

***ALICE* GETS A HAIRCUT: *BERKHEIMER* AND *AATRIX* RESTORE FACTUAL INQUIRY TO PATENT SUBJECT MATTER ELIGIBILITY UNDER § 101**

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I. INTRODUCTION

Patent subject matter eligibility under 35 U.S.C. § 101 has experienced some significant turbulence in recent years. The most dramatic change came with the Supreme Court’s decisions in *Mayo v. Prometheus* and *Alice v. CLS Bank*.¹ These two cases established a much-debated two-step framework, under which patent claims are subjected to stringent scrutiny.² Particularly, the *Mayo/Alice* framework involves the search for an “inventive concept,”³ which encompasses activities that are not “well-understood, routine, [or] conventional.”⁴

The introduction of the *Mayo/Alice* framework has generated substantial uncertainty in patent subject matter eligibility. The issue of patent subject matter eligibility under 35 U.S.C. § 101 was traditionally treated as a matter of law.⁵ However, under the *Mayo/Alice* framework, this legal issue is informed and frequently determined by the assessment of whether the activities recited in the claims are “‘well-understood, routine, [and] conventional’ activities previously known to the industry.”⁶ Recognizing the factual undertone of routineness and conventionality, district courts became wary about the

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1. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012); *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208 (2014).

2. The first step determines whether the claims at issue are directed to a patent-ineligible concept. The second step assesses whether the claim elements are sufficient to transform the patent-ineligible concept into a patent-eligible application. *See Alice*, 573 U.S. at 218, 221.

3. *See Mayo*, 566 U.S. at 68.

4. *Id.* at 67.

5. *See, e.g., Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017) (“Patent eligibility under § 101 is an issue of law that we review without deference.”).

6. *Alice*, 573 U.S. at 225 (citing *Mayo*, 566 U.S. at 73).

evidentiary standard to apply to patent subject matter eligibility.⁷ Neither the Federal Circuit nor the Supreme Court came to help. As a result, inconsistency and confusion ensued. Some district courts continued addressing patent subject matter eligibility issues as a matter of law, and disposed the issues on pre-trial motions, even when there was a dispute over routineness and conventionality.⁸ This practice is inconsistent with the current procedural rules in civil litigation.⁹

For the first time since the adoption of the *Mayo/Alice* framework, the Federal Circuit in *Berkheimer v. HP* and *Aatrix v. Green Shades* correctly identified the issues regarding routineness and conventionality as factual in nature and recognized the patent eligibility issue as a matter of law informed by these underlying facts.¹⁰ As such, pursuant to the Federal Rules of Civil Procedure, district courts could not ignore the factual dispute over routineness and conventionality in granting pre-trial motions.¹¹ The clarification by *Berkheimer* and *Aatrix* dispelled part of the uncertainty and inconsistency surrounding patent litigation cases involving § 101 subject matter eligibility issues and helped regularize these cases within the existing civil litigation system.

However, the *Berkheimer* and *Aatrix* cases did not preclude addressing patent eligibility issues on pre-trial motions. On the contrary, they highlighted the use of judicial notice in the determination of routineness and conventionality.¹² Since the issues of routineness and conventionality in patent

7. *See, e.g.*, *Genetic Techs. Ltd. v. Bristol-Myers Squibb Co.*, 72 F. Supp. 3d 521, 538 (D. Del. 2014) (applying the clear and convincing standard to patent subject matter eligibility). *But see* *Cal. Inst. of Tech. v. Hughes Communs., Inc.*, 59 F. Supp. 3d 974, 978 n.6 (C.D. Cal. 2014) (refusing to apply the clear and convincing standard to the § 101 analysis).

8. *See, e.g.*, *Berkheimer v. Hewlett-Packard Co.*, 224 F. Supp. 3d 635 (N.D. Ill. 2016) (granting summary judgment motion for the defendant as the patent at issue was ruled invalid for claiming ineligible subject matter, despite a dispute over the conventionality of the invention).

9. Disputes over material facts would preclude the grant of pre-trial motions. *See* FED. R. CIV. P. 12(b)(6), 12(c), 56; *see also* *SCA Hygiene Prods. Aktiebolag v. First Quality Baby Prods., LLC*, 137 S. Ct. 954, 964 (2017) (stating that “the same common-law principles, methods of statutory interpretation, and procedural rules as other areas of civil litigation” also govern patent law).

10. *See* *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018) (“Whether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination.”); *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1128 (Fed. Cir. 2018) (“Whether the claim elements or the claimed combination are well-understood, routine, conventional is a question of fact.”).

11. *See* FED. R. CIV. P. 12(b)(6), 12(c), 56.

12. *See* *Berkheimer v. HP Inc.*, 890 F.3d 1369, 1372 (Fed. Cir. 2018) (en banc) (Moore, J. concurring) (holding that a court need not accept as true allegations that contradict matters properly subject to judicial notice); *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 890

eligibility often involve industry-specific facts that are rich in scientific and technological details, the judicial notice standard for other areas of law may not be readily applicable to questions of patent eligibility. The Federal Circuit missed the opportunity in *Berkheimer* and *Aatrix* to provide practical guidance on taking judicial notice in the context of patent law.

Part II of this Note provides a review of recent developments in the jurisprudence on patent subject matter eligibility. Part III describes the *Berkheimer* and the *Aatrix* cases in some detail. Part IV analyzes the impact of the cases on patent litigation, focusing on pre-trial motions. Part IV also proposes an approach to the application of judicial notice to the determination of routineness and conventionality. Part V concludes that while the Federal Circuit correctly restored factual inquiry to § 101, it did not provide guidance on the application of judicial notice in this context.

II. LEGAL BACKGROUND

A. EVOLUTION OF THE SUPREME COURT JURISPRUDENCE ON PATENT SUBJECT MATTER ELIGIBILITY

To obtain a patent, U.S. patent law requires that the claimed invention be patent-eligible subject matter as defined in 35 U.S.C. § 101.¹³ This statute sets forth an exclusive list of patent-eligible categories: (1) process; (2) machine; (3) manufacture; and (4) composition of matter.¹⁴ The Supreme Court has created three patent-ineligible judicial exceptions to the scope of § 101: (1) laws of nature; (2) natural phenomena; and (3) abstract ideas.¹⁵ Inventions such as computer algorithms, mathematical formulas, and scientific principles are ineligible for patent protection because they fall into these exception categories.¹⁶ The judicially-created exceptions are at the center stage of the recent development of the Supreme Court jurisprudence on patent subject matter eligibility.

With the advancement of computer-based informational technologies, the Supreme Court announced two important patent eligibility doctrines in

F.3d 1354, 1358 (Fed. Cir. 2018) (en banc) (Moore, J., concurring) (also holding that a court need not accept as true allegations that contradict matters properly subject to judicial notice).

13. See 35 U.S.C. § 101 (2018).

14. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974) (holding that “no patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101”).

15. See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

16. See *CLS Bank Int'l v. Alice Corp. Pty. Ltd.*, 717 F.3d 1269, 1283 (Fed. Cir. 2013) (holding that patent protection is not available because “a person cannot truly ‘invent’ an abstract idea or scientific truth”), *aff'd*, 573 U.S. 208 (2014).

Diamond v. Diehr.¹⁷ First, the Court recognized that the boundary between ineligible and eligible patent subject matter should exist between abstract principles and their application.¹⁸ Second, the Court held that the novelty issue is irrelevant in determining subject matter eligibility.¹⁹

However, in a series of decisions issued between 2010 and 2014, the Supreme Court chipped away the doctrines established in *Diehr*, expanded the applicability of judicial exception categories, and thus restricted the scope of patent protection.²⁰

Bilski v. Kappos is the first case in the succession.²¹ The patent at issue claimed a method for hedging against the risk of price fluctuation in the trading of commodities.²² Although it rejected the imposition of limitations inconsistent with the text of § 101,²³ the Court concluded that the judicial exception categories of ineligible patent subject matter should be upheld “as a matter of statutory *stare decisis* going back 150 years.”²⁴ The Court expressed its concerns for the preemptive use of a patent that would effectively become “a monopoly over an abstract idea.”²⁵ In addition, noticing the conventional nature of the claimed business method, the Court for the first time injected the inventiveness concept into patent subject matter eligibility.²⁶

The Supreme Court expanded on the inventiveness analysis in *Mayo v. Prometheus* in 2012.²⁷ The patent in *Mayo* was directed to a process for determining the proper dosage of a drug.²⁸ The Court first characterized the process as merely reciting a natural relation, which fell under an ineligible

17. *Diamond v. Diehr*, 450 U.S. 175 (1981).

18. *See id.* at 188 (“While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.”).

19. *Id.* at 188–89 (“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.”).

20. *See* Michael R. Woodward, *Amending Alice: Eliminating the Undue Burden of “Significantly More”*, 81 ALBANY L. REV. 329, 335 (2017).

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

22. *See id.* at 598–99.

23. *Id.* at 612.

24. *Id.* at 602.

25. *See id.* at 611–12.

26. *See id.* at 611 (“In light of these precedents, it is clear that petitioners’ application is not a patentable ‘process.’ Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk: ‘Hedging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.’”) (quoting *In re Bilski*, 545 F.3d 943, 1013 (Fed. Cir. 2008) (Rader, J., dissenting)).

27. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012).

28. *See id.* at 73–74.

judicial exception.²⁹ The Court then framed the issue as to determine whether the claims added “significantly more than simply describe these natural relations.”³⁰ The Court concluded that the claims were “not sufficient to transform unpatentable natural correlations into patentable applications.”³¹ This is because the claims merely recited “well understood, routine, conventional activity already engaged in by the scientific community,” and therefore added “nothing significant.”³² The Supreme Court explained that the reason behind the “significantly more” requirement was to avoid the preemptive use of a natural law.³³ The danger of preemption would become severe when a patented process claims “no more than an instruction to apply the natural law.”³⁴ However, since the determination of routineness and conventionality implicitly involves novelty and obviousness analyses,³⁵ the Court implicitly ignored the *Diehr* doctrine that novelty is irrelevant in patent subject matter eligibility.³⁶

Later in its unanimous decision in *Alice v. CLS Bank*, the Supreme Court distilled the holdings of *Mayo* into a two-step test for determining patent subject matter eligibility (the *Mayo/Alice* test).³⁷ The patent in *Alice* claimed a computer-implemented business scheme for mitigating settlement risk by using a third-party intermediary.³⁸ At *Mayo/Alice* step one, the Court first determined whether the claims were directed to a judicial exception, in this case an abstract idea.³⁹ The Court declined to provide guidance on the scope of the “abstract idea” category, and instead relied on an “I know it when I see it” approach.⁴⁰

Having concluded that the claims were directed to a patent-ineligible abstract idea, the Court then sought to determine whether the claims were able

29. *Id.* at 77.

30. *Id.*

31. *Id.* at 80.

32. *Id.* at 79–80.

33. *See id.* at 72.

34. *Id.* at 68 (internal quotation marks omitted).

35. *See id.* at 90 (“We recognize that, in evaluating the significance of additional steps, the § 101 patent eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap.”).

36. *See* *Diamond v. Diehr*, 450 U.S. 175, 188–89 (1981).

37. *See* *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 217–18 (2014).

38. *See id.* at 212–13.

39. *Id.* at 218.

40. *See id.* at 221 (“In any event, we need not labor to delimit the precise contours of the ‘abstract ideas’ category in this case.”); *see also* *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (“I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it.”).

to “transform that abstract idea into a patent-eligible invention” at *Mayo/Alice* step two.⁴¹ The Court interpreted *Mayo/Alice* step two as a search for an “inventive concept.”⁴² An otherwise ineligible abstract idea becomes eligible when there is “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.’”⁴³ Claims do not satisfy *Mayo/Alice* step two if they involve nothing more than “well-understood, routine, conventional activity previously engaged in by researchers in the field.”⁴⁴ Accordingly, since the claims at issue in *Alice* merely required generic computer implementation, the Supreme Court concluded that they failed to transform the patent-ineligible abstract idea into a patent-eligible invention.⁴⁵

B. THE APPLICATION OF *MAYO/Alice* BY THE FEDERAL CIRCUIT

In applying the *Mayo/Alice* test, the Federal Circuit has decided that “mere instruction to apply” an abstract idea, either on a “generic computer” or “with a high level of generality,” would not satisfy the “inventive concept” requirement.⁴⁶ In addition, claim elements characterized as having “insignificant, extra-solution activity” could not suffice as “inventive concepts” either.⁴⁷ Furthermore, claim limitations that serve to limit an invention to a particular technological field will not be enough to constitute “inventive concepts.”⁴⁸ Inventors seeking to obtain patent protection for software-based inventions could only rely on the guidance of several rare post-*Alice* cases where Federal Circuit held that software patents satisfied *Mayo/Alice* step two.⁴⁹

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

42. *Id.*

43. *Id.* at 217–18 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012)).

44. *See Mayo*, 566 U.S. at 73.

45. *See Alice*, 573 U.S. at 226.

46. *See Applying Step Two of the Alice/Mayo Test*, BITLAW GUIDANCE, <https://www.bitlaw.com/guidance/patent/applying-step-two-of-Alice-Mayo-test.html> [<https://perma.cc/ZH2P-URNW>] (last visited Dec. 18, 2019).

47. *See id.*

48. *See id.*

49. This Note is focused on *Mayo/Alice* step two, but it by no means suggests that *Mayo/Alice* step one is immaterial to patent subject matter eligibility. The Federal Circuit has held in at least two software patent cases (*Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1316 (Fed. Cir. 2016)) that the claims were not directed to abstract ideas at *Mayo/Alice* step one, therefore there was no need to reach the analysis at step two. Moreover, *Mayo/Alice* step two only applies to the “additional elements” not included in the “abstract idea” identified in step one. *See Alice*, 573 U.S. at 217 (“[W]e consider the elements of each claim both individually and as an ordered

In 2014, the Federal Circuit found that the software patent at issue in *DDR Holdings v. Hotels.com* to be eligible under § 101.⁵⁰ The patent claimed a system that allowed a “host” webpage to direct visitors to a composite webpage rather than to a third party’s webpage.⁵¹ The district court ruled that the patent was eligible under § 101, because the process of displaying composite web pages represented “an improvement to computer technologies in the marketplace.”⁵² The Federal Circuit affirmed the ruling.⁵³ At *Mayo/Alice* step one, the Federal Circuit recognized that it was not straightforward to identify the nature of the abstract idea involved in this case.⁵⁴ However, under “any of the characterizations of the abstract idea,”⁵⁵ the court found that the claims satisfied *Mayo/Alice* step two because there was an “inventive concept.”⁵⁶ The Federal Circuit found that since the claims specified how the “interactions with the [i]nternet were manipulated to yield a desired result,” the limitation of the claims, when “taken together as an ordered combination,” recited an invention that was “not merely the routine or conventional use of the [i]nternet.”⁵⁷ In addition, the Federal Circuit also noted that the claims did not “attempt to preempt every application of the idea,” because the “additional features” in the claims prevented the claims from monopolizing the abstract idea.⁵⁸

In the 2016 case *BASCOM v. AT&T Mobility*,⁵⁹ the Federal Circuit found that claims directed to an abstract idea were nonetheless patent eligible.⁶⁰ The patent at issue claimed an invention for filtering content on the internet by individually customizable access network accounts.⁶¹ The claims combined the benefits of the internet filtering software systems installed on a user’s

combination to determine whether the *additional elements* transform the nature of the claim into a patent-eligible application.”) (emphasis added; internal quotation marks omitted). Therefore, the level of abstraction used in *Mayo/Alice* step one not only determines the elements encompassed by the identified “abstract idea,” it also indirectly affects the availability of the “additional elements” for the step two analysis. Neither the Supreme Court nor the Federal Circuit has so far provided guidance for the level of abstraction to be used at *Mayo/Alice* step one, leaving discretion to district courts.

50. *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1259 (Fed. Cir. 2014).

51. *See id.* at 1248–49.

52. *DDR Holdings, LLC v. Hotels.com, L.P.*, 954 F. Supp. 2d 509, 527 (E.D. Tex. 2013).

53. *DDR Holdings*, 773 F.3d at 1259.

54. *Id.* at 1257.

55. *Id.*

56. *See id.* at 1259.

57. *Id.* at 1258–59.

58. *Id.* at 1259.

59. *BASCOM Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016).

60. *See id.* at 1343.

61. *See id.* at 1344–45.

computer, on the local server, and at the internet service provider level, while mitigating their individual drawbacks.⁶²

The district court held that the patent claimed the abstract idea of “filtering [i]nternet content,”⁶³ and that the additional claim limitations were no more than “routine additional steps” involving generic computer components interacting with the internet in “well-known ways to accomplish the abstract idea.”⁶⁴ The Federal Circuit agreed with the district court on *Mayo/Alice* step one and concluded that the claims were directed to an abstract idea.⁶⁵ However, at *Mayo/Alice* step two, the Federal Circuit vacated the district court’s decision,⁶⁶ and found that the district court erred by looking at each claim element individually, instead of looking at the claim elements as an ordered combination.⁶⁷ The Federal Circuit found that although the filtering function was implemented on generic computers, the installation of the filtering tool “at a specific location remote from the end-users” was a “non-conventional and non-generic arrangement of known, conventional pieces” that provided the “inventive concept.”⁶⁸

III. THE *BERKHEIMER* AND *AATRIX* CASES

A. *BERKHEIMER V. HP*

1. *District Court Litigation*

Steven E. Berkheimer filed a lawsuit against Hewlett-Packard Co. (HP) alleging that HP had infringed his asset management program patent.⁶⁹ The patent at issue claimed a “method of archiving an item in a computer processing system” that comprised four steps: (1) presenting an item to a parser; (2) parsing the item into multiple objects; (3) comparing the objects with previously archived ones; and (4) flagging the objects for manual reconciliation if they don’t satisfy a predetermined standard or user-defined rule.⁷⁰

In the motion for summary judgment, HP argued that the patent was invalid under the *Mayo/Alice* framework because it merely claimed an abstract

62. *See id.*

63. *BASCOM Global Internet Servs., Inc. v. AT&T Mobility LLC*, 107 F. Supp. 3d 639, 655 (N.D. Tex. 2015).

64. *Id.*

65. *BASCOM*, 827 F.3d at 1349.

66. *Id.* at 1352.

67. *See id.* at 1349–50.

68. *Id.* at 1350.

69. *Berkheimer v. Hewlett-Packard Co.*, 224 F. Supp. 3d 635, 637 (N.D. Ill. 2016).

70. *See id.* at 637–38.

idea, namely “reorganizing data and presenting the data for manual reconciliation.”⁷¹ In response, Mr. Berkheimer argued that there was an “inventive concept” in the claims, because the claimed invention solved a problem “necessarily rooted in computer technology” beyond conventional computing.⁷²

The court was unconvinced by Mr. Berkheimer’s argument, and found the claims covered only “well-understood, routine, and conventional” computer functions written “at a relatively high level of generality.”⁷³ Accordingly, the court ruled that the claims were invalid under § 101, and granted HP’s motion for summary judgment.⁷⁴ Mr. Berkheimer appealed to the Federal Circuit.

2. Federal Circuit Appeal

On appeal, Mr. Berkheimer renewed his argument that the patent was eligible because it claimed an invention that improved computational functionality over the prior art by eliminating redundancy and enabling one-to-many editing.⁷⁵

Having concluded that the claimed invention was directed to an abstract idea at *Mayo/Alice* step one,⁷⁶ the Federal Circuit panel⁷⁷ ruled that claims 1–3 and 9 failed *Mayo/Alice* step two because they only covered parsing and comparing data and therefore didn’t recite the functionality improvement disclosed in the specification.⁷⁸

However, with respect to the other claims, the panel took an unusual step to remand for further fact-finding.⁷⁹ The panel emphasized that patent subject matter eligibility was an issue of law informed by underlying facts.⁸⁰ When determining the validity of a patent, the district courts should use the “clear and convincing” standard for the review of these underlying facts.⁸¹ The panel concluded that “storing” and “editing data” in claims 4–7 embodied the improved computational functionality as described in the patent specification.⁸² Therefore there was a genuine dispute of material fact as to whether the methods in claims 4–7 perform more than “well-understood,

71. *Id.* at 643.

72. *Id.* at 646.

73. *Id.* at 647–48.

74. *Id.* at 648.

75. *See* Berkheimer v. HP Inc., 881 F.3d 1360, 1368 (Fed. Cir. 2018).

76. *Id.* at 1366.

77. Judges Moore, Taranto, and Stoll comprised the panel.

78. *Id.* at 1370.

79. *See id.* at 1370–71.

80. *Id.* at 1365.

81. *Id.* at 1368.

82. *Id.* at 1370.

routine, and conventional activities.”⁸³ As such, it was inappropriate to grant summary judgment as to claims 4–7.⁸⁴

However, the Federal Circuit panel did not place a stop on the pre-trial disposition of patent subject matter eligibility issues. The panel noted that the § 101 analysis as an issue of law was often appropriate for pre-trial disposition, including at the motion to dismiss or summary judgment stages.⁸⁵ Specifically, the panel recognized that when there was no genuine issue of material fact regarding the routineness and conventionality of claim elements, courts could decide the patent eligibility issue on summary judgment.⁸⁶

B. *AATRIX V. GREEN SHADES*

1. *District Court Litigation*

*Aatrix v. Green Shades*⁸⁷ is similar to *Berkheimer*. In this case, Aatrix alleged that Green Shades infringed on two of its patents.⁸⁸ The patents had claims directed to systems and methods for designing, creating, and importing data into a viewable form on a computer.⁸⁹ Green Shades filed a Rule 12(b)(6) motion to dismiss, arguing that the claims were invalid because they were ineligible under § 101.⁹⁰ Aatrix filed a motion for leave to amend its complaint, so that it could include factual statements supporting the “inventive concept” required at *Mayo/Alice* step two.⁹¹ The factual allegations in the proposed amended complaint included how the claimed invention improved computational efficiency over prior art.⁹² The district court denied Aatrix’s motion for leave as futile and granted Green Shades’s motion to dismiss.⁹³ Aatrix appealed.

83. *Id.*

84. *Id.*

85. *See id.* at 1368.

86. *Id.*

87. *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 2016 U.S. Dist. LEXIS 176222 (M.D. Fla. Mar. 30, 2016).

88. *See id.* at *1–2.

89. *See id.* at *16–19, 36–39.

90. *Id.* at *3.

91. *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 2016 U.S. Dist. LEXIS 184121, at *1 (M.D. Fla. Nov. 16, 2016).

92. Scott D. Eads et al., *Latest Federal Circuit Court Cases, 2/16/18*, SCHWABE, WILLIAMSON & WYATT (Feb. 16, 2018), <https://www.schwabe.com/newsroom-publications-satrix-software-inc-v-green-shades-software-inc-appeal-no-2017-1452-fed-cir-feb-14-2018> [<https://perma.cc/N5B5-BAAW>].

93. *Aatrix*, 2016 U.S. Dist. LEXIS 176222, at *45; *Aatrix*, 2016 U.S. Dist. LEXIS 184121, at *3.

2. Federal Circuit Appeal

On appeal, the Federal Circuit panel⁹⁴ found that the district court erred in granting Green Shades' motion to dismiss and denying Aatrix's motion for leave to amend complaint.⁹⁵ The panel emphasized that in order to decide patent subject matter eligibility at the motion to dismiss stage, there must be "no factual allegations that, taken as true, prevent resolving the eligibility question as a matter of law."⁹⁶ The panel found that the proposed complaint amendment contained factual allegations that, taken as true, would have supported the assertion that the claimed invention improved computational efficiency.⁹⁷ Since the improved computational efficiency could have constituted activities more than routine and conventional, the claimed invention could have satisfied the "inventive concept" requirement at *Mayo/Alice* step two, and could therefore have been patent eligible under § 101.⁹⁸ As such, the proposed complaint amendment would not have been futile.⁹⁹

C. DENIAL OF *EN BANC* HEARING IN *BERKHEIMER* AND *AATRIX*

Both Mr. Berkheimer and Aatrix petitioned the Federal Circuit to rehear the cases *en banc*. In response to the petitions, the Federal Circuit issued almost identical precedential orders denying both requests.¹⁰⁰

Judge Moore, writing for the majority,¹⁰¹ emphasized that the routineness and conventionality in a certain field at a certain point of time is a factual issue.¹⁰² As such, since the determination of subject matter eligibility under § 101 requires the analysis of "underlying facts," courts should not decide subject matter eligibility as a matter of law when there is a factual dispute over

94. Judges Moore, Taranto, and Reyna comprised the *Aatrix* panel.

95. *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1123 (Fed. Cir. 2018).

96. *Id.* at 1125.

97. *Id.* at 1127.

98. *Id.* at 1127–28.

99. *Id.* at 1127.

100. *See Berkheimer v. HP Inc.*, 890 F.3d 1369, 1369–70 (Fed. Cir. 2018) (*en banc*); *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 890 F.3d 1354, 1355 (Fed. Cir. 2018) (*en banc*).

101. While *Aatrix* and *Berkheimer* presented a unified position highlighting the factual inquiries under § 101, these two cases did not appear to represent the opinions held by the majority of the Federal Circuit judges. Judge Moore was only able to garner support from four other judges. Judge Lourie concurred with the judgment, but suggested that the Congress should intervene. Judge Reyna's dissented, and argued that Judge Moore's characterization of *Berkheimer* and *Aatrix* as "unremarkable" was controversial. Judges Prost, Chen, Hughes, and Wallach did not join any written opinions, suggesting that within the Federal Circuit, there could be a number of different views on the § 101 analysis. As such, it is likely to see panel-dependent decisions on § 101 issues going forward.

102. *See Berkheimer*, 890 F.3d at 1370 (Moore, J., concurring).

routineness and conventionality.¹⁰³ Judge Moore also characterized *Berkheimer* and *Aatrix* decisions as “narrow,” noting that they did not cast doubt on previous cases where patent eligibility issues were handled at pre-trial stages.¹⁰⁴ She explained that the holdings in *Berkheimer* and *Aatrix* did not deviate from well-established legal principles. Instead, they “merely hold that it must be answered under the normal procedural standards.”¹⁰⁵

D. THE AFTERMATH OF *BERKHEIMER* AND *AATRIX*

1. *The USPTO’s Berkheimer Memorandum*

On April 19, 2018, in response to the Federal Circuit’s *Berkheimer* and *Aatrix* decisions, the United States Patent and Trademark Office (USPTO) issued a memorandum (the “*Berkheimer* memo”).¹⁰⁶ The *Berkheimer* memo specifically addressed the “limited question” of routineness and conventionality.¹⁰⁷ While recognizing that the *Berkheimer* and *Aatrix* decisions did not change the *Mayo/Alice* framework,¹⁰⁸ the USPTO for the first time acknowledged that a rejection under § 101 would require particular evidence pertinent to routineness and conventionality.¹⁰⁹

The requirement for particular evidence represents a substantial departure from USPTO’s current practice. The current Manual of Patent Examining Procedure (MPEP) allows patent examiners to rely on their “expertise in the art” to determine routineness and conventionality of the claim elements.¹¹⁰ In contrast, the *Berkheimer* memo indicated that the claim elements are presumed to recite non-conventional activities unless proven otherwise by the examiner’s finding of routineness and conventionality with particular evidence.¹¹¹

The *Berkheimer* memo further limited the categories of evidence that the examiner must rely on in order to support a finding of routineness and conventionality.¹¹² There are four categories of such evidence: (1) a citation to

103. *Id.* at 1370–71.

104. *Id.* at 1373–74.

105. *Id.* at 1374.

106. UNITED STATES PATENT & TRADEMARK OFFICE, CHANGES IN EXAMINATION PROCEDURE PERTAINING TO SUBJECT MATTER ELIGIBILITY, RECENT SUBJECT MATTER ELIGIBILITY DECISION (*BERKHEIMER V. HP, INC.*) (2018) [hereinafter *BERKHEIMER MEMO*].

107. *Id.* at 1.

108. *See id.* at 2.

109. *See id.* at 2–3.

110. UNITED STATES PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE [hereinafter MPEP] § 2106.05(d).

111. *BERKHEIMER MEMO*, *supra* note 106, at 3.

112. *See id.*

an express statement in the specification or during prosecution,¹¹³ (2) a citation to a court decision,¹¹⁴ (3) a citation to a publication,¹¹⁵ and (4) a statement of official notice.¹¹⁶

Although the USPTO attempted to downplay the significance of the *Berkheimer* memo by calling it a “clarification,”¹¹⁷ commentators have characterized this memo as “consequential and examination-changing.”¹¹⁸ In addition to its effects on USPTO’s patent examination practice, the *Berkheimer* memo is also likely to bring a major shift in the practice of patent drafting and prosecution, especially for patent applications that are currently vulnerable to § 101 rejection under the *Mayo/Alice* test.

2. Pre-trial Disposition of Patent Eligibility After *Berkheimer* and *Aatrix*

In both *Berkheimer* and *Aatrix*, the Federal Circuit indicated that the decisions did not mean to foreclose pre-trial disposition of patent subject matter eligibility issues under § 101.¹¹⁹ In practice, the Federal Circuit has continued affirming district courts’ pre-trial dispositions of patent subject matter eligibility issues in several cases after *Berkheimer* and *Aatrix*.

In *Voter Verified v. Election System & Software*,¹²⁰ the patent claimed a computer-implemented auto-verification voting system.¹²¹ The district court found the patent invalid under § 101 because it failed the *Mayo/Alice* test, and granted the defendant’s motion to dismiss under Rule 12(b)(6).¹²² On appeal,

113. *Id.* at 3–4. Evidence of this category must describe the claim elements as well-understood, routine, or conventional, or otherwise so well-known that they do not need a description to meet the § 112 requirements.

114. *Id.* at 4. The available court decisions as discussed in the relevant MPEP section identified 21 areas of well-understood, routine, or conventional activities. *See* MPEP, *supra* note 110, at § 2106.05(d)(II).

115. BERKHEIMER MEMO, *supra* note 106, at 4. The memo emphasized that the description in the publication would need to show that the claim elements are “widely prevalent or in common use in the relevant field.”

116. *Id.* The *Berkheimer* memo placed stringent limits on the office notice practice. If the applicant challenges the official notice, the examiner must then provide evidence according to categories (1) through (3) or submit an affidavit or declaration with particular factual statements and supporting explanation.

117. *Id.* at 2.

118. *See* Christopher C. Johns, *Berkheimer Memorandum, a Big Shift, in Fact*, FINNEGAN (Apr. 24, 2018), <https://www.finnegan.com/en/insights/blogs/prosecution-first/berkheimer-memorandum-a-big-shift-in-fact.html> [<https://perma.cc/53CS-NRNH>].

119. *See* *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).

120. *Voter Verified Inc. v. Election Sys. & Software LLC*, 2017 U.S. Dist. LEXIS 215091 (N.D. Fla. Mar. 21, 2017).

121. *See id.* at *4.

122. *Id.* at *5.

the Federal Circuit affirmed the district court's decision¹²³ and found that neither party disputed the fact that "the claims recited the use of general purpose computers to carry out the abstract idea."¹²⁴ As such, "the factual allegations here, taken as true, [did] not prevent a § 101 determination at the Rule 12(b)(6) stage."¹²⁵

In *SAP America v. InvestPic*,¹²⁶ the patent at issue was directed to a "system for statistical analysis, display, and dissemination of financial data over a network."¹²⁷ Having found no inventive concept in the claim elements,¹²⁸ the district court granted the plaintiff's Rule 12(c) motion for judgment on the pleadings.¹²⁹ On appeal, the Federal Circuit concluded that since there were no factual allegations to support a plausible inference for an inventive concept, the district court's decision to grant the motion for judgment on the pleadings was proper.¹³⁰

In *BSG Tech v. Autozone*,¹³¹ the patent claimed a method of using a self-evolving database which could store, retrieve, and display marketplace information to guide user selections.¹³² The district court held that the claim elements were either "nothing more than an instruction to apply the abstract idea" or "a generic database to implement the abstract idea."¹³³ Therefore, the district court granted both a motion to dismiss in this case and a motion for summary judgment in a related case that involved the same patent.¹³⁴ On appeal, the Federal Circuit differentiated this case with *Berkeheimer*, finding that the only alleged unconventional feature in the asserted claims in this case simply restated the abstract idea itself.¹³⁵ As such, since there was no genuine issue of material fact in that case, the Federal Circuit affirmed the summary judgment.¹³⁶

123. *Voter Verified Inc. v. Election Sys. & Software LLC*, 887 F.3d 1376, 1379 (Fed. Cir. 2018).

124. *Id.* at 1386.

125. *Id.* at 1385.

126. *SAP Am., Inc. v. InvestPic, LLC*, 260 F. Supp. 3d 705 (N.D. Tex. 2017).

127. *Id.* at 709.

128. *Id.* at 718.

129. *Id.* at 719.

130. *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1169 (Fed. Cir. 2018).

131. *BSG Tech LLC v. Autozone, Inc.*, 2017 U.S. Dist. LEXIS 96276 (E.D. Tex. Mar. 30, 2017).

132. *See id.* at *11.

133. *Id.* at *15.

134. *Id.* at *17.

135. *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1291 (Fed. Cir. 2018).

136. *Id.*

IV. ANALYSIS

A. BERKHEIMER AND AATRIX PROVIDED OVERDUE CLARIFICATION ON THE EVIDENTIARY STANDARD AT *MAYO*/*ALICE* STEP TWO

Patent subject matter eligibility under § 101 has been considered as a “threshold” issue completely within the court’s domain.¹³⁷ As an issue of law, district courts often address patent eligibility issues at pre-trial stages to save time, money, and “scarce judicial resources.”¹³⁸

Following the adoption of the *Mayo*/*Alice* framework, there was a dramatic rise in the number of district court § 101 invalidity decisions on pre-trial motions.¹³⁹ This trend has elicited growing concerns about the apparent contention between the treatment of § 101 eligibility as an issue of law and the underlying factual issues at *Mayo*/*Alice* step two.¹⁴⁰

Legal scholars have pointed out that in searching for the “inventive concept,” courts need to engage in a novelty analysis, obviousness analysis, or both to determine whether or not a claim discloses well-understood, routine, and conventional activity previously engaged in by scientists who work in the field.¹⁴¹ Moreover, since both novelty and obviousness analyses involve factual issues, it is difficult to see how district courts could determine routineness and conventionality at early stages in the litigation without addressing subsidiary fact questions.¹⁴²

137. See, e.g., *Bilski v. Kappos*, 561 U.S. 593, 594 (2010) (“The § 101 eligibility inquiry is only a threshold test.”). But see Dennis Crouch and Robert P. Merges, *Operating Efficiently Post-Bilski by Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673 (2010) (arguing that courts should hold off on evaluating claims under § 101, and only deploy the full § 101 analysis when a claim passes muster under the other validity doctrines).

138. See *Ultramercial, Inc. v. Hulu, L.L.C.*, 772 F.3d 709, 718–19 (Fed. Cir. 2014) (Mayer, J., concurring).

139. Jeffrey A. Lefstin et al., *Final Report of the Berkeley Center for Law and Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 BERKELEY TECH. L.J. 551, 576 (2018). The data in the Report showed that there were no more than three § 101 invalidity decisions in any year prior to 2012 when *Mayo* was decided. The number increased to an average of eight per year in the two years following *Mayo*. After *Alice* was decided in 2014, the number increased by more than 10-fold, to a total of 222 invalidity decisions within the thirty-two months following the *Alice* decision.

140. See Raymond A. Mercado, *Resolving Patent Eligibility and Indefiniteness in Proper Context: Applying Alice and Aristocrat*, 20 VA. J.L. & TECH. 240, 241 (2016).

141. See *id.* at 330–31. The argument that the determination of patent eligibility under the *Mayo*/*Alice* framework involves the novelty analysis, obviousness analysis, or both appears to receive support from *Mayo*. The *Mayo* decision explicitly recognized that, in evaluating the significance of the claim elements, the § 101 patent eligibility inquiry and the § 102 novelty inquiry “might sometimes overlap.” *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 90 (2012).

142. See Mercado, *supra* note 140, at 257–58.

However, before *Berkeheimer* and *Aatrix*, the Federal Circuit never explicitly questioned the appropriateness of pre-trial disposition of the § 101 issues under the *Mayo/Alice* framework. Its de novo review standard regarding subject matter eligibility, which affords no deference to lower courts' fact-finders of routineness and conventionality, only exacerbated the confusion.¹⁴³ Given the uncertainty around § 101 issues after *Alice*, legal scholars urged the announcement of a "badly needed" standard from the Federal Circuit regarding the factual inquiries underlying the § 101 issue, specifically at *Mayo/Alice* step two.¹⁴⁴

143. Normally, where a question of fact exists, a district court's factual findings are reviewed with deference on appeal, even when those factual findings are subsidiary to an ultimate question of law. This principle has been adopted in the appeal of issues involving claim construction, obviousness, and indefiniteness. *See* *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 833 (2015) (holding that appellate court in reviewing claim construction must give deference to a district court's subsidiary factual findings regarding extrinsic evidence); *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 1377 (Fed. Cir. 2006) (reviewing district court's factual findings underlying an obviousness determination for clear error); *Alfred E. Mann Found. for Sci. Research v. Cochlear Corp.*, 841 F.3d 1334, 1341 (Fed. Cir. 2016) (reviewing any factual findings underlying indefiniteness by the district court based on extrinsic evidence for clear error).

In contrast, this is not the approach adopted by the Federal Circuit in § 101 appeals. In *Prism Technologies v. T-Mobile USA*, the Federal Circuit declined to afford any deference to the lower court's factual findings underlying the determination of patent subject matter eligibility. *See* *Prism Techs. LLC v. T-Mobile USA, Inc.*, 696 Fed. Appx. 1014, 1017 (Fed. Cir. 2017), *cert. denied*, 138 S. Ct. 689 (2018). Instead, the Federal Circuit performed de novo review of all eligibility issues, including subsidiary findings of fact. Prism petitioned the Supreme Court to decide whether a district court's factual findings in support of its eligibility holding may be reviewed de novo, as the Federal Circuit did, or only for clear error, as Rule 52(a) and Supreme Court precedent required. The Supreme Court denied the petition for a writ of certiorari. *Prism Techs. LLC v. T-Mobile USA, Inc.*, 138 S. Ct. 689 (2018).

Actually, during the de novo review of § 101 patent subject matter eligibility issues, the Federal Circuit has often covertly engaged in factual findings. It is not uncommon for the court to compare elements recited in patent claims to the prior art to determine whether the claims provide an inventive concept at *Mayo/Alice* step two. In *BASCOM v. AT&T Mobility*, the Federal Circuit stated in its decision that "[b]y taking a prior art filter solution and making it more dynamic and efficient, the claimed invention represents a software-based invention that improves the performance of the computer system itself." *BASCOM Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341, 1351 (Fed. Cir. 2016) (internal quotation marks omitted). While the Federal Circuit did not admit that it engaged in factual finding, it remanded, rather than reversed, the district court's decision, so that the parties could present more evidence to resolve factual disputes in a retrial. The practice of the Federal Circuit in reviewing patent subject matter eligibility issues has created much confusion. Frustrated by the lack of uniformity and consistency, Judge Moore has stated, "[w]hen we convert factual issues, or mixed questions of law and fact, into legal ones for our de novo review, we undermine the uniformity and predictability goals this court was designed to advance." *Highmark, Inc. v. Allcare Health Mgmt. Sys., Inc.*, 701 F.3d 1351, 1362 (Fed. Cir. 2012) (Moore, J., dissenting from denial of petition for rehearing en banc).

144. Mercado, *supra* note 140, at 332.

In *Berkheimer* and *Aatrix*, the Federal Circuit confirmed the need for fact finding in the determination of routineness and conventionality underlying patent subject matter eligibility issues. The Federal Circuit also emphasized that the pre-trial disposition of § 101 issues needed to conform to the requirements stipulated in the Federal Rules of Civil Procedure.

1. *Berkheimer and Aatrix Confirmed the Need to Consider Underlying Facts in the Inquiry of Patent Subject Matter Eligibility Under § 101*

Before *Alice*, the Federal Circuit had acknowledged that the legal question as to patentable subject matter might “turn on subsidiary factual issues.”¹⁴⁵ In *Ultramercial, Inc. v. Hulu, LLC*, the Federal Circuit emphasized that the § 101 inquiry was “rife with underlying factual issues.”¹⁴⁶ Specifically, the § 101 analysis required the courts to search for claim limitations that “narrow or tie the claims to specific applications of an otherwise abstract concept.”¹⁴⁷ In addition, courts must determine whether the patent “embraces a scientific principle or abstract idea,”¹⁴⁸ which could involve the analysis of underlying facts. Further, the determination for whether something was “conventional” or “routine” also involved factual analysis.¹⁴⁹ Finally, courts must determine to what extent the claim would pre-empt a field, which would also “involve historic facts.”¹⁵⁰ As such, “factual inquiries likely abound”¹⁵¹ in the § 101 analysis.¹⁵²

After the adoption of the *Mayo/Alice* framework, the Federal Circuit never explicitly extended the requirement for fact finding to the determination of subject matter eligibility, nor did it provide any guidance on the evidentiary standard to establish routineness and conventionality. Although it mentioned that the § 101 inquiry “may contain underlying factual issues,”¹⁵³ this tacit announcement was insufficient to clarify the post-*Alice* uncertainty and confusion regarding subject matter eligibility.

The *Berkheimer* and *Aatrix* cases confirmed that in assessing patent eligibility issues under the *Mayo/Alice* framework, the analysis needed to

145. *See In re Comiskey*, 554 F.3d 967, 975 (Fed. Cir. 2009).

146. *Ultramercial, Inc. v. Hulu, LLC*, 722 F.3d 1335, 1339 (Fed. Cir. 2013).

147. *Id.*

148. *Id.*

149. *Id.*

150. *Id.*

151. *Id.*

152. *See* Gregory H. Lantier & Richard A. Crudo, *Can Juries Decide Patent Eligibility Under 35 U.S.C. § 101?*, 27 FED. CIR. B.J. 45, 50 (2017).

153. *Mortg. Grader, Inc. v. First Choice Loan Servs.*, 811 F.3d 1314, 1325 (Fed. Cir. 2016) (quoting *Accenture Global Servs. v. Guidewire Software, Inc.*, 728 F.3d 1336, 1341 (Fed. Cir. 2013)).

consider underlying facts. The Federal Circuit in *Berkheimer* explicitly stated that “[w]hether a claim recites patent eligible subject matter is a question of law which may contain disputes over underlying facts.”¹⁵⁴ Specific to *Mayo/Alice* step two, the *Berkheimer* court further announced that “[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination” that “goes beyond what was simply known in the prior art.”¹⁵⁵

The *Berkheimer* and *Aatrix* decisions correctly captured the nature of routineness and conventionality inquiries. The determination of routineness and conventionality inevitably involve “a recital of external events.”¹⁵⁶ The external events, such as “who did what, when and where, how and why”¹⁵⁷ cannot be resolved by reading the claims or by applying the law. The assessment of routineness and conventionality requires a factual inquiry into the technological context of an invention, especially the state of the art that skilled artisans possessed at the time of the invention. In fact, the time of the invention itself is also a factual question that needs to be resolved by determining the specific activities of each inventor during a period of time.¹⁵⁸ Therefore, under the *Mayo/Alice* framework, the determination of § 101 patent subject matter eligibility issues undeniably requires the consideration of underlying factual issues.

2. *Berkheimer and Aatrix Emphasized that the Pre-Trial Disposition of § 101 Issues Needs to Conform to the Federal Rules of Civil Procedure*

In *Berkheimer* and *Aatrix*, the Federal Circuit emphasized that the handling of underlying factual issues at *Mayo/Alice* step two in pre-trial motions needed to conform to the Federal Rules of Civil Procedure.¹⁵⁹ Pursuant to the Federal Rules of Civil Procedure, if the defendant in a patent infringement case raises an invalidity defense on § 101 grounds and moves to dismiss the case under Rule 12(b)(6), the courts assume the truth of all well-pleaded facts and draw all reasonable inferences that favor the patent owner to determine the validity of the patent at issue.¹⁶⁰ Similarly, if the defendant raises an invalidity defense on § 101 grounds and moves for summary judgment under Rule 56, the courts

154. *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).

155. *Id.* at 1369.

156. *Berkheimer v. HP Inc.*, 890 F.3d 1369, 1370 (Fed. Cir. 2018) (citing *Thompson v. Keohane*, 516 U.S. 99, 110 (1995)).

157. *Berkheimer*, 890 F.3d at 1370 (citing *U.S. Bank Nat'l Ass'n ex rel. CWC Capital Asset Mgmt. LLC v. The Village at Lakeridge, LLC*, 138 S. Ct. 960, 966 (2018)).

158. *See MPEP*, *supra* note 110, at § 715.

159. *Berkheimer*, 890 F.3d at 1371.

160. *See* FED. R. CIV. P. 12(b)(6).

assume that all disputed facts and reasonable inferences are in favor of the patent owner, and only grant a summary judgment when there is no genuine dispute of material fact as to the validity of the patent.¹⁶¹ Applying these rules to the facts pertinent to routineness and conventionality at *Mayo/Alice* step two, a well-pleaded assertion of non-routine or non-conventional activities would preclude a motion to dismiss, and any assertion or evidence that could introduce genuine dispute of material facts with regard to routineness and conventionality would preclude a summary judgment.

Although the Federal Circuit characterized the *Berkheimer* and *Aatrix* decisions as a mere clarification, this was clearly an understatement of the effect these two cases could have on patent litigation involving subject matter eligibility issues under § 101.¹⁶² Since the adoption of the *Mayo/Alice* framework, factual questions have taken a more prominent position in the inquiry of patent subject matter eligibility, which was traditionally treated as a matter of law. District courts either ignored or were confused about the changing role of factual issues, and continued treating § 101 patent eligibility issues as if there were no inquiry of fact.¹⁶³ The inaction of the Federal Circuit to provide guidance has, in effect, created a patent litigation regime that applies irregular procedural rules and evidentiary standards to factual issues underlying the inquiry of patent subject matter eligibility. The *Berkheimer* and *Aatrix* decisions represented an overdue regularization of the disputes over patent subject matter eligibility issues within the existing civil litigation system, at least at the district court level.¹⁶⁴

161. See FED. R. CIV. P. 56.

162. The Federal Circuit in *Berkheimer* stated that “[p]atent eligibility has in many cases been resolved on motions to dismiss or summary judgment. Nothing in this decision should be viewed as casting doubt on the propriety of those cases.” *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).

163. Before *Berkheimer* and *Aatrix*, some district courts had already denied summary judgment motions because the movant did not provide evidence pertinent to routineness and conventionality at *Mayo/Alice* step two. “When, as here, Millennium is asking the court to infer that the combination of elements is conventional, it must supply some evidence to convince the trier of fact to accept its version of events. Since those facts are lacking here, Millennium’s position is necessarily rejected.” *Ameritox, Ltd. v. Millennium Health, LLC*, 88 F. Supp. 3d 885, 911 (W.D. Wis. 2015). But many other district courts routinely dispose of the § 101 issue as a matter of law, even when there are factual disputes about routineness and conventionality at *Mayo/Alice* step two.

164. It remains a question, however, whether the Federal Circuit would adjust its de novo review standard, and defer to lower court’s fact-findings on routineness and conventionality at *Mayo/Alice* step two.

B. *BERKHEIMER* AND *AATRIX* FAILED TO PROVIDE GUIDANCE ON
TAKING JUDICIAL NOTICE AT *MAYO*/*ALICE* STEP TWO

The clarification that any factual dispute at *Mayo*/*Alice* step two would preclude the pre-trial disposition of the § 101 issue is not a moratorium on resolving patent subject matter eligibility at the pleading or at the summary judgment stages. In *Berkheimer*, the Federal Circuit pointed out that “not every § 101 determination contain[ed] genuine disputes over the underlying facts material to the § 101 inquiry.”¹⁶⁵ Accordingly, when there is no genuine dispute of material fact regarding the routineness and conventionality of the claim elements, the subject matter eligibility issue can be decided on summary judgment as a matter of law.¹⁶⁶

Specifically, the Federal Circuit approved the application of judicial notice as a standard in determining whether a factual dispute exists.¹⁶⁷ As a common law doctrine codified in the Federal Rules of Evidence, courts may judicially notice a fact that is “not subject to reasonable dispute.”¹⁶⁸ A judicially noticeable fact is either “generally known within the trial court’s territorial jurisdiction” or “can be accurately and readily determined from sources whose accuracy cannot reasonably be questioned.”¹⁶⁹

The Federal Circuit held that, when ruling on pre-trial motions, courts need not “accept as true allegations that contradict matters properly subject to judicial notice or by exhibit.”¹⁷⁰ In other words, courts are not bound to credit “bald assertions, unsupported conclusions, and opprobrious epithets woven into the fabric of the complaint.”¹⁷¹ If the alleged subsidiary facts by the patent owner in support of the “inventive concept” are contradicted by matters of which courts may properly take judicial notice, the courts do not have to take the alleged facts as true or disputed in deciding pre-trial motions.

165. *Berkheimer*, 881 F.3d at 1368. Similarly, the *Aatrix* court noted that “patent eligibility can be determined at the Rule 12(b)(6) stage” when “there are no factual allegations that, taken as true, prevent resolving the eligibility question as a matter of law.” *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1125 (Fed. Cir. 2018).

166. *Berkheimer*, 881 F.3d at 1368.

167. *See Berkheimer v. HP Inc.*, 890 F.3d 1369, 1372 (Fed. Cir. 2018) (en banc) (Moore, J., concurring) (“[A] court need not accept as true allegations that contradict matters properly subject to judicial notice or by exhibit.”).

168. FED. R. EVID. 201(b).

169. *Id.*

170. *Berkheimer*, 890 F.3d at 1372.

171. *Banco Santander de P.R. v. Lopez-Stubbe (In re Colonial Mortg. Bankers Corp.)*, 324 F.3d 12, 15 (1st Cir. 2003).

From a policy perspective, if a fact is indisputable, there isn't any good reason to "jump through evidentiary hoops for its admission."¹⁷² Meanwhile, since judicial notice allows a court to accept adjudicative facts as true without requiring proof, the indisputability of judicially noticed facts must satisfy a strict standard to guarantee the fairness for the parties in litigation.¹⁷³

Unfortunately, neither *Berkheimer* nor *Aatrix* provided practical guidance on the scope of judicial notice that the district courts could properly take in the determination of routineness and conventionality. This Note discusses the principles of taking judicial notice, and provides some illustration of how to apply these principles to the determination of routineness and conventionality at *Mayo/Alice* step two.

1. "Generally Known Within the Trial Court's Territorial Jurisdiction"

The indisputability of a fact can be established by the general knowledge within a court's territorial jurisdiction.¹⁷⁴ For example, a California court took judicial notice of "the overwhelming deluge of publicity attendant to and extensive public discussion of the O. J. Simpson criminal trial," because the "overall notoriety and widespread coverage of the trial were generally known within the territorial jurisdiction."¹⁷⁵ The following Table provides further examples of the "generally known" facts that courts took judicial notice in their decisions.

172. Coleen M. Barger, *Challenging Judicial Notice of Facts on the Internet Under Federal Rule of Evidence 201*, 48 U.S.F.L. REV. 43, 48 (2013).

173. See Christopher Onstott, *Judicial Notice and the Law's "Scientific" Search for Truth*, 40 AKRON L. REV. 465, 470 (2007).

174. See FED. R. EVID. 201(b).

175. See *Cochran v. NYP Holdings, Inc.*, 58 F. Supp. 2d 1113, 1122 n.5 (C.D. Cal. 1998).

Table 1. Examples of judicially noticed “generally known” facts.

Cases	Judicially noticed facts
<i>Carey v. Population Servs. Int’l</i> , 431 U.S. 678, 695–96 (1977).	“With or without access to contraceptives, the incidence of sexual activity among minors is high.”
<i>Kaggen v. IRS</i> , 57 F.3d 163, 166 (2d Cir. 1995).	Banks send monthly statements to depositors.
<i>United States v. Munoz</i> , 974 F.2d 493, 495 (4th Cir. 1992).	South America is a “major source of the cocaine sold and used in the United States.”
<i>Seyfried v. Walton</i> , 668 F.2d 214, 219 (3d Cir. 1981).	The “progressively higher levels of intellectual and emotional development of students in the later grades of secondary school.”
<i>Sinatra v. Heckler</i> , 566 F. Supp. 1354, 1356 (E.D.N.Y. 1983).	The Postal Service is “heavily burdened during and in the aftermath of the holiday season and that delivery is sometimes slowed.”
<i>Flood v. Kubn</i> , 309 F. Supp. 793, 797 (S.D.N.Y. 1970).	“[B]aseball is everybody’s business.”

However, the routineness and conventionality at *Mayo/Alice* step two may not be amenable for judicial notice under the “general knowledge” approach for the following two reasons.

First, the inquiry of routineness and conventionality at *Mayo/Alice* step two is incompatible with the scope of “general knowledge.” Under the *Mayo/Alice* framework, the “inventive concept” requires more than “well-known, routine, and conventional” activities practiced in the industry relevant to the claimed invention. The accurate understanding of the state of the art of the relevant industry requires specific knowledge of that industry, which is not readily available to the general public. Therefore, an evidentiary standard asking how universally the general public knows a fact that is beyond the scope of their knowledge likely provides no benefit.¹⁷⁶ Moreover, the “general knowledge” standard applies to the territorial jurisdiction of the court. The arbitrary geographical limitation is irrelevant to the factual inquiry about an industry whose practice is not subjected to such territorial limitations. In other words, the “general knowledge” within a court’s territorial jurisdiction regarding an

176. See *Onstott*, *supra* note 173, at 473.

industry's state of the art most likely would not accurately reflect the real situation in that industry.

Second, the routineness and conventionality analysis at *Mayo/Alice* step two is susceptible to hindsight bias of the general public. Some industries, for example, the internet and software, are tightly connected to daily life. Due to constant exposure and interaction with these industries, the general public, regardless of territorial jurisdiction, could reasonably form an accurate understanding of the current state of the art of these industries. In the assessment of routineness and conventionality at *Mayo/Alice* step two, however, the critical point in time is the time of invention for pre-AIA patents or the time of filing for post-AIA patents, which could be many years ago. Therefore, it is questionable whether or not the "general knowledge" of the state of the art today could provide any meaningful indication of the state of the art in the past.¹⁷⁷

Indeed, some courts have refused to take judicial notice in the determination of the historical state of the art based on "general knowledge." In *In re Eynde*, in order to fulfill the § 112 statutory requirements,¹⁷⁸ the applicant requested the court to take judicial notice of the state of the art.¹⁷⁹ The court rejected the request because "the facts constituting the state of the art are normally subject to the possibility of rational disagreement among reasonable men and are not amenable to the taking of such notice."¹⁸⁰ Similarly, in *In re Pardo*, the Board of Patent Appeals and Interferences (BPAI), without citing supporting evidence, took judicial notice that the invention would have been obvious to a skilled artisan in 1970.¹⁸¹ The appeals court reversed, noting "the skill of a person of ordinary skill in either computer programming or design in 1970 is not a proper subject for judicial notice today, no matter how simple a claimed invention may seem in hindsight."¹⁸²

On the other hand, some courts took judicial notice on the historical state of the art in a way that appeared inconsistent with the Federal Rules of Evidence. In *Zenith Radio v. Ladd*, the court affirmed a patent application

177. See generally Neal J. Rouse & Kathleen D. Vohs, *Hindsight Bias*, 7 PERSP. ON PSYCHOL. SCI. 411 (2012).

178. In this case, the patent applicant failed to submit reference to challenge a 35 U.S.C. § 112 rejection in a timely manner. In order to fulfill the § 112 statutory requirements, the specification of the application would need to enable a person having ordinary skill in the art to make and use the disclosed invention without undue experimentation. Not allowed to enter the reference due to the delay, the applicant instead requested the court to take judicial notice of the state of the art.

179. *In re Eynde*, 480 F.2d 1364, 1370 (C.C.P.A. 1973).

180. *Id.*

181. *In re Pardo*, 684 F.2d 912, 917 (C.C.P.A. 1982).

182. *Id.*

rejection by the BPAI.¹⁸³ In forming the rejection, the BPAI took judicial notice that “material removal broadly by drilling holes for the purpose is a well known conventional expedient.”¹⁸⁴ Since it is unlikely that the general public had the accurate knowledge pertinent to a specific engineering field, the reviewing district court should not have allowed the judicial notice. Moreover, in *Affinity Labs of Texas v. Directv*, the magistrate judge took judicial notice that the “commercial practice of disseminating regionally broadcast content to users outside the region is both well-known and historically long-standing.”¹⁸⁵ In explaining the finding, the magistrate judge relied on “general historical observations that come to mind as evidence.”¹⁸⁶ The judicial notice in this case is likely improper, because judges should not take judicial notice based on their own understanding of fact. The judicially noticed fact needs to be generally known by the public.

Despite the inconsistent practice across district courts, the Federal Circuit has never decided whether, or how, a court should use “general knowledge” as the basis for judicial notice in the determination of historical state of the art. The silence of the Federal Circuit on this issue, however, should not be construed as a total prohibition. Following some sensible evidentiary standard, courts could properly take judicial notice with regard to the historical state of the art based on the knowledge of the general public. The principles for the standard should at least include: (1) the general public, not just the skilled artisans, is sufficiently familiar with the potentially industry-specific fact, and (2) the fact reflects a long-standing truth, therefore not vulnerable to hindsight bias.

As an illustration of these principles, in a copyright infringement case concerning the similarity between two snowman toys, the court took judicial notice of the traditional features of snowmen.¹⁸⁷ This judicial notice was appropriate because the general public was familiar with the features of snowmen. In addition, since the traditional features of snowmen do not change much over time and are notoriously known, they are immune to hindsight bias. The following Table provides additional cases where courts took judicial notice of the historical state of the art under the “general knowledge” approach. In these cases, courts have taken judicial notice not only because the general public has frequent exposure to these industries in daily

183. *Zenith Radio Corp. v. Ladd*, 198 F. Supp. 286, 288 (D.D.C. 1961).

184. *Id.* at 287–88.

185. *Affinity Labs of Tex., LLC v. Directv, LLC*, 109 F. Supp. 3d 916, 938 (W.D. Tex. 2015).

186. *Id.*

187. *Eden Toys, Inc. v. Marshall Field & Co.*, 675 F.2d 498, 500 n.1 (2d Cir. 1982).

life, but also because the historical state of the art at issue is so notoriously known that the risk of hindsight bias is negligible.

Table 2. Examples of judicially noticed historical state of the art.

Cases	Judicially noticed historical state of the art
<i>In re</i> Wiechers, 347 F.2d 608, 610–11 (C.C.P.A. 1965).	The “notoriously old business arrangement . . . [of] the repayment of loans in installments.”
<i>buySAFE, Inc. v. Google, Inc.</i> , 765 F.3d 1350, 1355 (Fed. Cir. 2014).	A contractual relationship with a “transaction performance guaranty” is “beyond question of ancient lineage.”
<i>Ultramercial, Inc. v. Hulu, LLC</i> , 772 F.3d 709, 722–23 (Fed. Cir. 2014).	Generic computers and the internet “have become indispensable staples of contemporary life.”

2. “Accurately Verifiable from Reliable Sources”

Even if a fact is not generally known, a court can still take judicial notice if the fact can be accurately determined from sources whose accuracy cannot be reasonably questioned.¹⁸⁸ This approach needs to satisfy two requirements. First, the court must be capable of determining the accuracy of the judicially noticed fact based on the source. For example, by referring to a public record, a court can verify whether a statement is present in that public record. However, the court cannot accurately determine whether the statement is true or false by referring to that public record alone, because there is no guarantee that every statement in that record is true. As a result, the court may take judicial notice of the presence, but not the truthfulness, of the statement.¹⁸⁹ Second, the accuracy of the sources cannot be reasonably questioned. Traditionally, sources in this category have included officially kept data records, dictionaries, commercial directories, textbooks, maps, encyclopedia, and almanacs. With the expansion of internet-based sources, the scope of reliable sources is also changing.¹⁹⁰

In contrast to the “general knowledge” approach, the inquiry of routineness and conventionality at *Mayo/Alice* step two is amenable for judicial

188. See FED. R. EVID. 201(b).

189. See, e.g., *Bias v. Moynihan*, 508 F.3d 1212, 1225 (9th Cir. 2007) (taking judicial notice of litigant’s pro se status, but declining to take judicial notice of the content of deposition that is subject to dispute).

190. See generally *Barger*, *supra* note 172.

notice under the “reliable source” approach. While it is disfavored to rely on the public’s common sense to determine the historical state of the art in a specific technological field, it is reasonable for a court to assess routineness and conventionality by referring to the verifiable information found in reliable and authoritative sources. Under the “reliable source” approach, there are two mechanisms that could be at play in the determination of routineness and conventionality.

First, courts could take judicial notice of the presence of statements pertinent to routineness and conventionality in the specification and prosecution history of the patent at issue. Once judicially noticed, the statements adverse to patent eligibility can serve as evidence against the patent owner under the doctrine of party admission.¹⁹¹ This mechanism is consistent with USPTO’s *Berkheimer* memo, where in order to show routineness and conventionality, the examiners can make citations to an express statement in the specification or in the prosecution history.¹⁹² Indeed, courts have taken judicial notice of the presence of statements in patents, published patent applications, and patent prosecution history, which are all considered public record.¹⁹³ For example, in *X One v. Uber*, the district court granted defendant’s request to take judicial notice of two U.S. patents.¹⁹⁴ The court explained that “matters of public record” were the appropriate subjects of judicial notice, and that “patents are matters of public record and the proper subject of judicial notice.”¹⁹⁵ In *Uniloc USA v. HTC America*, the district court took judicial notice of the prosecution history of the patent at issue.¹⁹⁶ The court explained that it may “consider the asserted patent and relevant prosecution history as matters of public record appropriate for judicial notice.”¹⁹⁷

Second, courts could rely on the authorities of dictionaries, textbooks, university publications, industry manuals, and government research reports to judicially notice scientific and technological facts. If these scientific and technological facts could attest to whether the activities in claim elements are widely prevalent or in common use in the relevant field, courts could properly take judicial notice of such facts to rule on the routineness and conventionality

191. See FED. R. EVID. 801(d)(2).

192. See *BERKHEIMER MEMO*, *supra* note 106, at 3–4.

193. *Massachusetts v. Westcott*, 431 U.S. 322, 323 n.2 (1977) (public records “may be judicially noticed”).

194. *X One, Inc. v. Uber Techs., Inc.*, 239 F. Supp. 3d 1174, 1182 n.1 (N.D. Cal. 2017).

195. *Id.* (internal quotation marks omitted).

196. *Uniloc USA, Inc. v. HTC Am., Inc.*, 2018 U.S. Dist. LEXIS 100737, at *19–20 (W.D. Wash. June 15, 2018).

197. *Id.* at *19 n.6 (citing *Integrated Tech. Sys. v. First Internet Bank of Ind.*, 2017 U.S. Dist. LEXIS 21309, at *2 (E.D. Tex. Jan. 30, 2017)).

at *Mayo/Alice* step two. The following Table provides some example cases where courts relied on sources of authority to take judicial notice of scientific and technological facts.

Table 3. Examples of judicially noticed scientific and technological facts.

Cases	Judicially noticed fact	Authorities
<i>Hines on behalf of Sevier v. Sec’y of HHS</i> , 940 F.2d 1518, 1525–26 (Fed. Cir. 1991).	The incubation period of measles.	Nelson Textbook of Pediatrics (13th ed. 1987).
<i>Texpor Traders, Inc. v. Trust Co. Bank</i> , 720 F. Supp. 1100, 1105 n.2 (S.D.N.Y. 1989).	“[A] sample size of thirty or more is generally recognized as sufficient to guarantee normality of the distribution of sample means.”	Statistical Concepts for Attorneys (1983).
<i>Allen v. United States</i> , 588 F. Supp. 247, 258 n.3 (C.D. Utah 1984).	A series of “elementary principles of physics, chemistry, and other sciences.”	Handbook of Chemistry and Physics (64th ed. Weast 1983).
<i>Jacobs v. N.C. Admin. Office of the Courts</i> , 780 F.3d 562, 565 n.2 (4th Cir. 2015).	Characteristics of social anxiety disorder DSM-IV.	Diagnostic and Statistical Manual of Mental Disorders (4th ed. 2000).
<i>Edwards v. Sec’y of HHS</i> , 572 F. Supp. 1235, 1238 (E.D.N.Y. 1983).	Subjective symptoms of pain and discomforting are consistent with the side effects of medications.	Physician’s Desk Manual (1983).
<i>Harris v. H & W Contr. Co.</i> , 102 F.3d 516, 522 (11th Cir. 1996).	“Graves’ disease is a condition that is capable of substantially limiting major life activities if left untreated.”	The Merck Manual of Diagnosis and Therapy (15th ed. 1987).
<i>Lennon v. Metro. Life Ins. Co.</i> , 504 F.3d 617, 623 (6th. Cir. 2007).	“As blood-alcohol levels rise, so does the risk of being involved in a fatal crash.”	Nat’l Hwy. Traffic Safety Admin., U.S. Dep’t of Transp. Studies.

<i>Pantry, Inc. v. Stop-N-Go Foods, Inc.</i> , 796 F. Supp. 1164, 1168 (S.D. Ind. 1992).	“Ingestion of any concentration of benzene would be carcinogenic.”	EPA promulgation in the Federal Register, National Primary Drinking Water Regulations.
<i>Williams v. Emplrs. Mut. Cas. Co.</i> , 845 F.3d 891, 904 (8th Cir. 2017).	“Radium is a solid that emits alpha particles.”	Merriam-Webster’s Collegiate Dictionary 1026 (11th ed. 2012)

In the context of determining the routineness and conventionality related to the historical state of the art, courts have also relied on scientific and technological facts from industry-specific authorities. Notably, in both *Bilski* and *Alice*, the Supreme Court relied on a number of economics textbooks and expert studies to determine whether the business methods in these cases were well-known. The following Table illustrates the authorities the Supreme Court relied on in *Bilski* and *Alice*.

Table 4. The authorities the Supreme Court relied on in *Bilski* and *Alice*.

Cases	Judicially noticed fact	Authorities
<i>Bilski v. Kappos</i> , 561 U.S. 593, 611 (2010).	“Hedging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.”	Introduction to Derivative Financial Instruments (2008). Financial Accounting: An Introduction to Concepts, Methods, and Uses (13th ed. 2010). Fundamentals of Corporate Finance (8th ed. 2008).
<i>Alice Corp. Pty. Ltd. v. CLS Bank Int’l</i> , 573 U.S. 208, 219–20 (2014).	“The concept of intermediated settlement is a fundamental economic practice long prevalent in our system of commerce.”	Studies in History, Economics and Public Law (1896). Risk Management and Financial Institutions (3d ed. 2012).

The rapid emergence of online information sources in recent years has greatly expanded the potential sources available for judicial notice. However, since judicial notice preempts the opportunity to “use rebuttal evidence, cross-examination, and argument to attack contrary evidence,” courts need to use caution to determine the reliability of the sources, so that judicially noticed facts are beyond reasonable controversy.¹⁹⁸ Recognizing the risk of trusting unreliable sources, some courts maintain a more rigid standard for judicial notice, while switching to a more flexible standard for expert witness.¹⁹⁹

Legal scholars have proposed practical criteria in assessing the reliability of online sources, and encouraged the courts to examine at least three factors of the online source: “(1) knowledge of the subject matter, (2) independence from relevant bias, and (3) incentive to ensure accuracy.”²⁰⁰ First, the author’s expertise is most important in assessing whether an online source can be relied upon for judicial notice. Courts should take judicial notice relying on internet sources that “exist solely to disseminate the findings of exceedingly qualified experts to the public.”²⁰¹ In addition, courts should also consider potential bias in assessing whether an online source is reliable. An online source providing expert knowledge may nevertheless be unreliable if it presents the knowledge to advance its own agenda. Therefore, courts should favor information provided by government agencies or unbiased public organizations over that provided by private parties who may have conflicts of interest.²⁰² Courts should also consider whether an online source is incentivized to invest resources to keep the published information accurate. Online sources that suffer consequences, either in authoritative status or in economic interest, when the information they provide is out of date are more incentivized to ensure the accuracy of their information.²⁰³ A candid assessment of these three

198. See Barger, *supra* note 172, at 49.

199. See Onstott, *supra* note 173, at 476 (“Even states that have adopted *Dauber’s* admissibility standard, thereby rejecting the *Frye* test for admissibility, continue to treat *Frye’s* application to judicial notice positively.”).

200. Jeffrey Bellin & Andrew Guthrie Ferguson, *Trial by Google: Judicial Notice in the Information Age*, 108 NW. U. L. REV. 1137, 1167 (2014).

201. *Id.*; see, e.g., *City of Monroe Emps. Ret. Sys. v. Bridgestone Corp.*, 399 F.3d 651, 655 n.1 (6th Cir. 2005) (taking judicial notice of information on the National Association of Securities Dealers, Inc. (NASD) website); *Gent v. CUNA Mut. Ins. Soc’y*, 611 F.3d 79, 84 n.5 (1st Cir. 2010) (taking judicial notice of information on the Center for Disease Control and Prevention (CDC) website).

202. See, e.g., *Exxon Shipping Co. v. Baker*, 554 U.S. 471, 501 n.17 (2008) (declining to rely on research funded in part by Exxon).

203. See Bellin & Ferguson, *supra* note 200, at 1170.

factors, some legal scholars argue, will result in “numerous determinations that reputable online sources come within Rule 201’s scope for judicial notice.”²⁰⁴

3. *The Application of Judicial Notice in Berkheimer and Aatrix*²⁰⁵

In *Berkheimer*, judicial notice would not satisfy the “general knowledge” standard, but could be appropriate under the “reliable source” approach. The patent owner in *Berkheimer* asserted that the “inventive concept” in the patent claim at issue lay in the fact that the claimed invention improved computer functionality.²⁰⁶ Conventional digital asset management systems at the time included “numerous documents containing multiple instances of redundant document elements,”²⁰⁷ which led to “inefficiencies and increased costs.”²⁰⁸ To solve this problem, the specification of the patent at issue described an inventive feature that stored data in an unconventional manner via eliminating redundancy and enabling one-to-many editing. Therefore, the claimed invention increased efficiency and computer functionality over the prior art systems.²⁰⁹

In order to assess whether judicial notice is proper under the “general knowledge” approach, we first ask whether the general public could have an accurate understanding of the state of the art of the industry in the asserted claims. The claims are directed to a data management algorithm. While it is fair to say that the general public may have some experience interacting with the front end client interface of some data management systems in daily life, it is unlikely that the general public is familiar with the development of the data management algorithms at the back end of the systems. Therefore, there is hardly any meaningful “general knowledge” that could support any judicial notice in assessing the routineness and conventionality of the asserted invention at issue.

Even if we assume that the frequent use of data management systems today could familiarize the general public with the industry as a whole, it would still be questionable whether the general public could accurately assess the state

204. *Id.* at 1167–68.

205. The key facts related to the discussion of judicial notice in *Berkheimer* and *Aatrix* are very similar. The patents in both cases involve computer-implemented data processing methods first filed at the USPTO more than a decade ago. The patent owners in both cases claimed the existence of “inventive concept,” thus creating factual disputes in the pre-trial stages of the litigation. As such, the application of judicial notice in *Berkheimer*, as discussed in this Section, would also apply to *Aatrix*. For the purpose of reducing redundancy, the discussion of *Aatrix* is omitted.

206. *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018).

207. *Id.*

208. *Id.*

209. *Id.*

of the art of the data management industry some twenty years ago when the patent application was filed.²¹⁰ Even skilled persons in the art, who have a solid understanding of the development of data management algorithms, are susceptible to hindsight bias when they assess the state of the art twenty years ago solely based on their recollection and common sense. Therefore, under the “general knowledge” approach, it would be improper for the court to take judicial notice of historical state of the art to assess whether the asserted claims in *Berkheimer* only recited well-known, routine and conventional activities at *Mayo/Alice* step two.

Applying the “reliable source” approach to *Berkheimer*, the Federal Circuit correctly took judicial notice of the patent at issue. Patents are public record, and the accuracy of patent information can be verified by consulting the database maintained by the USPTO. In addition, courts can take judicial notice at any stage of a proceeding, including when a case is on appeal.²¹¹ In the specification of the judicially noticed patent, the patent owner included statements asserting the inventive concept at *Mayo/Alice* step two. The Federal Circuit correctly ruled the case based on the presence of these statements. Since the challenger of patent validity did not provide any judicially noticeable evidence that could negate the asserted inventive concept by the patent owner,²¹² the mere presence of the patent owner statements in the specification was sufficient to introduce genuine dispute of material fact regarding the determination of patent eligibility. Therefore, due to the factual dispute, the Federal Circuit correctly vacated lower court’s summary judgment.

In *Berkheimer*, neither the parties nor the courts referred to any reliable authoritative source for judicially noticeable scientific facts pertinent to the routineness and conventionality of the claimed data management algorithm. However, if we assume that a reputable algorithm textbook, a widely-accepted data management manual, or an unbiased, up-to-date website providing expert information had described the features recited in the asserted patent as well-known, routine, or conventional as of the filing date of the patent, it would have been appropriate for the court to take judicial notice of such description and to treat it as true when deciding pre-trial motions on the § 101 patent eligibility issues.

210. The priority date of the patent at issue, U.S. Patent No. 7,447,713, is October 13, 2000.

211. See FED. R. EVID. 201(d).

212. See *Berkheimer*, 881 F.3d at 1368 (“[W]hether the claimed invention is well-understood, routine, and conventional is an underlying fact question for which HP offered no evidence.”).

The routineness and conventionality in patent eligibility often involve scientific and technological details that are industry-specific. As such, the application of judicial notice in the determination of patent subject matter eligibility under § 101 may require some delicate customization. As the court of appeals specialized in patent-related issues, it is incumbent on the Federal Circuit to establish sensible principles for taking judicial notice in the context of patent law. Although the Federal Circuit in *Berkheimer* and *Aatrix* confirmed the applicability of judicial notice in the determination of routineness and conventionality at *Mayo/Alice* step two,²¹³ it unfortunately did not seize the opportunity to further provide practical guidance on how to take advantage of this evidentiary tool. Therefore, the application of judicial notice in the context of patent subject matter eligibility is still only guided by comparisons from other areas of law.

V. CONCLUSION

The Federal Circuit in *Berkheimer* and *Aatrix* correctly identified that the inquiries of routineness and conventionality at *Mayo/Alice* step two were issues of fact. Patent eligibility under § 101, although ultimately an issue of law, is informed by underlying facts. Emphasizing the importance of compliance with civil procedure rules in the cases involving patent subject matter eligibility issues, the Federal Circuit effectively regularized these cases within the existing civil litigation system and eliminated much of the uncertainties surrounding the evidentiary standard in determining patent subject matter eligibility.

As an evidentiary tool at courts' disposal, judicial notice could play an important role in the pre-trial disposition of patent subject matter eligibility disputes. In *Berkheimer* and *Aatrix*, the Federal Circuit, however, missed out on the opportunity to provide guidance on the use of judicial notice in determining routineness and conventionality at *Mayo/Alice* step two. Applying the statutory requirements for judicial notice, courts should be extremely cautious about using the "general knowledge" approach to determine routineness and conventionality. However, courts can take judicial notice under the "reliable source" approach if the facts pertinent to routineness and conventionality are from sources that are authoritative, unbiased, and up-to-date.

213. See *Berkheimer v. HP Inc.*, 890 F.3d 1369, 1372 (Fed. Cir. 2018) (en banc) (Moore, J. concurring) (holding that a court need not accept as true allegations that contradict matters properly subject to judicial notice); *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 890 F.3d 1354, 1358 (Fed. Cir. 2018) (en banc) (Moore, J., concurring) (also holding that a court need not accept as true allegations that contradict matters properly subject to judicial notice).