]etween the two data points provided by *Flook* and *Diehr* . . . there is a vast unknown, and hence, unresolved problem of vagueness."[27] Before examining in detail the patent claims presented by the individual cases of this famous trilogy, it is worthwhile to gain context by taking a whirlwind tour through the old case of *Le Roy v. Tatham* (1853), where the Supreme Court first elaborated on the notion that ideas were not patentable.

In *Le Roy*, the Hanson brothers discovered that lead pipe could be produced by contact welding (i.e., by mechanically pressing the hot component parts together under heat and pressure). There, the Court found that what was claimed was not the principle of contact welding, but an application of contact welding to form lead pipe. The Court stated that the scientific principle of contact welding was not patentable, but the "*processes* used to extract, modify, and concentrate natural agencies" were.[28] In fact, as revealed by Justice Nelson in his dissenting opinion, this patentability exception dates back even further than *Le Roy*, to the 1795 English case of *Boulton v. Bull*.[29] There, Lord Chief Justice Eyre opined that:

> [T]here can be no patent for a mere principle, but for a principle so far embodied and connected with corporeal substances as to be in a condition to act and to produce effects in any art, trade, mystery, or manual occupation, I think there may be a patent.[30]

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22. *Id.* at 58-61 (discussing the binary conversion algorithm in *Gottschalk v. Benson*, 409 U.S. 63 (1972) as a type of claim that describes "things/methods that were actually invented but that are abstract because they have too many end-uses and are thus insufficiently applied to merit patent protection.").

23. *Alice*, 134 S. Ct. at 2360.

24. 409 U.S. 63 (1972).

25. 437 U.S. 584 (1978).

26. 450 U.S. 175 (1981).

27. Collins, *supra* note 18, at 60.

28. *Le Roy*, 55 U.S. at 175 (Nelson, J., dissenting) (emphasis added).

29. Boulton v. Bull, 2 H. Bl. 463 (1795).

30. *Boulton*, 2 H. Bl. at 495 (Eyre C.J.). The quote continues: "It is not that the patentee has conceived an abstract notion, that the consumption of steam in fire engines may be less-

Thus, the dichotomy, at least as it existed in 1853,[31] was between abstract ideas which lacked practical application (such as an idea of itself, original causes, and motives) and ideas which had (such as those applied to industrial processes or in the "commerce or manufacture" of a new device).[32] *Rubber-Tip* sums up the rule as follows: "[a]n idea of itself is not patentable, but a new device by which it may be made practically useful is."[33]

II. Supreme Court Jurisprudence Before *Mayo* and *Alice*

A. *Abstract Idea or Process: The Benson, Flook, and Diehr Trilogy*

The fight between patent-ineligible abstract ideas and patent-eligible processes is played out in the *Benson-Flook-Diehr* trilogy. In *Benson*, the patent claimed an algorithm for converting binary-coded decimal numerals into pure binary form. The Supreme Court held that the claim was "so abstract and sweeping as to cover both known and unknown uses of the [algorithm]."[34] Furthermore, the Court found that "[t]he end use may . . . vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents,"[35] and so was "in practical effect . . . a patent of the algorithm itself."[36] Six years later, in *Flook*, the Court interpreted *Benson* as standing for the "long-established principle [that] 'phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.' "[37] Thus, the Court reasoned that under *Benson*'s principle, a claim would be abstract if it covered the entire universe of possible uses or the basic tools of science.

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ened, but he has discovered a practical manner of doing it . . . . Surely this is a very different thing from taking a patent for a principle; it is not for a principle, but for a process." *Id.* at 495–96.

31. At the time of *Boulton* in 1795, the English courts were conflicted over whether a method which did not result in any new manufacture was patentable. Unlike in the U.S., where the dichotomy was principle/process, the dichotomy that existed in England was principle/manufacture. See Michael Risch, *America's First Patents*, 64 Fla. L. Rev. 1279, 1297-98 (2012). The dichotomy that existed for them was of "unpatentable principles" or "patentable manufactures." *Id.* at 1299.

32. *Le Roy*, 55 U.S. at 175. While it may not be entirely clear if *Le Roy*'s list of excluded subject matter includes mental processes, it is clear that *Le Roy* focused on practical applications of ideas—the Court stated that "[a] new property discovered in matter, when practically applied, in the construction of a useful article of commerce or manufacture, is patentable." *Id.* at 175. *See also* Rubber-Tip Pencil Co. v. Howard, 87 U.S. 498, 507 (1874).

33. *Rubber-Tip*, 87 U.S. at 507. Interestingly, although *Rubber Tip* has been cited in *Benson*, *Flook*, and *Diehr* for the proposition that "an idea of itself is not patentable," *Rubber Tip* really was a case about novelty, or the lack thereof in the claimed idea of attaching rubber eraser tips to pencils. *Id.* at 498.

34. *Benson*, 409 U.S. at 68.

35. *Id.* at 68.

36. *Id.* at 72.

37. *Flook*, 437 U.S. at 599 (quoting *Benson*, 409 U.S. at 67).

In *Flook*, the claims set forth a method of using a mathematical algorithm to automatically update alarm limits in a catalytic conversion process. Even though the Court agreed that the claims did not "wholly preempt the mathematical formula," the Court still held that the claimed method was not directed to a process, but was instead an attempt to claim a mathematical formula.[38] The Court reasoned that the step of automatically updating the alarm limits based on the output of the algorithm was "post-solution activity," and could not be the defining criterion between a patent-ineligible principle and a patent-eligible process. Such a criterion would "exalt[ ] form over substance," because any competent draftsman could attach some form of post-solution activity to almost any mathematical formula.[39]

Instead, according to the *Flook* Court, the defining criterion was inventive application. This came as a result of its reading of *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*[40] and *Funk Bros. Seed v. Kalo*,[41] which the Court cited for the proposition that "the *process itself* . . . must be new and useful."[42] This led the Court to hold that for a claim to be patent-eligible, it must contain an "inventive application" of a principle, because the mere discovery of a principle was not enough.[43] In effect, requiring inventive application was really just the Court's euphemism for requiring novelty. This is revealed by the Court's search for an inventive application, where it dissected the claims into their individual components and found that each component—from the catalytic conversion process to the practice of monitoring process variables to the use of computers for automatic alarm monitoring—was "well-known" and therefore lacked inventive application.[44] Analytically then, *Flook*'s inventive application standard is more demanding than *Le Roy*'s practical application standard.

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38. *Id.* at 590. *Flook* only claimed the algorithm in the context of alarm limits, and only then for the purpose of updating alarm limits tagged to process variables of a specific process—the catalytic chemical conversion of hydrocarbons.

39. *Id.*

40. *Id.* at 591 ("While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.") (quoting Mackay Radio & Tel. Co. v. Radio Corp. of Am., 306 U.S. 86, 94 (1939).

41. *Id.* ("He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.") (quoting Funk Bros. Seed v. Kalo, 333 U.S. 127, 130 (1948)).

42. *Id.* (emphasis added).

43. *Id.* at 594.

44. *Id.* (holding that "[I]t is absolutely clear that respondent's application contains no claim of patentable invention. The chemical processes involved in catalytic conversion of hydrocarbons are well known, as are the practice of monitoring the chemical process variables, the use of alarm limits to trigger alarms, the notion that alarm limit values must be recomputed and readjusted, and the use of computers for 'automatic monitoring-alarming.' ").

The third case, *Diehr*, takes a radical departure from *Flook*. In *Diehr*, the Court upheld the patent eligibility of a computer-implemented rubber curing process that used the well-known Arrhenius equation to continuously calculate remaining cure time. Without overruling *Flook*, *Diehr* explicitly denounced *Flook*'s dissection of the claims as "inappropriate," and debased *Flook*'s inventive application standard by stating that the novelty "of any steps in a process, or even of the process itself" was not relevant in a subject matter inquiry.[45] Instead, *Diehr* applied a "whole claims" approach, where the central criterion was whether the claimed process, as a whole, was "performing a function which the patent laws were designed to protect."[46]

The *Diehr* Court first noted that the rubber curing process was an industrial process that has "historically [been] eligible to receive the protection of our patent laws." While the Court had evidently taken history into consideration, the only formal example that it provided of such a patent-protected function was the "transformation or reduction of an article to a different state or thing."[47] However, the Court clarified that achieving such a transformation or reduction was not sufficient on its own, but was only a "clue" toward determining patent eligibility.[48]

In *Diehr*, the fact that the claim provided a step-by-step description of the rubber curing process and that the process itself produced "a result heretofore unknown in the art" gave the Court sufficient grounds to find the claims were directed to a process rather than a mathematical principle.[49] This may seem overly formalistic, because a competent draftsman could cloak a mathematical principle or an abstract idea in step-by-step process language replete with tangible inputs and outputs—but that was the price the *Diehr* Court was willing to pay to keep *Flook*'s novelty analysis at bay.

By the close of the trilogy, three vastly different patent eligibility standards had arisen. Under *Benson*, an idea was found patent-ineligible (abstract) if its practical implementation would cover all known and unknown uses of the idea. Under *Flook*, an idea was found abstract if the individual

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45. *See Diehr*, 450 U.S. at 188-89 ("It is *inappropriate to dissect* the claims into old and new elements and then to ignore the presence of the old elements in the analysis [as was done in *Flook*]. This is particularly true in a process claim, because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made. *The 'novelty' of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter*.") (emphasis added).

46. *See Diehr*, 450 U.S. at 192 ("On the other hand, when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is *performing a function which the patent laws were designed to protect* (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.") (emphasis added).

47. *Id.* at 184.

48. *Id.*

49. *Id.* at 184, n.14.

steps of the process were not novel. Under *Diehr*, the question was whether or not the process performed some patent-protected function. Arranged on an ascending scale, *Le Roy* would be prototypical of the most forgiving standard (requiring practical application); followed by *Benson* (claims can't be sweeping); then *Diehr* (requiring process application); and finally *Flook* (requiring inventive application).

B. Bilski *and the Patent Eligibility of Intangible Process Claims*

Almost three decades passed before the Supreme Court had the chance to decide another patent case—*Bilski v. Kappos*.[50] *Bilski* is important because it left the door open for patent protection of not only business method claims, but also other intangible subject-matter claims (such as software claims). It also showed how the current Supreme Court applied the *Benson-Flook-Diehr* trilogy.

In *Bilski*, the patent at issue claimed a method of hedging against the risk of price changes in commodities trading and a mathematical formula expressing the same. Since the claim was directed to a completely intangible process, an important patentability threshold question existed: whether or not business method claims, which were not tied to a particular machine, and which did not transform or reduce an article to a different state or thing (the "machine-or-transformation" test),[51] were patent-ineligible for that reason alone.

The Court first held that the machine-or-transformation test was only a "useful and important clue," and not "the sole test" for deciding whether an invention is a patent-eligible process.[52] Thus, a claim could still be directed to a process even if it were not tied to a machine, and did not transform or reduce an article to a different state or thing. The Court pointed out that the broad definition of "process" in 35 U.S.C. § 100(b)[53] did not limit patent-eligible processes to only those which passed the machine-or-transformation test.[54] Relying on the rule of statutory interpretation that each term should be defined by its "ordinary, contemporary, [and] common meaning," the Court defined "method" as "[a]n orderly procedure or process . . . regular way or

50. 561 U.S. 593 (2010).

51. The "machine-or-transformation" test was first articulated in *Benson*, where "[i]t [wa]s argued that a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a 'different state or thing.' " 409 U.S. at 71. In *Benson*, the Court did not affirmatively reject the machine-or-transformation test, but only stated in the negative that "[w]e do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents." *Id.*

52. *Bilski*, 561 U.S. at 604.

53. The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material. 35 U.S.C. § 100(b).

54. *Bilski*, 561 U.S. at 603.

manner of doing anything . . . a set form of procedure adopted in investigation or instruction."[55]

Under this broad definition of "process," only five justices found that business method patents were not categorically excluded from patent protection.[56] The Court was unanimous, however, in voting to retain the judicial exclusions for abstract ideas, laws of nature, and natural phenomena. Thus, the next question was whether the particular claims in *Bilski* were directed to a patent-eligible method or a patent-ineligible abstract idea.

The *Bilski* Court held that the claims were abstract and cited to *Benson*, *Flook*, and *Diehr*. While the Court's fluid citation to the trilogy may seem like it was applying all three standards at once, its analysis was focused not on whether the claims described a process, but on whether the claims were abstract. Analogizing to *Benson*, the Court held that allowing the claims in *Bilski* would preempt the use of hedging in all fields and grant the inventors a monopoly over "a fundamental economic practice long prevalent in our system of commerce."[57] Neither *Flook*'s inventive application standard, nor *Diehr*'s patent-protected function standard, were explicitly used to reject the claims. Instead, the Court cited *Flook* for the proposition that limiting an algorithm to a particular technological environment would not render an abstract idea patent-eligible.[58] Similarly, it cited *Diehr* for its emphasis on analyzing claims as a whole, and for the idea that an application of a mathematical formula could be patent-eligible if the claim as a whole was not "an attempt to patent a mathematical formula, but rather an industrial process for the molding of rubber products."[59]

Thus, *Bilski* left open the question of whether it was the *Flook* or *Diehr* standard (and the question of *how* each case should be applied) that should determine if an idea was directed to a patent-eligible process.

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55. *Id.*

56. *Id.* at 657. *Bilski* was a 5-4 decision on the issue of patentability of business methods. Justice Stevens concurrence was joined by Justices Ginsburg, Breyer, and Sotomayor.

57. *Bilski*, 561 U.S. at 610. In *Bilski*, what was claimed was essentially the following steps: i) sell a commodity at fixed price A (assume A is the short position price); ii) identify other traders willing to take a counter-position (i.e., long); iii) sell commodity at fixed price Z to those other traders to offset the earlier (short) position. *Id.* at 599. There is no practical difference between Bilski's claimed method of protecting against financial risk by matching up traders looking to take on opposite positions and the concept of hedging, which is the idea of taking opposing short and long investment positions to balance financial risk.

58. *Id.* at 610.

59. *Id.* at 611.

III. The Two-Step Framework for Patent Subject Matter Eligibility

A. Mayo *and the Beginning of the Two-Step Framework*

A year later the Supreme Court answered the question left open by *Bilski*, albeit in an unexpected way. Instead of simply deciding which standard applied, the Court combined *Benson*'s abstract idea inquiry with *Flook*'s inventive application inquiry in a two-step analysis.[60] Step One asked if the claims were directed to a natural law.[61] Step Two asked whether the claims do "significantly more" than describe the natural law, i.e., whether they contained an "inventive concept."[62]

In *Mayo*, the claim at issue involved a method of optimizing thiopurine drug treatment.[63] A thiopurine drug was first administered to a patient, with blood samples subsequently taken to measure the amount of drug that had been metabolized by the body. If the metabolite levels dipped below a threshold specified in the claim, that would indicate that the dosage should be increased to achieve efficacy; conversely, if the levels exceeded a higher specified threshold, the dosage should be decreased to avoid toxic side effects.

In Step One, the Court held that the claimed relationship between metabolite levels and drug dosage "itself exists in principle apart from any human action," and "[t]he relation is a consequence of the ways in which thiopurine compounds are metabolized by the body – [an] entirely natural process[ ]." Thus, the Court found that the claims set forth natural laws.[64]

In Step Two, the Court dissected the claim in search of an "inventive concept," and held that the claim did not add enough to transform the "statements of . . . correlations" into a process that "appl[ies] natural laws."[65] The claim contained three steps—an "administering" step, a "wherein" step, and a "determining" step.[66] According to the Court, doctors had been administering drugs containing 6-thioguanine long before the patent issued; the instruction to increase or decrease dosage merely informed a doctor of the relevant natural laws; and methods for determining the metabolite levels were already well known in the art.[67] Each of the three steps individually consisted of "well understood, routine, conventional activity already engaged in by the scientific community," and the claim as a whole added "nothing significant beyond the sum of their parts taken separately."[68] The result was that either

60. *Mayo*, 132 S. Ct. at 1296-97.
61. *Id.*
62. *Id.*
63. *Id.* at 1289.
64. *Id.* at 1297.
65. *Id.*
66. *Id.*
67. *Id.* at 1297-98.
68. *Id.*

individually or as a whole, the steps were insufficient to transform "unpatentable natural correlations into patentable applications."[69]

In effect, *Mayo*'s Step Two analysis is nothing more than a rehash of *Flook*'s inventive application analysis—it even uses some of the same language. In *Flook*, the Court framed the question before it as whether "the formula . . . the only *novel* feature of respondent's method . . . makes an otherwise *conventional* method eligible for patent protection."[70] While the question before the *Mayo* Court was not framed in exactly the same way,[71] the *Mayo* Court—like the *Flook* Court before it—also dissected the claim into its individual steps, and found that there was no patentable invention because everything about the method was "*well known*" and "conventional."[72] In short, the *Mayo* Court followed *Flook*'s analytical approach to a tee.

But why should *Flook* have been the standard to apply at Step Two, and not *Diehr*, when it was the more recent case? The *Mayo* Court did not adequately explain why process qua process was not enough. It referenced the "draftsman's art,"[73] but this was the same concern that the *Diehr* Court considered when it decided against applying *Flook*'s inventive application standard.[74] Moreover, in light of *Diehr*'s two admonitions against the dissecting of claims and the tainting of subject matter eligibility with novelty, why did stare decisis not apply?

The simple answer is that the Court was either confused, or was attempting to heroically reinterpret *Diehr*'s clear rejection of the inventive application standard. It explained that the process in *Diehr* was patent-eligible because the "additional steps . . . integrated the equation into the process as a whole . . . [and] transformed the process into an inventive application of the formula."[75] However, this is an underwhelming gloss on *Diehr* that is both factually and analytically inaccurate. Factually, the "additional steps" in *Diehr* comprised the usual steps in the rubber curing process (the loading of the mold, the opening of the press, etc.).[76] By *Mayo*'s own standards, there is nothing remotely inventive about these steps or the underlying rubber curing

69. *Id.* at 1298.

70. *Flook*, 437 U.S. at 588 (emphasis added).

71. *Mayo*, 132 S. Ct. at 1297 (stating that "The question before us is whether the claims do significantly more than simply describe these natural relations. To put the matter more precisely, do the patent claims add *enough* to their statements of the correlations to allow the processes they describe to qualify as patent eligible processes that *apply* natural laws?").

72. *Compare Mayo*, 132 S. Ct. at 1297-98 *with Flook*, 437 U.S. at 594.

73. *Mayo*, 132 S. Ct. at 1294.

74. *See Diehr*, 450 U.S. at 192 ("To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection.").

75. *Mayo*, 132 S. Ct. at 1292 (quoting *Diehr*, 450 U.S. at 187) (internal citations omitted) (emphasis added).

76. *Diehr*, 450 U.S. at 184.

process itself—*Diehr* claimed the same rubber curing process that had been known for over a century.[77] Analytically, the *Diehr* Court believed it was "inappropriate" to dissect the claims into individual steps in the first place; and even if the Court had dissected the claims in that case, the additional steps did not transform a patent-ineligible mathematical principle into a patent-eligible *inventive application* of that principle; rather, they transformed a patent-ineligible mathematical principle into a patent-eligible *process* of curing synthetic rubber.[78] Under the latter analysis, novelty and inventiveness were irrelevant.[79]

B. Alice *Applies* Mayo*'s Two-Step Framework*

Instead of bringing to light the latent issues in the *Mayo* Court's decision to apply *Flook* over *Diehr*, the *Alice* Court endorsed *Mayo's* two-step test as "a *framework* for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts."[80] *Alice* demonstrated that the *Mayo* framework was capable of transcending its biopharmaceutical and law-of-nature roots, and transplanting itself into the realm of abstract ideas and computer-executed business methods. In *Alice*, the Court articulated the framework as follows:

> First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, "[w]hat else is there in the claims before us?" To answer that question, we con-

77. *Id.* at n.8.

78. *See id.* at 187 ("The respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber. Their process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of that equation. Rather, they seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process. These include installing rubber in a press, closing the mold, constantly determining the temperature of the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time. Obviously, one does not need a 'computer' to cure natural or synthetic rubber, but if the computer use incorporated in the process patent significantly lessens the possibility of 'overcuring' or 'undercuring,' the process as a whole does not thereby become unpatentable subject matter.").

79. *See Diehr*, 450 U.S. at n.15 ("The fact that one or more of the steps in respondents' process may not, in isolation, be novel or independently eligible for patent protection is irrelevant to the question of whether the claims as a whole recite subject matter eligible for patent protection under § 101.").

80. *Alice*, 134 S. Ct. at 2355 (emphasis added). That *Mayo*'s two-step test became the gold standard is a little surprising, because the Court decided *Ass'n of Molecular Pathology v. Myriad Genetics* in between *Mayo* and *Alice*, and there it did not apply *Mayo*'s two-step test. 569 U.S. ___, 133 S. Ct. 2107 (2013). *See also* Jeffrey A. Lefstin, *The Three Faces of Prometheus: A Post-Alice Jurisprudence of Abstractions*, 16 N.C.J.L. & TECH. 647, 654 (2015) (opining "the [*Myriad*] Court's holding, that isolated and purified human genetic sequences were not patent-eligible, seemed premised only on § 101's requirement that an invention be 'new.' However, in *Alice Corp. v. CLS Bank*, the Court confirmed that *Mayo's* framework is the general test for patent eligibility.").

> sider the elements of each claim both individually and "as an ordered combination" to determine whether the additional elements "transform the nature of the claim" into a patent-eligible application. We have described step two of this analysis as a search for an "'inventive concept'"—*i.e.,* an element or combination of elements that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."[81]

The patent in *Alice* claimed "a method of exchanging financial obligations between two parties using a third-party intermediary to mitigate settlement risk."[82] Under Step One, the Court held that the method recited an abstract idea because settlement through intermediaries was a "fundamental economic practice" and a "building block of the modern economy."[83] Applying the *Flook* inventive application standard under Step Two, the *Alice* Court held that the sole "additional element"—the claim limitation that required implementation by a generic computer—was not enough to transform the abstract idea into a patent-eligible application.[84]

In reaching this conclusion, the Court first looked at the claim elements separately, and held that the function performed by the computer at each step was "purely conventional."[85] Next, considering the claim "as an ordered combination," the Court held that the computer components "ad[d] nothing . . . that is not already present when the steps are considered separately," and determined that "[v]iewed as a whole, these method claims simply recite the concept of intermediated settlement as performed by a generic computer."[86]

While the Court did not explicitly define what additional claim elements would make the claim patent-eligible, it quoted *Mayo*'s proposition that "'[s]imply appending conventional steps, specified at a high level of generality,' to a method already 'well known in the art' was not 'enough' to supply the 'inventive concept' needed to make this transformation."[87] Specifically applied to software, "[a]n instruction to apply the abstract idea of intermediated settlement using some unspecified, generic computer . . . is not *'enough'* to transform the abstract idea into a patent-eligible invention."[88]

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81. *Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 132 S. Ct. 1289, 1294-98 (2012) (internal citations omitted).
82. *Alice*, 134 S. Ct. at 2356.
83. *Id.* at 2357.
84. *Id.* at 2358.
85. *Id.* at 2359 (quoting *Mayo*, 132 S. Ct. at 1289).
86. *Id.*
87. *Id.* at 2357 (quoting *Mayo*, 132 S. Ct. at 1289).
88. *Id.* at 2360 (quoting *Mayo*, 132 S. Ct. at 1289). *See also id.* at 2358 ("Wholly generic computer implementation is not generally the sort of 'additional featur[e]' that provides

The Court did however provide some examples of the "additional features" that might supply enough of an inventive concept to "transform the abstract idea" into a patent-eligible application; these include "improve[ments] [to] the functioning of the computer itself" or "improvement[s] in any other technology or technical field."[89] Without further guidance, it is impossible to tell the scale of improvement necessary to make the transformation, and it is likely that the patent-eligibility of many future software patents will turn on this new doctrine. Patent drafters today should take the Court's cue to include more language in the claim specifications to show how the claimed invention is an improvement over the prior art.

The aftermath of the *Mayo* Court's decision to sweep *Diehr* under the rug, and the *Alice* Court's decision to endorse *Mayo*, was the tsunami of invalidations at the lower courts. Part IV analyzes the Federal Circuit's recent crop of software decisions in order to explain why only one case has successfully run the gauntlet of the *Alice* two-step.

IV. Federal Circuit applies *Alice*

Within the first year or so after *Alice*, the Federal Circuit decided seven precedential software patent cases on substantive grounds. In all but one case, the Federal Circuit ruled that the patent claims were impermissibly drawn to an abstract idea and lacked a transformative inventive concept.

In two cases, *buySAFE v. Google*[90] and *OIP Techs. v. Amazon.com*,[91] the Federal Circuit directly applied *Alice* to hold that claims covering a transaction guaranty (*buySAFE*) and an offer-based price optimization (*OIP Techs*.) were abstract because they were directed to fundamental economic concepts. At Step Two, the claims in both cases were held to be insufficiently applied because they were implemented using generic computers. This was true despite the fact that in *OIP Techs.*, the invention arguably improved the functioning of the computer. There, the use of computers and the internet provided data which allowed price-optimization "with more granularity."[92] However, the court was not convinced. It cited *Alice* for the proposition that the "use of a computer to create electronic records, track multiple transac-

any 'practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.' ") (quoting *Mayo*, 132 S. Ct. at 1289).

89. *Id.* at 2359.

90. 765 F.3d 1350 (Fed. Cir. 2014) (holding that a transaction guaranty – a "long-familiar" commercial practice of "ancient lineage" – was abstract, and that the mere addition of a generic computer does not add an inventive concept).

91. 788 F.3d 1359 (Fed. Cir. 2015) (holding that automated offer-based price optimization is an abstract idea "similar to other 'fundamental economic concepts' "; that the use of a computer to automatically determine an optimized price is "routine" and "conventional"; and that non-specific programming, i.e., "any sequence of instructions designed for execution on a computer system" is overly broad to function as a limitation on pre-emption).

92. *OIP Techs.*, 788 F.3d at 1363.

tions, and issue simultaneous instructions" was not inventive.[93] Following this proposition, the federal circuit held that a computer program allowing users to perform tasks "more quickly or more accurately" was not patentable.[94]

The remaining five Federal Circuit software cases do not deal with fundamental economic concepts. Three involve the manipulation of tangible and intangible data, and two involve internet advertising.

A. *Data Manipulation Cases*

In *Digitech Image Techs. v. Elecs. for Imaging*, the patents at issue claimed a device profile and a method to more accurately translate color representations between input and output devices (e.g., between a camera and a monitor) in a digital image processing system.[95] The Federal Circuit held that data manipulation—by transforming its spatial and color properties from a device-dependent to a device-independent state—is "not directed to any tangible embodiment of this information (i.e., in physical memory or other medium)"; nor does it "claim any tangible part of the digital processing system."[96] Therefore, the court held that this claim fell outside the eligible subject matter categories.[97] To better understand the court's holding, it is helpful to think in the non-technology analog of purely mental processes. Just as human thought is patent-ineligible because it is merely a collection of ideas without any tangible embodiment, "[d]ata in its ethereal, nonphysical form is simply *information* that does not fall under any of the categories of eligible subject matter under section 101."[98]

Digitech therefore seems to imply that tangible embodiments of data would be patent-eligible. However, in *Content Extraction and Trans. v. Wells Fargo Bank* ("*CET*"), the Federal Circuit held otherwise.[99] In *CET*, the steps comprised collecting data, recognizing certain data within the collected data set, and storing that recognized data in memory. Even though the final storage step made the data tangible, the claims were still found to be abstract, because they were "drawn to the basic concept of data recognition and storage . . . [which] humans have always performed."[100] CET argued that the claims should not be held abstract because computers were required to process and recognize the stream of bits output by a scanner, but the court

93. *Id.* at 1363 (quoting *Alice*, 132 S. Ct. at 1294).
94. *Id.*
95. 758 F.3d 1344, 1349 (Fed. Cir. 2014) (discussing the patent claims).
96. *Id.*
97. *Id.*
98. *Id.* at 1350 (emphasis added).
99. 776 F.3d 1343 (Fed. Cir. 2014).
100. *Id.* at 1347; the Federal Circuit goes on to say that, "[a]nd banks have, for some time, reviewed checks, recognized relevant data such as the amount, account number, and identity of account holder, and stored that information in their records." *Id.*

pointed out that in *Alice*, computers were likewise required to process the stream of bits output by the computers performing the financial transactions, and that did not save the claims from being held abstract.[101] The Court analogized to *Alice*, and reasoned that just as claims directed to "the concept of intermediated settlement" were abstract, so too must claims "drawn to the basic concept of data recognition and storage" be abstract.[102]

While it might seem that the Federal Circuit created a new "fundamental IT concepts" subcategory of abstract ideas, another way to understand the case is to de-emphasize the "fundamental-ness" of the idea, and instead focus on the comparison between the idea and the scope of its implementation in the claimed method. Recall that *Benson* held that a claim would be abstract if it were so sweeping as to cover both "known and unknown" uses of the idea.[103] In *CET*, the method contained three steps: (1) receiving and storing scanner output into a memory; (2) recognizing hardcopy data corresponding to a data field; and (3) storing that information into memory for that corresponding data field. These steps are not only a literal transposition of the idea of data storage and recognition into patent drafting jargon, but they also apply to a sweeping range of activities (including the digitization of everything from bank checks to medical images to sheet music). Thus, the claims could be held abstract under *Benson*, without having to resort to the fundamental economic concepts prong of the analysis.

In Step Two, the court could not find any additional limitations which transformed the claims into a patent-eligible application. It held that the digitization of hard copy information into computer-readable data using existing technologies such as scanners, digitizers, optical recognition technology and memory storage was a well-known "basic concept" that neither added an inventive concept nor resulted in much more than a limitation to a "particular technological environment . . . [which] has been held insufficient to save a claim in this context."[104]

In *Internet Patents Corp. v. Active Network ("IPC")*, the court held that the claimed method of maintaining the state of online application forms on a web browser, despite the (inadvertent) activation of other application forms or the use of the back and forward buttons, was "directed to the idea itself—the abstract idea of avoiding loss of data."[105] Specifically, the court held that the step of maintaining a webform's state described the "effect or result" and was "dissociated from any method."[106] The court elaborated that the "mechanism for maintaining state is not described, although this [was] stated to be

101. *Id.*
102. *Id.*
103. *Benson*, 409 U.S. at 68.
104. *CET*, 776 F.3d at 1348.
105. 790 F.3d 1343, 1348 (Fed. Cir. 2015).
106. *Id.*

the essential invention."[107] While this may sound like the court is hinting at an enablement problem, it could also be understood in terms of abstractness—disclosure of the specific mechanism might have persuaded the court that the claimed method was a specific and inventive implementation of the idea of avoiding loss of data, rather than an attempt to claim the idea itself.

In Step Two, the Federal Circuit found that the additional elements of the back and forward buttons were conventional, and the limitations of a computer system, computer instructions, and computer-readable storage medium were "merely generic data collection steps" attempting to "sit[e] the ineligible concept in a particular technological environment."[108] This reflects a direct application of *Alice*, which held that generic computer implementation was not enough to transform a patent-ineligible abstract idea into a patent-eligible claim.

At first glance, the data manipulation cases seem to suggest that the Federal Circuit has greatly expanded the abstract idea category. The Federal Circuit declared that intangible data was abstract in *Digitech*, recognized "fundamental IT concepts" in *CET*, and even seemed to import elements of enablement in *IPC*. However, these moves can also be understood under the classical conception of abstract ideas. Overall, these cases are consistent with *Alice*.

B. *Internet Advertising Cases:* DDR *and* Ultramercial

DDR has been the only software patent case to survive a patent eligibility challenge at the Federal Circuit.[109] This section explains what makes *DDR* unique and compares *DDR* to *Ultramercial*, which, like *DDR*, also claimed a method of internet advertising. The comparison reveals that both cases could have gone the other way, and the different outcomes can be explained in terms of the court's different analytical standards, which harkens back to *Flook* and *Diehr*.

In *DDR*, the patentee claimed a method of retaining website visitors by imitating the "look and feel" of a host website.[110] Without deciding what the abstract idea was, the court held that the claims were patent-eligible under *Alice* Step Two. The court cited a litany of reasons to justify its conclusion, including that the claimed idea was "necessarily rooted in computer technology";[111] that it "overc[a]me a problem specifically arising in the realm of computer networks";[112] that it "overr[ode] the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink";[113] and that

107. *Id.*
108. *Id.* at 1349.
109. 773 F.3d 1245 (Fed. Cir. 2014).
110. *Id.* at 1245.
111. *Id.* at 1257.
112. *Id.*
113. *Id.* at 1258.

it solved the problem of being "instantly transported away" from a host's website when a hyperlink is activated.[114] Concluding, the court wrote, "the claimed solution amounts to an inventive concept for resolving this particular Internet-centric problem, rendering the claims patent-eligible."[115]

The court in *Ultramerial*, on the other hand, held that the claimed method of providing free access to online media in exchange for watching an advertisement was not patentable. There, the court did begin by identifying the abstract idea—namely "using advertisement as an exchange or currency." The court then proceeded to *Alice* Step Two, and held that the additional steps to unblock access to the media were "routine," "conventional," or comprised of "insignificant '[pre]-solution activity' " that cannot transform an abstract idea into patent-eligible subject matter.[116] For example, the step to consult and update an activity log to determine that the advertisement was not played more times than contracted for was held to be an "insignificant 'data-gathering step[ ],' "[117] and the step to require a user's active consent before the advertisement is played was regarded as "insignificant '[pre]-solution activity.' "[118] The court also held that adding the internet as a claim limitation gave no "practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself."[119]

Having set forth both cases, this note will attempt to show that if *Ultramercial* had been analyzed under *DDR*'s rubric, the opposite result would have been reached, and vice versa.

The analysis begins by defining the problem that *Ultramercial* was attempting to resolve. The specifications of the *Ultramercial* patent set forth two problems.[120] First, intellectual property owners were not getting paid the royalties owed to them because "the widespread use of the Internet has made it possible to distribute and share intellectual property in its digital form, worldwide, beyond the control of the intellectual property rights holders."[121] Second, "Internet banner ads have hit new lows in responses. Once a 3% click-through rate, they are now, at the time of filing this application, as low as 2 click-throughs per 1,000 impressions."[122] Both of these problems are

114. *Id.* at 1257-59.

115. *Id.* at 1259.

116. *Ultramercial*, 772 F.3d at 715-16 (quoting *Alice*, 134 S. Ct. at 2357; *Mayo*, 132 S. Ct. at 1298).

117. *Id*. (quoting CyberSource v. Retail Decisions, 654 F.3d 1366, 1370 (Fed. Cir. 2011)).

118. *Id*. (quoting *Mayo*, 132 S. Ct. at 1298).

119. *Id.* at 716 (citing CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d 1366, 1370 (2011) (reasoning that the use of the Internet to verify credit card transaction does not meaningfully add to the abstract idea of verifying the transaction)).

120. U.S. Patent No. 7,346,545 ('545 Patent) (filed May 29, 2001).

121. '545 Patent, *supra* note 120, at col. 1, l. 32-36.

122. *Id.* at col. 2, ll. 14-19.

"Internet-centric," and they "specifically aris[e] in the realm of computer networks."[123]

Ultramercial's invention solved both problems by putting together internet advertisers with intellectual property owners offering their media for sale online. For every time that a media product was accessed, the advertiser would automatically pay the intellectual property owner a royalty. In return, advertisers would be guaranteed a captive audience, because consumers were prevented from accessing the copyrighted media unless they had first consented to view an advertisement. Such a seamless system guaranteed worldwide payment and advertising that could only be done using computers and the internet. Therefore the invention was "necessarily rooted in computer technology."

Finally, the claimed invention had also overridden "the routine and conventional sequence of events."[124] At the time, unauthorized access to copyrighted media had become a widespread problem thanks to the internet, and click-throughs for conventional online advertising had plummeted tenfold.[125] Additionally, the specifications described the rise of Napster, which, because it was free, became a "very attractive site to illegally download copyrighted music."[126] The specifications also explained how the obvious solution—charging fees—would be ineffective, because those "under 18 years of age, who [could not] purchase easily online . . . would continue to seek other means by which to illegally download music."[127] Charging fees would also do nothing to prevent college students from using their school-supplied high-speed Internet connections to "massive[ly] download[ ] . . . un-paid for copyrighted music."[128] By offering a non-fee solution to the problem, the claimed invention sought to break the routine and convention of free, illegal distribution of copyrighted works, while simultaneously ensuring that intellectual property owners received royalties and advertisers were guaranteed viewership.

A sharp reader may point out that the preceding paragraphs attempt to show that the invention was not "routine and conventional" by comparing it with the state of the art at the time (in the same vein as a "whole claims" approach),[129] an approach which seems curious given the well-established divide-and-conquer method of individual step analysis. For example, in *Mayo*, the steps of administering a drug, measuring the metabolite, and adjusting the drug's dosage were "well understood, routine, conventional activ-

123. *DDR*, 773 F.3d at 1257, 1259.
124. *Id.* at 1257.
125. *See* '545 Patent, *supra* note 120, at col. 1, l. 32-36, col. 2, ll. 14-19.
126. *Id.* at col. 1, l. 59-63.
127. *Id*.
128. *Id.* at col. 1, ll. 64-67.
129. *See supra* p. 109-10 discussion of *Diehr*'s "whole claims" approach.

ity already engaged in by the scientific community."[130] However, the following second round analysis, in which *Ultramercial*'s rationale is applied to *DDR*, will show that the Federal Circuit is not so hamstrung that it cannot consider claims holistically.

In *Ultramercial*, the court had properly followed the *Alice* two-step by first defining an abstract idea in Step One before proceeding to Step Two. By contrast, in *DDR*, the parties could not even pinpoint the abstract idea. Instead of deciding on one definition, the court let it slide. In its opinion, under any of the appellant's various characterizations of the abstract idea,[131] and even by the dissent's characterization of the same,[132] the claims would still have satisfied Step Two.[133] But defining an abstract idea at Step One is a crucial step that cannot be skipped. Whether to take a high or low level of abstraction is an important question of law, because it determines the additional steps to be analyzed under Step Two. In this regard, Supreme Court precedent—particularly *Bilski* and *Alice*—dictates that a high level of abstraction should be taken. While a broad approach means that an idea is more likely to be found abstract, it also leaves more room to find an inventive step under Step Two.[134] This is because when compared to a highly-abstracted idea, it becomes easier to frame each step as a specific implementation of the idea, rather than an attempt to claim all "known and unknown" uses of that idea.[135]

Returning to the analysis, *DDR* claimed an outsourcing system which, upon activation of a commercial link on the source page by the user, serves up composite webpages which look and feel like the host webpage by combining stored visual elements of the host webpage with commerce object content from the advertiser link.[136] The invention thereby sought to create a

130. *Mayo,* 132 S. Ct. at 1298.

131. *DDR*, 773 F.3d at 1257 (citing examples of the appellants' various characterizations of the abstract idea, "including 'making two web pages look the same,' 'syndicated commerce on the computer using the Internet,' and 'making two e-commerce web pages look alike by using licensed trademarks, logos, color schemes and layouts.' ").

132. *Id.* (quoting the dissent's characterization of the abstract idea as "the entrepreneurial goal 'that an online merchant's sales can be increased if two webpages have the same 'look and feel.' ").

133. *Id.* at 1259 (holding that because the claims "recite[d] a specific way to automate the creation of a composite web page by an 'outsource provider' that incorporate[d] elements from multiple sources in order to solve a problem faced by websites on the Internet," the claims include[d] " 'additional features' that ensure[d] the claims [we]re 'more than a drafting effort designed to monopolize the [abstract idea]' ").

134. Within limits, the broader the idea allegedly claimed by the patent, the easier it is for the claims to be held abstract, because the claims would come closer to the "basic tools" of innovation. *See Alice*, 132 S. Ct. at 2354. The corollary is that at extreme levels of abstraction, the claim steps would easily be regarded as practical implementations of such highly-abstracted ideas in *Alice* Step Two.

135. *See Benson*, 409 U.S. at 68.

136. *DDR*, 773 F.3d at 1248.

third-party ad webpage that was stylistically indistinguishable from the linking (host) webpage.

A broad construction of the abstract idea would be making two webpages look the same.[137] Under this construction, the "outsource provider"—an external web server which automatically generates composite webpages that look and feel like the source page—could be an additional element of sufficient inventiveness to transform the abstract idea into a patent-eligible application of the idea. But, like in *IPC*, the specific workings of this "essential invention" are not disclosed; the claim merely states in broad language that the outsource provider is to first retrieve stored data corresponding to the source page, and then use the stored data to "automatically generate" the hybrid webpage—as if by magic.[138] Without more to explain how the essence of the invention—the merging of the webpages—is achieved, these steps are but hollow echoes of the abstract idea of automatically generating composite webpages.

A narrower construction of the abstract idea would be something like "the automatic creation of a product page that looks and feels like the source page upon the activation of a hyperlink on the source page." In this case, the outsource provider—which automatically compiles and overlays the data from the source and product pages to produce a composite page—would be a necessary component of the abstract idea and could not be counted as an additional, potentially inventive step. And neither could the rest of the components. The claims' "data store," "computer store," "computer processor," "web browser," etc., are akin to the "data processing system," "communications controller," and "data storage unit" in *Alice*. The *Alice* Court dismissed these elements as "purely functional and generic," and nothing more than "a handful of generic computer components configured to implement the [ab-

137. An even broader construction would be "a method to retain website visitors," or "a method of internet advertising," but these suffer from the same problem as the less broad construction discussed here. Granted, under these broadest constructions there may not even be a need for a Step Two analysis, since the claimed method would easily be considered a specific application of these broadest constructions. A reasonable challenger would seek to invalidate the claims under the level of abstraction at which he would get to, and succeed at Step Two, i.e., at a moderate level of abstraction.

138. *DDR*, 773 F.3d at 1257 (finding that the representative claim "recites a system that, among other things, 1) stores 'visually perceptible elements' corresponding to numerous host websites in a database, with each of the host websites displaying at least one link associated with a product or service of a third-party merchant, 2) on activation of this link by a website visitor, automatically identifies the host, and 3) instructs an Internet web server of an 'outsource provider' to construct and serve to the visitor a new, hybrid web page that merges content associated with the products of the third-party merchant with the stored 'visually perceptible elements' from the identified host website"). *See also* U.S. Patent No. 7,818,399 col 27 l. 65 – col. 28 l. 32 (filed Jan. 30, 2006).

stract] idea."[139] Therefore, regardless of a broad or narrow construction, the claims in *DDR* should have failed at Step Two.

The reason the claims survived is probably because the *DDR* court was willing to construe inventiveness at a whole claims level. Even though no individual component, such as the outsource provider, was independently inventive, the court thought the whole idea of dressing up a third party's website to look like the host website was inventive. By contrast, the *Ultramercial* court focused only on the inventiveness of the individual components. If *DDR* had been subjected to the same scrutiny, the decision would have probably come out looking like this (applying the *DDR* claim to *Ultramercial*'s argument structure):

> The . . . steps comprise the abstract concept of . . . [creating a composite page that replicates the look and feel of the source page]. Adding routine additional steps such as . . . [storing the requisite visual data, requiring an activation signal, identifying and retrieving the visual data], and use of the Internet does not transform an otherwise abstract idea into patent-eligible subject matter. Instead, the claimed sequence of steps comprises only "conventional steps, specified at a high level of generality," which is insufficient to supply an "inventive concept." *Alice*, 134 S. Ct. at 2357 (quoting *Mayo*, 132 S. Ct. 1294, 1297, 1300). Indeed, the steps of . . . [storing the requisite visual data] represent insignificant "data-gathering steps," *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1370 (Fed. Cir. 2011), and thus add nothing of practical significance to the underlying abstract idea. Further, that the . . . [server automatically identifies and retrieves the appropriate set of stored visual elements for the source webpage] also represents only insignificant "[pre]-solution activity," which is also not sufficient to transform an otherwise patent-ineligible abstract idea into patent-eligible subject matter.[140]

Had *Ultramercial*'s patents been evaluated at *DDR*'s whole claims level, the court would probably have concluded that *Ultramercial*'s method of internet advertising was neither routine nor conventional. But taking a step back, it is not altogether clear that the court would get to Step Two to assess routineness and conventionality, because under a *proper* Step One analysis, *Ultramercial*'s claims should not have been held to be abstract.

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139. *Alice*, 134 S. Ct. at 2360. *See also id.* at 2358 ("[W]holly generic computer implementation is not generally the sort of 'additional featur[e]' that provides any 'practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.' ") (quoting *Mayo*, 132 S. Ct. at 1297).

140. *Ultramercial*, 772 F.3d at 715-16.

In *Ultramercial*, the appellants contended that their claims were not abstract because they were "directed to a specific method of advertising and content distribution that was previously unknown and never employed on the Internet before."[141] The court disagreed with the appellant, instead siding with the appellees and the district court in characterizing the claims as directed to the abstract idea "that one can use [an] advertisement as an exchange or currency."[142] While it is true that at the highest level of abstraction the patent teaches a method of using advertisement as currency, the court mischaracterizes the challenged claims. They are not "so abstract and sweeping as to cover both known and unknown uses" of advertisements functioning as currency on the internet.[143]

First, the claims apply only to media products that "are covered by intellectual property rights protection" and which "are available for purchase."[144] The claims do not cover non-copyrighted media products ("freeware"), such as all Twitch video streams,[145] and all user-generated YouTube videos. The claims also do not cover streaming sites where the media is unavailable for sale on that site. For example, YouTube streams official, copyrighted music videos of virtually every famous celebrity, but consumers are unable to purchase these music videos from YouTube.

Second, the claims apply only to media that has general public access restrictions.[146] This means that sites like YouTube with default open door policies are not covered.

Third, the claims apply only when a user must view the ad as a precondition for access, and even then only under the user's active request. Sites that enable access by default, and which intersperse non-user requested ads during the airing of the media product, are not covered. Even if the ad were shown at the beginning, it would not be covered if it played automatically without a user's active request.

Finally, the claims do not cover traditional forms of web advertising such as pop-up banner ads and embedded advertisements which do not require a user's active consent.

Thus, unlike in *Benson*—which purported to claim a fundamental algorithm of virtually unlimited utility in computer programming—the scope of the *Ultramercial* claims is precisely known and well-delineated. In fact,

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141. *Id.* at 714.

142. *Id.*

143. *Mayo*, 132 S. Ct. at 1301 (quoting *Benson*, 409 U.S. at 68).

144. '545 Patent, *supra* note 120, at col 8, l. 7-12.

145. *See* TWITCH, http://www.twitch.tv/p/about ("Founded in June 2011, Twitch is the world's leading social video platform and community for gamers. Each month, more than 100 million community members gather to watch and talk about video games with more than 1.7 million broadcasters. Twitch's live and video on demand platform caters to the entire video game industry, including game developers, publishers, media outlets, events, casual content creators, and the entire esports scene.").

146. '545 Patent, *supra* note 120 at col. 8, l. 22-23.

the claims are restricted to just one particular mode of advertising—one which requires a user's active, rather than passive, participation to request a viewing of the advertisement.[147] These limitations should have allayed fears that the claims would be "so abstract and sweeping as to cover both known and unknown uses [of the invention]."[148] Indeed, they should have instilled confidence that the claims were not directed to such a high level of abstraction that they would "pre-empt the [concept of using advertising as currency] and in practical effect be a patent on the [concept] itself."[149] The facts better support a finding that the method was not abstract, but was simply appellants' inventive way of solving the Napster problem—"a specific method of advertising and content distribution that was previously unknown and never employed on the Internet before."[150]

To sum up, the two-round comparison of *Ultramercial* and *DDR* shows that the Federal Circuit has not consistently applied the *Alice* two-step. Procedurally, Step One was skipped in *DDR*, but not in *Ultramercial*. Substantively, in Step Two, the *Ultramercial* court seemed inclined only on searching for an inventive application at the individual component level, unlike in *DDR*, where the court was focused on the whole claims level. Because the inconsistent emphasis has led to opposite results, further guidance is necessary from the Federal Circuit or the Supreme Court to explain when one approach would predominate over the other, i.e., when a finding of inventive application at the whole claims level would predominate over a lack of inventive application at the individual component level, and vice versa. If any amount of inventive application at the whole claims level will do, then courts should seriously analyze whole claims with the same rigor as they do individual steps (for now, whole claims analysis seems more a conclusory afterthought than an actual consideration).[151]

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147. *Id.* at col. 8, l. 27-30, 38-42. In the sixth step of the claimed method, the consumer must request to view the sponsor message. In the ninth step of the claimed method pertaining to interactive ads, the copyrighted media will only be unlocked after receiving a response to the interactive query.

148. *Benson*, 409 U.S. at 72.

149. *Id.*

150. *Ultramercial*, 772 F.3d at 714.

151. *See*, *e.g.*, *Mayo*, 132 S. Ct. at 1298 ("Those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately"); *Alice*, 134 S. Ct. at 2351 ("Viewed as a whole, these method claims simply recite the concept of intermediated settlement as performed by a generic computer. They do not, for example, purport to improve the functioning of the computer itself or effect an improvement in any other technology or technical field."); *Ultramercial*, 772 F.3d at 716 ("[The] ordered combination of steps recites an abstraction—an idea, having no particular concrete or tangible form. The process of receiving copyrighted media, selecting an ad, offering the media in exchange for watching the selected ad, displaying the ad, allowing the consumer access to the media, and receiving payment from the sponsor of the ad all describe an abstract idea, devoid of a concrete or tangible application. Although certain additional limitations, such as consulting an activity log, add a degree of particularity, the concept embodied by the majority of the limitations describes only the abstract idea of showing an advertisement before delivering free content.").

V. Unexpected Results as an Escape Hatch and the 4-Box Matrix

One proposal to reconcile the outcomes in *DDR* and *Ultramercial* is to hold that an inventive concept may be supplied by an "ordered combination of steps"[152] which produces an unconventional or unexpected *result*. This notion derives from the *DDR* opinion itself, where one of the ways the court distinguished *DDR* from *Ultramercial* was that "the claims at issue here [in DDR] specify how interactions with the Internet are manipulated to yield a desired result—*a result* . . . [which causes] the computer network [not to] operat[e] in its *normal, expected manner*."[153] This results-based analysis seems consistent with *Diehr*, which also distinguished *Flook* on the basis that the claims resulted in the creation of something new and unexpected—as the *Diehr* Court stated, the perfectly cured synthetic rubber product was "*a result heretofore unknown in the art*."[154] However, I do not suggest that unconventional or unexpected results are required to pass Step Two; but if such results can be found in the claims at issue, there is a good chance that the claims can be saved.

If a finding of unexpected results is a valid basis on which to distinguish *DDR* from *Ultramercial*, then Step Two can be visualized as a four-box matrix. On the horizontal axis is the conventionality of the individual steps. On the vertical axis is the conventionality of the ordered combination/result, or the expectedness of the effects. The four possible combinations are illustrated as shown:

152. *See Alice*, 134 S. Ct. at 2355 ("[W]e consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application.").

153. *DDR*, 773 F.3d at 1258. *See also id.* at 1258-59 ("Unlike the claims in *Ultramercial*, the claims at issue here specify how interactions with the Internet are manipulated to yield a desired result—a result that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink. Instead of the computer network operating in its normal, expected manner by sending the website visitor to the third-party website that appears to be connected with the clicked advertisement, the claimed system generates and directs the visitor to the above-described hybrid web page that presents product information from the third-party and visual 'look and feel' elements from the host website.").

154. *See Diehr*, 450 U.S. at n.15 (The "claims . . . are not limited to the isolated step of 'programming a digital computer.' Rather, [the] claims describe a process of curing rubber beginning with the loading of the mold and ending with the opening of the press and the production of a synthetic rubber product that has been perfectly cured—a result heretofore unknown in the art.") (emphasis added).

4-BOX MATRIX

(EFFECTS)	(INDIVIDUAL STEPS)	
	UNCONVENTIONAL	CONVENTIONAL
UNEXPECTED	(Unconventional Steps, Unexpected Effects) e.g. Warp Drive	(Conventional Steps, Unexpected Effects) e.g. DDR
EXPECTED	(Unconventional Steps, Expected Effects) e.g. New method to smite mice	(Conventional Steps, Expected Effects) e.g. *Mayo*, *Alice*, all other Fed. Cir. rejections

The four-box matrix serves as a reminder that even though over nine out of ten software patents have been invalidated at the Federal Circuit—and all rejects have so far landed in the same quadrant of the matrix—there exist three other quadrants, each of which represents a patent-eligible combination. Additionally, this four-box matrix can help patent practitioners and analysts quickly visualize the strength of their patent portfolios.

Patents in the top-right "conventional steps, unexpected effects" quadrant are unpredictable and exciting. Given the courts' current propensity to emphasize individual step analysis over ordered combination analysis, a showing of unexpected effects can make all the difference for cases otherwise indistinguishable on the facts. Emphasis should be placed on showing how the invention at the whole claims level is a specific implementation of an improvement over the prior art—i.e., instead of referencing the individual steps, reference the effects instead. For example, *Diehr*'s algorithm led to *perfectly* cured synthetic rubber, a result "unknown" to the art at the time, and *DDR*'s mimetic hybrid webpage helped visitors to not feel "transported away" from the host webpage when they clicked on an advertiser's link.

By contrast, patents in the top-left "unconventional steps, unexpected effects" quadrant seem like a slam dunk, since both individual steps and combination effects are unconventional or unexpected. Although none of the discussed cases fit in this category, it is still useful to think of the category as an aspirational target.

Patents in the bottom-left "unconventional steps, expected effects" quadrant are what I would call the classic, "run-of-the-mill" patents—they

disclose new ways of doing old things. As one author puts it, "Class 43 [Fishing, Trapping and Vermin Destroying] is a testament to man's continuing war with the mouse, including subcategories for 'impaling,' 'explosive,' 'choking or squeezing' and 'electrocuting' traps, in addition to those that 'smite.' "[155] The abstract ideas of "impaling," "detonating" or "smiting" mice is made patent-eligible by the multitude of unconventional steps man has conjured, in all his boundless imagination, to effectuate the extermination of the much-maligned creature. An unconventional electrocution step to stun a mouse before its regular demise by smiting may just be the winning ticket.

Finally, the darling of the courts these days, and where patents go to rest, is the "conventional steps, expected effects" quadrant. Examples of steps and additional features which courts have held insufficient to transform an abstract idea into patent-eligible subject matter include the following: generic computer implementation;[156] the Internet;[157] combining intangible data;[158] unblocking access to media;[159] applying well-known technologies such as digitizers to hardcopy information;[160] and using a computer to optimize price.[161]

Conclusion

It may seem incredible that over a century-and-a-half after *Le Roy*, courts are still unable to concisely define what constitutes an abstract idea. This is not altogether surprising, considering the fact that since *Le Roy*, abstract ideas have been defined by what they are not—i.e., applied ones. From practical application to process application to inventive application, the line between patent-ineligible ideas (the so-called abstract ideas) and patent-eligible applications of those ideas has been a moving target. Rather than clarifying the doctrine, it seems the Court has only made things worse. In leaping to the inventive application standard in *Mayo*, the Court obfuscated glaring incompatibilities and philosophical differences that underlay some of its own precedent, and buried *Diehr*'s challenge to the relevance of novelty in the subject matter eligibility inquiry.

Practically, the Court's reticence in positively delimiting the abstract idea category has led to significant inconsistencies in the way its patent eligibility framework has been applied at the Federal Circuit. Before *Mayo* and *Alice*, a negative definition of an abstract idea worked well, because there was not a Step One which required courts to determine, prior to and independent of Step Two's inventive application test, whether claims were di-

155. Alan L. Durham, *Patent Law Essentials: A Concise Guide* 19 (4th ed. 2013).
156. *Alice*, 134 S. Ct. at 2358.
157. *Ultramercial*, 772 F.3d at 716.
158. Digitech Image Techs. v. Elecs. for Imaging, 758 F.3d 1344, 1349 (Fed. Cir. 2014).
159. *Ultramercial*, 772 F.3d at 715-16.
160. *CET*, 776 F.3d at 1347.
161. *OIP Techs.*, 788 F.3d at 1363.

rected to an abstract idea. Post-*Alice*, precisely delineating the abstract idea is necessary, since it determines the "additional steps" that will be analyzed under Step Two. These days, it seems taken for granted that there is always an abstract idea to be found in the claims, even when the claims appear to reflect carefully considered decisions designed to achieve a specified aim in a particular manner. If, as a policy matter, the abstract idea doctrine was really only about precluding broad monopolies over fundamental concepts or over the basic tools of technology, perhaps the incredible invalidation statistics at the courts and the PTAB should give judges pause to consider how they have been applying *Alice*.

At the end of the day, the line between patent-eligible and ineligible ideas is a fine line that is only going to get finer, for as long as humanity progresses and continues developing new technologies, so too will the number of "fundamental truths" and "blocks of human ingenuity" continue to increase. We owe it to ourselves, and to the next generation of inventors, to be more conscientious of what we invalidate, and why.