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Predictability and Nonobviousness in Patent Law After KSR

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PREDICTABILITY AND NONOBVIOUSNESS IN PATENT LAW AFTER KSR

Christopher A. Cotropia*

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In KSR International Co. v. Teleflex, Inc., the Supreme Court addressed the doctrine of nonobviousness, the ultimate question of patentability, for the first time in thirty years. In mandating a flexible approach to deciding nonobviousness, the KSR opinion introduced two predictability standards for determining nonobviousness. The Court described predictability of use (hereinafter termed “Type I predictability”)—whether the inventor used the prior art in a predictable manner to create the invention—and predictability of the result (hereinafter termed “Type II predictability”)—whether the invention produced a predictable result—both as a means for proving obviousness.

Although Type I predictability is easily explained as part of the flexible approach endorsed by KSR, Type II predictability represents a potentially radical shift in the nonobviousness doctrine. Instead of focusing on whether reasons already existed to create the invention, like Type I predictability does, a Type II predictability analysis takes the invention’s creation as a given and examines instead the invention’s operation. Type II predictability moves the analysis away from the gap between the prior art and the invention to the invention only.

The United States Patent and Trademark Office (“USPTO”), the Federal Circuit, and lower courts are using Type II predictability fairly extensively after KSR. The problem with this usage is that Type II predictability runs counter to statutory language, introduces hindsight bias, discriminates against certain technologies, and conflicts with basic patent theory. Accordingly, the USPTO and courts need to reconsider the use of Type II predictability and their interpretation of KSR.

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INTRODUCTION

In *KSR International Co. v. Teleflex, Inc.*,¹ the Supreme Court addressed the doctrine of nonobviousness, a critical question of patentability,² for the first time in thirty years.³ Most critical analyses of *KSR* have focused on the *KSR* Court's requirement of a flexible approach for determining a patent claim's nonobviousness.⁴ Moreover, courts and the United States Patent and Trademark Office ("USPTO") have responded to *KSR* by changing their methodology accordingly, becoming less rigid in their approaches to determining nonobviousness.⁵

1. 550 U.S. 398 (2007).

2. See NONOBVIOUSNESS—THE ULTIMATE CONDITION OF PATENTABILITY (John F. Witherspoon ed., 1980).

3. See *Dann v. Johnston*, 425 U.S. 219 (1976).

4. See, e.g., Daralyn J. Durie & Mark A. Lemley, *A Realistic Approach to the Obviousness of Inventions*, 50 WM. & MARY L. REV. 989, 991-92 (2008); Jeanne C. Fromer, *The Layers of Obviousness in Patent Law*, 22 HARV. J.L. & TECH. 75, 76 (2008); Justin Lee, Note, *How KSR Broadens (Without Lowering) the Evidentiary Standard of Nonobviousness*, 23 BERKELEY TECH. L.J. 15, 15-16 (2008).

Others have empirically examined whether *KSR* lowered or raised the nonobviousness standard. See, e.g., Glynn S. Lunney, Jr. & Christian T. Johnson, *Not So Obvious After All: Patent Law's Nonobviousness Requirement, KSR, and the Fear of Hindsight Bias*, 47 GA. L. REV. 41 (2012); Jennifer Nock & Sreekar Gadde, *Raising the Bar for Nonobviousness: An Empirical Study of Federal Circuit Case Law Following KSR*, 20 FED. CIR. B.J. 369 (2011).

5. See, e.g., *OSRAM Sylvania, Inc. v. Am. Induction Techs., Inc.*, 701 F.3d 698, 706-07 (Fed. Cir. 2012) ("The Supreme Court has warned, however, that, while an analysis of any teaching, suggestion, or motivation to combine known elements is useful to an obviousness analysis, the overall obviousness inquiry must be expansive and flexible.").

Another part of the *KSR* decision has not received as much scholarly attention as the flexibility discussion,⁶ but is nonetheless used extensively by courts and the USPTO. The Supreme Court in *KSR* emphasized predictability as a basis for an obviousness finding, and described two types of predictability—predictability of use (“Type I”), focusing on the predictability of the inventor’s changes to the prior art in order to create the invention⁷—and predictability of the result (“Type II”), looking at whether the invention produced predictable results.⁸

Although Type I predictability does not disturb the fundamental tenets of nonobviousness jurisprudence, Type II predictability does. Type I predictability represents another incarnation of traditional reasons used to determine nonobviousness based on a combination or change of prior art references.⁹ That is, if the invention’s change to the prior art is predictable, reasons for the invention’s creation must have existed prior to the invention, rendering the invention obvious.¹⁰ Type II predictability is different, focusing not on whether the invention would have been created absent the inventor,¹¹ but taking the invention’s creation as a given and looking instead at the invention’s operation.¹² If an invention behaves in a predictable manner and, in turn, produces predictable results, that invention is obvious under Type II predictability even though there is no indication that the invention would have ever been created without the inventor’s own insights.

6. A very notable exception is a discussion by Rob Merges and John Duffy, recognizing that “[p]redictability is key” after *KSR*. ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* 688 (5th ed. 2011). And Rob Merges recognized that the general test for obviousness employs a “predictability” requirement as its key term. *See generally* Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L. J. 1, 2 (1992). As discussed *infra*, predictability as to use of the prior art, Type I predictability, fits nicely within the nonobviousness doctrine. *See infra* Part II.A.1. Predictability of results, Type II predictability, does not. *See infra* Part III.

7. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.”).

8. *See id.* at 416 (“[T]he combination must do more than yield a predictable result.”).

9. *See, e.g., Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1361 (Fed. Cir. 2011) (considering whether the invention was a “predictable solution” to a known problem).

10. *See KSR*, 550 U.S. at 421 (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”).

11. *See* Christopher A. Cotropia, *Patent Law Viewed Through an Evidentiary Lens: The “Suggestion Test” as a Rule of Evidence*, 2006 BYU L. REV. 1517, 1524-25 (noting that the nonobviousness doctrine implements a “but for” test—granting protection where it is needed to prompt invention).

12. *See, e.g., Tokai Corp. v. Easton Enters., Inc.* 632 F.3d 1358, 1378 (Fed Cir. 2011) (Newman, J., dissenting) (“The determination of obviousness is not whether a person could, with full knowledge of the patented device, reproduce it from prior art or known principles. The question is whether it would have been obvious, without knowledge of the patentee’s achievement, to produce the same thing that the patentee produced.”).

Type II predictability shifts the nonobviousness doctrine's focus from (a) looking for pre-existing reasons to cross the gap between the prior art and the invention to (b) the invention by itself and whether it behaves as expected. This shift in focus under Type II predictability, from the invention's likely creation to the expectedness of the invention's results, represents a fundamental change to the nonobviousness doctrine.

This Article argues that after *KSR*, the USPTO and the courts actually use Type II predictability in their nonobviousness analysis, and sometimes use it exclusively. In its Manual of Patent Examining Procedure ("MPEP"),¹³ the USPTO instructs patent examiners that they can find a patent claim obvious if the invention's results are predictable. Moreover, the Patent Trial and Appeal Board ("PTAB") issues opinions relying on Type II predictability for obviousness determinations.¹⁴ Courts are making similar findings since *KSR*, with the Federal Circuit using Type II predictability in its nonobviousness analysis, although not yet explicitly recognizing the fundamental shift it represents.¹⁵ District courts are more explicit about the possible change to nonobviousness that Type II predictability represents.¹⁶ A district court even explicitly questioned whether it is proper to instruct juries on Type II predictability and if this standard can be reconciled with established approaches to nonobviousness.¹⁷

The primary problem with Type II predictability, particularly when used by itself to render a patent claim obvious, is that the standard runs counter to patent law and patent policy. As this Article explains, the plain language of the governing nonobviousness statute, 35 U.S.C. § 103, rejects a Type II predictability analysis by requiring an evaluation of the "differences" between the prior art and the invention.¹⁸ Type II predictability also introduces further hindsight bias into the analysis because of the standard's focus on the outcome—the invention—and lack of emphasis on the circumstances prior to the invention's creation. By definition, Type II predictability also biases

13. See, e.g., MPEP (8th ed. Rev. 9, Aug. 2012).

14. See, e.g., *Ex Parte Smith*, 83 U.S.P.Q. 2d 1509 (B.P.A.I. 2007) (using Type II predictability to find claims obvious).

15. See, e.g., *Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337, 1343-44 (Fed. Cir. 2008) (finding the invention obvious because the results of the combination were predictable).

16. See, e.g., *Fujitsu, Ltd. v. Tellabs, Inc.*, No. 09-C-4530, 2013 WL 4465703, at *8 (N.D. Ill. Aug., 20, 2013) (quoting *KSR*, 550 U.S. at 416) ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

17. See, e.g., *Depuy Spine v. Medtronic Sofamor Danek, Inc.*, 526 F. Supp. 2d 162, 170 (D. Mass. 2007), *aff'd in part, rev'd in part, and remanded on other grounds* by 567 F.3d 1314 (Fed. Cir. 2009) (rejecting a jury instruction based on predictability of results as a sole basis for a finding of obviousness).

18. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 287 (2011) ("A patent for a claimed invention may not be obtained . . . if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art. . . .").

patent protection against predictable and simple technologies even though patent law should encourage such technologies,¹⁹ sometimes because of the very simplicity Type II predictability punishes. Finally, Type II predictability runs counter to basic patent theory because patent law is focused on incentivizing would-be inventors to journey down unlikely development paths, not just create inventions with a specific type of result—an unpredictable one.²⁰

This Article proceeds as follows: Part I sets forth the basics of modern nonobviousness doctrine. This Part details the Supreme Court's nonobviousness jurisprudence from *Graham v. John Deere* to just prior to the *KSR* decision. Part II then discusses two separate important aspects of *KSR*: namely, its flexible approach to determining nonobviousness, and its discussion of the post-*Graham* case law relating to the concept of synergy. Part II details how, through these discussions, *KSR* introduces both Type I and Type II predictability. Part II then describes obviousness analyses at the USPTO and in the courts using both types of predictability, detailing how recent decisions use predictability when determining nonobviousness after *KSR*. Finally, Part III explains how Type II predictability runs counter to the statutory language in Section 103, introduces additional hindsight bias, discriminates against certain technologies, and conflicts with basic patent theory.

I. THE NONOBVIOUSNESS DOCTRINE PRIOR TO *KSR*

The nonobviousness requirement, “the ultimate condition for patentability,”²¹ demands an invention to be more than just new and useful.²² The invention must be of “a significant enough technical advance to merit the award of a patent.”²³ Nonobviousness represents the highest hurdle an invention must overcome to gain protection.²⁴

19. See *Van Veen v. United States*, 386 F.2d 462, 465 (1967) (“Experience has shown that some of the simplest advances have been the most nonobvious.”); STEVEN J. PALEY, *THE ART OF INVENTION: THE CREATIVE PROCESS OF DISCOVERY AND DESIGN* (2010) (explaining the value of simple innovations); see also *Goodyear Tire & Rubber Co. v. Ray-O-Vac Co.*, 321 U.S. 275, 279 (1944) (simplicity of itself does not negate invention).

20. See Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 *YALE L. J.* 1590, 1603-20 (2011) (describing the “inducement standard” for determining patentability).

21. NONOBVIOUSNESS—THE ULTIMATE CONDITION OF PATENTABILITY, *supra* note 2.

22. 35 U.S.C. § 101.

23. MERGES & DUFFY, *supra* note 6, at 619 (“Many patent lawyers consider nonobviousness the most important of the basic patent requirements. . . . This belief exists in part because the two other requirements of patentability are relatively mild.”).

24. See Cotropia, *supra* note 11, at 1525-26; Glynn S. Lunney, Jr., *E-Obviousness*, 7 *MICH. TELECOMM. & TECH. L. REV.* 363, 370 (2001); Glynn S. Lunney, Jr., *Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution*, 11 *SUP. CT. ECON. REV.* 1, 19 (2004).

This section analyzes the theoretical underpinnings of modern nonobviousness doctrine and the substantive law that comprises the doctrine. This background section starts with the 1952 Patent Act²⁵, which marked the beginning of the modern doctrine, explores the Supreme Court's decision in *Graham v. John Deere*,²⁶ and the Supreme Court cases that follow, up to the Court's recent decision in *KSR Int'l Co. v. Teleflex, Inc.*²⁷ Through this discussion, the "gap measuring" aspects of the nonobviousness doctrine are introduced—both measuring whether some impetus already existed to cross the gap between the prior art and the invention (a "reason to combine" or change the prior art) and whether there is a difference in result or outcome between the prior art and the invention (a "synergy" from the invention).

The statutory test for nonobviousness was originally codified in 35 U.S.C. § 103 as part of the 1952 Patent Act and changed little since.²⁸ This codification, and the Supreme Court's interpretation of Section 103 in *Graham v. John Deere*, form the basis for modern nonobviousness doctrine over the past fifty-plus years.²⁹ Section 103 and *Graham* focus the theory and substantive law behind the nonobviousness inquiry on the difference—the "gap"—between what had been done and was known at the time of the invention and the claimed invention itself. Under this formulation, nonobviousness asks whether a skilled artisan at the time of the invention would have traversed this technological gap.³⁰

A. Section 103, *Graham*, and the "Gap"

The Section 103 statutory requirement for nonobviousness provides that:

"[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."³¹

The Supreme Court has expanded upon the statutory test established by Section 103. In *Graham v. John Deere Co.*, the court concluded that 35

25. Patent Act of 1952, Pub.L. No. 593, 66 Stat. 792-817 (codified as amended in scattered sections of 35 U.S.C.).

26. *Graham v. John Deere Co.*, 383 U.S. 1 (1965).

27. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

28. 35 U.S.C. § 103 (2012). The American Invents Act ("AIA"), passed in 2012, changed only what qualifies as "prior art" under Section 103, not the statutory test for comparing the invention to the prior art. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 287 (2011).

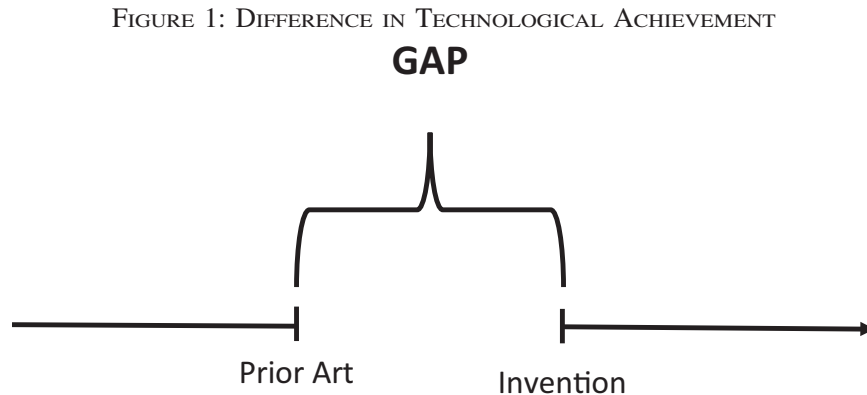
29. 2 DONALD S. CHISUM, CHISUM ON PATENTS § 5.02 (2001).

30. See *Graham*, 383 U.S. at 15.

31. 35 U.S.C. § 103(a) (2012).

U.S.C. § 103 mandated “several basic factual inquiries” to determine a claimed invention’s nonobviousness.³² These inquiries included: (1) identifying the “scope and content of the prior art”; (2) determining the “differences between the prior art and the claims”; and (3) ascertaining “the level of ordinary skill in the pertinent art.”³³ The Supreme Court then stated that “[a]gainst this background, the obviousness or nonobviousness of the subject matter is determined.”³⁴ Secondary considerations—objective factors that indicate an invention is nonobviousness—are then considered.³⁵

The *Graham* factors, like the language of Section 103 upon which they are based, define a “gap” and then measure that gap to determine nonobviousness.³⁶ The gap is the difference in degree of technological progress between what has already been accomplished in a given area—the prior art—and the invention for which patent protection is sought. The greater the difference in technological advancement between the prior art and the invention, the larger the gap defined by Section 103. The gap is depicted graphically in Figure 1, below.³⁷



The *Graham* inquiry then asks whether this gap is large enough to warrant a patent. As the Court indicated, “[t]he emphasis on non-obviousness is one of inquiry, not quality, and, as such, comports with the constitutional strictures.”³⁸ The question is whether bridging this gap would have been obvious to one skilled in the art or not.

32. *Graham*, 383 U.S. at 17.

33. *Id.* at 17-18.

34. *Id.*

35. *See id.*

36. *See* Christopher A. Cotropia, *Nonobviousness as an Exercise in Gap Measuring*, in 2 INTELL. PROP. AND INFO. WEALTH: ISSUES AND PRACTICES IN THE DIGITAL AGE 24-26 (Peter K. Yu ed., 2007) (“The magnitude of the gap ties directly into both policy goals of the nonobviousness requirement.”).

37. *Id.* at 25.

38. *Graham*, 383 U.S. at 17.

The Court applied this gap measuring approach to the patent in *Graham*, focusing on the “[o]bviousness of the [d]ifferences” between the prior art and the claimed invention.³⁹ *Graham* involved a patent claim for a clamp to reduce vibration in a shank plow used for rocky soil and fields.⁴⁰ The difference (the gap) between what had done before and the claimed invention was the location of the hinge plate on the plow—with the prior art hinge below the pivot point of the shank while the invention’s hinge was above.⁴¹ The patentee argued that this difference was nonobvious because placing the hinge plate above the pivot point allowed more flexibility in the shank, and thus less vibration in the plow.⁴² The Court concluded otherwise because, given the well-known problem of plow vibration, “a person having ordinary skill in the prior art . . . would immediately see that the thing to do was what *Graham* did, i.e., invert the shank and the hinge plate.”⁴³ The gap was too small for a skilled artisan given that “[t]he only other effective place available in the arrangement was to attach it below the hinge plate.”⁴⁴

The Court applied a similar gap measuring analysis in cases consolidated with *Graham*—*Calmar, Inc. v. Cook Chem. Co.* and *Colgate-Palmolive Co. v. Cook Chem. Co.*⁴⁵ In those cases, the Court concluded that the patented invention regarding a “hold-down” lid for a finger sprayer top “rests upon exceedingly small and quite non-technical mechanical differences in a device, which was old in the art.”⁴⁶ These differences were “rendered apparent” to a skilled artisan by the prior art, meaning that the skilled artisan could cross the gap easily, without any need for the inventor’s insights.⁴⁷

Over the next ten years, the Supreme Court revisited the nonobviousness doctrine and the *Graham* factors four times. In two of these cases, described below, the Court followed the gap measuring approach found in Section 103 and articulated in *Graham* by defining the gap and determining how likely a skilled artisan would have crossed it at the time of the invention.⁴⁸

In *United States v. Adams*, the claimed invention was a wet battery that used water, instead of a conventional acid, and employed electrodes made of magnesium and cuprous chloride, rather than zinc and silver chloride.⁴⁹ The

39. *Id.* at 24-25.

40. *Id.* at 19-21.

41. *Id.* at 19-22.

42. *Id.* at 21-23.

43. *Id.* at 25.

44. *Id.* at 24-25.

45. *Id.* at 26 (consolidated with *Graham*).

46. *Id.* at 36.

47. *Id.*

48. The other two cases, *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969), and *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976), introduced the synergy approaching to determining nonobviousness and are discussed in detail in Part I.B.

49. *United States v. Adams*, 383 U.S. 39 (1966).

Court concluded it was unlikely a skilled artisan would have made such changes since the workability of such a configuration as a battery was “wholly unexpected[],” “deter[ring] any investigation into such a combination.”⁵⁰ The knowledge at the time of invention “naturally discourage[d] the search” for the patented invention, meaning the gap was unlikely to be crossed by a skilled artisan.⁵¹

In contrast, the Court found the invention in *Dann v. Johnson* obvious because “[t]he gap between the prior art and [the invented] system is simply not so great as to render the system nonobvious to one reasonably skilled in the art.”⁵² The invention in *Johnson* was an automated category-coded financial transaction system, in which a user could code her checks and deposits to particular categories such as rent, food, or fuel.⁵³ The Court determined that giving a customer sub-accounts, essentially categorizing transactions, was well known and that automating such a system was not sufficiently different.⁵⁴ Automation of a new system would have been obvious because of the already “extensive use of data processing systems in the banking industry” at the time of the invention.⁵⁵ That is, the gap was not large enough to warrant patent protection.

B. Synergism—Another Method of Gap Measuring

The two Supreme Court cases sandwiched between *Adams* and *Dann*—namely, *Anderson’s Black-Rock Inc. v. Pavement Salvage Co.* and *Saikraida v. Ag. Pro, Inc.*—articulated a specific rule for determining the nonobviousness of combination inventions—a requirement for “synergism” for the resulting invention to be patentable.⁵⁶ As the Court articulated, synergism requires that the combination of prior art elements result “in an effect greater than the sum of the several effects taken separately.”⁵⁷

In the first case after *Graham*, *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, the Court introduced the synergism rule while finding the asserted patent obvious.⁵⁸ The invention in *Anderson’s-Black Rock* combined a radiant-heat burner with a paving machine.⁵⁹ The Court found the invention unpatentable because both the prior art radiant-heat burner and other portions of the paving machine, when combined, performed the same function

50. *Id.* at 51-52.

51. *Id.* at 52.

52. *Dann v. Johnston*, 425 U.S. 219, 230 (1976).

53. *Id.* at 221-22.

54. *Id.* at 226-27.

55. *Id.* at 227-30.

56. See Kevin J. Lake, *Synergism and Nonobviousness: The Rhetorical Rubik’s Cube of Patentability*, 24 B.C. L. REV. 697, 713-16 (1983) (describing *Anderson’s-Black Rock* and *Adams* usage of synergy).

57. *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 61 (1969).

58. *Id.* at 60-63.

59. *Id.* at 58.

as they did individually.⁶⁰ Their combination “did not produce a ‘new or different function.’”⁶¹ Combining these known elements “add[ed] nothing to the nature and quality” of the individual components.⁶² That is, there was no synergy in the combination.

The Court’s next nonobviousness decision, *Sakraida v. Ag Pro, Inc.*, took the same synergy approach to determining nonobviousness.⁶³ The patent in *Sakraida* concerned a dairy cow barn configured with sloped floors, drains, and water storage tanks in order to make waste cleanup simpler.⁶⁴ The Court concluded that this combination could not “properly be characterized as synergistic.”⁶⁵ The individual prior art elements operated in the same way when combined and produced the same results. And “[a] patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men. . . .”⁶⁶ Accordingly, the lack of synergy—the lack of a new or different result from the combination—rendered the invention obvious.

In *Anderson’s-Black Rock* and *Sakraida*, the Court did not focus on the likelihood of the gap being overcome by a skilled artisan; rather, it considered the technical effect of the invention in comparison to the prior art.⁶⁷ Does the combination do more—produce new or different results—than what each individual prior art element did on its own before? If not, the combination is not patentable because of a lack of synergy.

Synergy focuses on a gap—the gap between the results in the prior art and those of the invention. An invention lacks synergy if that gap is too small or essentially non-existent. Synergism does not focus on the path taken from the prior art to the invention and whether this path is unlikely to be traveled by the skilled artisan. Instead, synergism involves a comparison of operation—operation of the prior art by itself compared to the prior art when combined.⁶⁸ Whether such a combination would ever come about absent the inventor’s insights appears to be irrelevant under this standard.⁶⁹ Instead,

60. *Id.* at 60.

61. *Id.*

62. *Id.* at 62.

63. *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976).

64. *Id.* at 275-77.

65. *Id.* at 282.

66. *Id.* at 281 (quoting *Great A. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 153 (1950)).

67. *Id.* at 281-82; CHISUM, *supra* note 29, § 5.02[5][e].

68. See Tamir Packin, Note, *A New Test for Obviousness in Combination Patents: Economic Synergy*, 28 CARDOZO L. REV. 957, 960 (2006) (“The Supreme Court developed the first approach, known as the ‘synergy test,’ which requires that the known elements, when combined, must function in a synergistic way, where the function of the whole is greater than the sum of the parts.”).

69. When compared to the typical approach to nonobviousness (reason to combine or change), synergy’s different approach has drawn criticism. “The Supreme Court’s synergy test

synergy is about technical effect; more precisely, it is about the gap of technical effect between the prior art and the invention.

Thus, prior to the *KSR* decision, synergy as a nonobviousness standard was similar to the *Graham* factors approach. Both defined a gap between the prior art and the invention. However, this gap is either the amount of change needed in the prior art to create the invention (the *Graham* approach⁷⁰), or the difference in the results achieved by using the prior art versus using the invention (synergy).⁷¹

II. *KSR*'S "PREDICTABILITY" AS A CHANGE TO THE NONOBVIOUSNESS STANDARD

This part examines the Supreme Court's most recent decision on nonobviousness, *KSR*, its emphasis on predictability, and the subsequent use of predictability by the USPTO and courts. This examination starts with the *KSR* decision itself, explaining the decision's introduction of two distinct types of predictability. This part then looks at administrative decisions by the USPTO and court decisions by both the Federal Circuit and district courts. Opinions by all of these patent decision-makers are examined to determine how they use the predictability analysis introduced by *KSR* and the conclusions on nonobviousness produced by this usage.

The following analysis ultimately shows that *KSR* has introduced, and the USPTO and courts have adopted, two concepts of predictability into the law of nonobviousness: predictability as to use ("Type I" predictability) and predictability as to results ("Type II" predictability). The former turns out to be just another reason for a skilled artisan to combine the prior art and supports a conclusion that the gap is not large enough to justify patent protection. The latter, in contrast, is a true substantive change to nonobviousness by refocusing the inquiry on the invention by itself instead of the difference between the invention and the prior art. These two types of predictability,

may be too severe: synergy may sometimes be an indication that a combination invention is non-obvious, but it seems likely that a combination may sometimes be non-obvious without bringing a synergy." John H. Barton, *Non-Obviousness*, 43 IDEA 475, 503 (2003) (critiquing the Federal Circuit's nonobviousness requirement at the time for other shortcomings). The Federal Circuit has even dismissed synergism as a requirement for determining nonobviousness. See, e.g., *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360 (Fed. Cir. 1984) (finding a jury instruction on synergy erroneous); see also Robert Desmond, Comment, *Nothing Seems "Obvious" to the Court of Appeals for the Federal Circuit: The Federal Circuit, Unchecked by the Supreme Court, Transforms the Standard of Obviousness Under Patent Law*, 26 LOY. L.A. L. REV. 455, 456 (1993) ("Through its decisions over the last ten years, the [court] has dramatically reinterpreted the standard of obviousness. Certain patents that would have been invalid because they were obvious under the Supreme Court's standard have been construed as valid under the [court's] new standard of obviousness.").

70. See Cotropia, *supra* note 36, at 24-26.

71. See Packin, *supra* note 68, at 960.

and their appearance in post-*KSR* nonobviousness decisions and fundamental impact on the nonobviousness doctrine, are explored further below.

A. Two Types of “Predictability” in *KSR*

In 2006, the Supreme Court reconsidered the nonobviousness doctrine in *KSR International Co. v. Teleflex, Inc.*⁷² The Court reviewed whether the Federal Circuit’s exclusive use of the teaching, suggestion, or motivation (“TSM”) test to determine the nonobviousness of inventions, such as Teleflex’s combination of a adjustable automobile throttle pedal with electronic sensors, was proper.⁷³ The Court also addressed the continued viability of *Anderson’s-Black Rock* and *Sakraida* and synergy as a nonobviousness test.⁷⁴

The Court in *KSR* invoked the concept of predictability multiple times when discussing the nonobviousness doctrine. These invocations fall into two basic categories: predictability as to use and predictability as to results. Predictability of use was discussed in the context of making the nonobviousness inquiry more flexible and beyond the TSM test. The predictability of result approach was introduced in the Court’s discussion of the synergy cases—*Anderson’s-Black Rock* and *Sakraida*.

1. Predictable Use (“Type I” Predictability)

One fundamental decision of the Court in *KSR* was its rejection of the TSM test as the exclusive test for determining nonobviousness.⁷⁵ The Court, in turn, introduced a variety of gap measuring tools to determine whether an invention is nonobvious, one of which is the predictability of the prior art’s use—what is referred to in this Article as “Type I” predictability.⁷⁶

Such gap measuring tools introduced in *KSR* vary, but all have the same common goal—determining whether the gap between the prior art and the invention is large enough for the invention to warrant patent protection. For example, the Court noted that the inherent traits of a person having ordinary skill in the art could provide reasons to combine or change the prior art and render the invention obviousness.⁷⁷ Ordinary creativity of the skilled artisan should also be considered to determine nonobviousness.⁷⁸ The Court focused on externalities indicating that the gap between the prior art and the claimed

72. 550 U.S. 398 (2007).

73. *Id.* at 407.

74. *Id.* at 416-18.

75. *Id.* at 415.

76. *See, e.g.*, CHISUM, *supra* note 29, § 5.02.

77. *KSR*, 550 U.S. at 420-21 (“Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.”).

78. *Id.* at 418 (Courts should “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”).

invention was small, and that the invention, therefore, was obvious.⁷⁹ There are also instances where “the fact that a combination was obvious to try might show that it was obvious under § 103.”⁸⁰ Accordingly, the Court found that “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.”⁸¹

At the heart of this discussion of various factors was the Court’s reaffirmance of the *Graham* approach and the requirement that the nonobviousness analysis stay functional and flexible.⁸² As the Court put it, “it can be important” to identify a reason to combine the prior art.⁸³

In this discussion of flexibility in determining nonobviousness, the Court referenced predictability. Predictability measures the likelihood that a person of ordinary skill would combine or change elements of the prior art to make the invention. “[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.”⁸⁴ In turn, if there is a “predictable solution” to a given problem, “a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”⁸⁵ That is, the more predictable it is to use the prior art to make the invention, the more likely there was already a reason at the time of the invention for those of ordinary skill to make the necessary changes.

This type of predictability, Type I predictability, focuses on the likelihood a combination or change to the prior art would have happened and, thus, cross the gap, absent the inventor’s actions. Taking the state of the art at the time of invention, Type I predictability questions how likely—how predictable—it would be to cross the difference and come up with the invention. The greater the Type I predictability, the smaller the gap—or, put another way, the higher the likelihood that the gap would have been crossed without the inventor’s insight.⁸⁶

Thus, Type I predictability is simply another analytical tool introduced by the Court in *KSR* to make the nonobviousness inquiry more flexible.⁸⁷

79. *Id.* (“[D]emands known to the design community or present in the marketplace” can provide a reason to change the prior art in order to practice the invention can be found).

80. *Id.* at 421.

81. *Id.* While discussed in more detail *infra*, the term predictability entered this conversation as well.

82. *Id.* at 418-22.

83. *Id.* at 418.

84. *Id.* at 417.

85. *Id.* at 421.

86. *See supra* Part I.A.

87. *See, e.g.*, Fromer, *supra* note 4, at 76. In fact, Type I predictability is very similar to Merges’ articulation of nonobviousness as using an uncertainty standard for patentability.

The ultimate substantive inquiry does not change—the decision maker is still focused on whether the technological gap is large enough to warrant patent protection. Type I predictability is just another data point to help decide whether a skilled artisan would have made that jump without the inventor’s assistance.⁸⁸

2. Predictable Result (“Type II” Predictability)

The Court in *KSR* also discussed predictability in a different way by focusing not on whether the combination or change is predictable (Type I predictability), but on whether the behavior of the resulting combination or change is predictable (Type II predictability). That is, the Court discussed obviousness in situations where the ultimate invention “yield[s] predictable results,” not whether the creation of the invention itself is predictable.⁸⁹ This introduction of Type II predictability occurred when the Court revisited the synergy cases.

The *KSR* Court reaffirmed and further explained its holdings in *Anderson’s-Black Rock* and *Sakraida* by noting that “[n]either the enactment of § 103 nor the analysis in *Graham* disturbed this Court’s earlier instructions concerning the need for caution in granting a patent based on the combination of elements found in the prior art.”⁹⁰ The Court focused on the principles underlying decisions such as *Anderson’s-Black Rock* and *Sakraida* for determining the patentability of a claim for a combination of elements of the prior art.⁹¹

However, the discussion did not focus specifically on the concept of synergism described in these earlier opinions, but instead on the concept of predictability. The *KSR* Court described *Adams*, *Anderson’s-Black Rock*, and *Sakraida* as evaluating the predictability of the invention’s results.⁹² For cases where the Court found the inventions to be obvious, the Court pointed out that the combined elements operated as expected.⁹³ For *Anderson’s-Black Rock*, the Court explained that “[t]he radiant-heat burner functioned

Robert Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 2-4 (1992). Merges articulates the nonobviousness standard as “serv[ing] a gatekeeping function; it seeks to reward inventions that, viewed prospectively, have a low probability of success.” *Id.* at 2. “The nonobviousness standard encourages researchers to pursue projects whose success appears highly uncertain at the outset. The standard insists that only the results from uncertain research should be rewarded with a patent.” *Id.*

88. See, e.g., Marian Underweiser, *Presumed Obvious: How KSR Redefines the Obviousness Inquiry to Help Improve the Public Record of a Patent*, 50 IDEA 247, 268-274 (2010) (explaining how *KSR*’s requirement to show a “reason to combine” includes “predictable” combinations).

89. *KSR*, 550 U.S. at 416.

90. *Id.* at 415-16.

91. *Id.* at 416-17; see also MERGES & DUFFY, *supra* note 6, at 688 (noting this part of the *KSR* opinion).

92. *KSR*, 550 U.S. at 415-18.

93. *Id.*

just as a burner was expected to function; and the paving machine the same. The two in combination did no more than they would in separate, sequential operation.”⁹⁴ For *Sakraida*, the Court noted that the combination “yields no more than one would expect from such an arrangement.”⁹⁵ In contrast, the Court reasoned that the invention in *Adams* was nonobvious because the “elements worked together in an unexpected and fruitful manner.”⁹⁶ The Court explained that these synergism opinions focused on the predictability of the invention’s ultimate behavior, not on whether creating the invention was predictable.⁹⁷

Other scholars have noted this discussion of predictability in the context of synergy. For example, Duffy and Merges explicitly recognize this recasting of synergism by the Court in *KSR*.⁹⁸ They view the Court’s re-explanation of synergy as shifting the nonobviousness inquiry to predictability.⁹⁹

Type II predictability—predictability as to results—focuses on the invention itself instead of the gap between the prior art and the invention. The inquiry asks whether the invention, once it is created, acts in a predictable manner. Does it operate how a skilled artisan would believe it would when the prior art elements are changed or combined? The difference between the prior art and the invention—the gap—is irrelevant in a Type II predictability analysis.

The introduction of Type II predictability presents a different approach to determining nonobviousness. The Court’s focus in *KSR* on predictable results moves the inquiry away from the gap and from how easy is it for a skilled artisan to traverse the gap to instead focus solely on the invention and the interaction of the given elements of the invention itself.

One could argue that there is some linkage between the predictability of the operation of the invention and the magnitude of the gap. If the invention’s elements work together in an unpredictable way, that fact provides some second-order evidence that the path to get there is unpredictable, and unlikely to be traveled.¹⁰⁰ Skilled artisans are likely to avoid creating things for which the operation is uncertain. This reasoning is the foundation for a

94. *Id.* at 416-17.

95. *Id.* at 417.

96. *Id.* at 416.

97. Nor did the court look at it through traditional synergism lens—measuring the difference in results of the prior art elements and the invention. *See supra* Part I.B. (explaining the traditional synergy approach).

98. *See* MERGES & DUFFY, *supra* note 6, at 688.

99. *Id.* (noting that “[p]redictability is key” after *KSR*).

100. *See, e.g.,* Procter & Gamble Co. v. Teva Pharms. USA, Inc., 566 F.3d 989, 994 (Fed. Cir. 2009) (“If a patent challenger makes a prima facie showing of obviousness, the owner may rebut based on ‘unexpected results’ by demonstrating ‘that the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected.’”) (quoting *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995)).

rebuttal to a *prima facie* case of obviousness that existed well before *KSR*—unexpected results.¹⁰¹ The Federal Circuit has long recognized that even if there is some reason to combine the prior art to make the invention, if the results are unexpected, then this provides good objective evidence that a skilled artisan is unlikely to act on a possible reason to combine or change the prior art.¹⁰² Such unexpected results rebut the *prima facie* case of obviousness.¹⁰³

But the lack of predictable results is not conclusive of the likelihood that the invention *would not have been made* by a skilled artisan. Scientists commonly perform experiments in technical areas where they know, and are comfortable with the fact, that the exact result is not predictable. Quantum theory, for example, is rooted in unpredictability and uncertainty,¹⁰⁴ yet it is used extensively within physics and mechanical engineering as well other areas of science and technology such as computer design and biology. Even though the results of such application may be unpredictable, the usage of quantum theory is extensive and not, by definition, nonobvious in every situation.¹⁰⁵ For these types of applications and industries, the combinations happen all the time, even though the exact results are not necessarily known.¹⁰⁶

Moreover, the use of Type II predictability to prove obviousness presents a very different situation than looking at unexpected results. Prior to *KSR*, unpredictable results were used to disprove a case of obviousness, and

101. See, e.g., *In re Margolis*, 785 F.2d 1029, 1031 (Fed. Cir. 1986); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) (considering whether the patentee established unexpected results to rebut a *prima facie* case of obviousness).

102. See *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1575-76 (Fed. Cir. 1984) (finding an unexpected result and concluding that the invention was nonobvious).

103. See *In re Giannelli*, 739 F.3d 1375, 1379 (Fed. Cir. 2014) (“When a *prima facie* case of obviousness is made, the burden then shifts to the applicant to come forward with evidence and/or argument supporting patentability.”); *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1380 (Fed. Cir. 1986) (“Objective evidence such as commercial success, failure of others, long-felt need, and unexpected results must be considered *before* a conclusion on obviousness is reached and is not merely ‘icing on the cake,’ as the district court stated at trial.”).

104. See HALLIDAY ET AL., *FUNDAMENTALS OF PHYSICS* (8th Ed. 2008); GERARD J. MILBURN, *SCHRODINGER’S MACHINES: THE QUANTUM TECHNOLOGY RESHAPING EVERYDAY LIFE* iv-viii, xv-xvi (1997) (“Today, we are surrounded by technology that owes its existence, directly or indirectly, to the application of quantum mechanical process”); *THE UNCERTAINTY PRINCIPLE AND FOUNDATIONS OF QUANTUM MECHANICS* (William C. Price & Seymour S. Chissick eds., 1977) (explaining the uncertainty principles and its now common application in physics); Philip Ball, *The Dawn of Quantum Biology*, 474 *NATURE* 272 (2011) (describing the quantum effects in living organisms and their impact on creating quantum technologies).

105. See *THE UNCERTAINTY PRINCIPLE AND FOUNDATIONS OF QUANTUM MECHANICS*, *supra* note 104.

106. *Id.*

they are still used for this purpose.¹⁰⁷ After *KSR*, however, predictable results can now be used to deny patentability.

This switch in using predictability of results to establish the *prima facie* obviousness case magnifies Type II predictability's inability to provide insight into the size of the gap. The predictability of an interaction between prior art elements tells patent law little about whether an invention would have been made without the inventor's insights. There are conceivably many inventions that have yet to be attempted, or even envisioned, that once conceived, will yield predictable results. Therefore, just because an invention's results are predictable does not mean that the invention's creation is also likely.

For example, Post-It Notes exemplify predictable results of an unlikely combination. Post-It Notes are a combination of two known elements in the prior art—a piece of paper and a semi-adhesive substance.¹⁰⁸ Once they are combined, the results are very predictable—a piece of paper that lightly sticks.¹⁰⁹ The ingenuity—the nonobviousness—of this invention is in coming up with the combination in the first place.¹¹⁰ The same could be said for something like liquid paper—a very predictably-behaving combination whose path to creation and use was highly unlikely.¹¹¹

This predictable results standard is different from synergy. *Anderson's-Black Rock* and *Sakraida* originally articulated the concept of “synergism” as two elements that, when combined, interacted in such a way to produce a result that neither element could produce on its own.¹¹² Put simply, synergy is when “the whole is greater than the sum of the parts.”¹¹³ Synergy speaks to the differences between the prior art and the invention not with regard to the path of development but the difference in results. Synergism is still a comparative standard—it measures a difference. A synergistic invention provides a result that is greater than the result from each piece of prior art

107. See, e.g., *Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 997 (Fed. Cir. 2009) (describing the unexpected results secondary consideration that can negate a *prima facie* case of obviousness).

108. See JOEL LEVY, *REALLY USEFUL: THE ORIGINS OF EVERYDAY THINGS* 142-43 (Anna Bennett ed., 2002) (describing the invention of Post-It Notes).

109. *Id.*

110. *Id.* at 6; see also JOHN JEWKES ET AL., *THE SOURCES OF INVENTION* (1969) 71 (“Inventions in one field have lain dormant until some ingenious inventor has seized the old idea, combined it with a notion gleaned from another apparently unrelated field and produced a new and fruitful combination.”).

111. See ETHLIE ANN VARE & GREG PTACEK, *PATENTLY FEMALE: FROM AZT TO TV DINNERS, STORIES OF WOMEN INVENTORS AND THEIR BREAKTHROUGH IDEAS* 13-15 (2002) (describing the invention of liquid paper—a correction fluid for covering typing mistakes that was made with tempera paint and a common kitchen blender).

112. See *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 281-92 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 60-63 (1969).

113. *Sakraida*, 425 U.S. at 281-92; *Anderson's-Black Rock*, 396 U.S. at 60-63.

acting by itself, and thus the “results” gap between the prior art and the invention is considered large enough to warrant patent protection.¹¹⁴

In contrast, the same is not true for Type II predictability because not all predictable results lack synergy and vice versa. For example, a simple chemical reaction can evidence a lot of synergy, but be incredibly predictable. The combination of baking soda and vinegar is commonly used to create the classic children’s erupting volcano science fair project.¹¹⁵ Combining these produces a synergy—a result that behaves very differently than the individual elements themselves. Only when combination is made does the bubbling and expansion take place. Yet this result is incredibly predictable, with children reproducing this reaction every school year.¹¹⁶

Unpredictable results are likewise not necessarily synergistic. The unpredicted result may be that there is no interaction, such as with a failed chemical reaction with each chemical simply staying, and thus behaving, the same after their combination.¹¹⁷ This result could be unpredictable to a skilled artisan who believes that a reaction would occur, even though the reaction lacks any synergy—no new result is produced.¹¹⁸

Therefore, Type II predictability encompasses a very different standard to determine nonobviousness than looking for reasons to change or combine or even synergy. The standard shifts from measuring the invention’s technological advance over the prior art—the width and/or likely crossing of the gap—to valuing the uncertainty of the final invention by itself.

B. Predictability in the USPTO and Courts after KSR

Thus, there are two types of predictability introduced by *KSR* that the USPTO and federal courts can use in determining nonobviousness. The question is whether they are using Type I predictability—the “predictable use” type—and simply making the reason to change or combine analysis more flexible, or whether they are actually using Type II predictability—the “predictable results” type—and substantively changing the nonobviousness standard. Examining nonobviousness determinations by both the USPTO and the courts helps quantify the impact of *KSR*’s predictability discussion and determine whether Type II predictability is actually being used.

Accordingly, this Part examines all levels of the patent adjudication system. The discussion starts with the USPTO, which makes an initial determi-

114. See Packin, *supra* note 68, at 960.

115. NEIL ARDLEY, 101 GREAT SCIENCE EXPERIMENTS 11 (Jenny Vaughan & Steve Setford eds., 2006) (detailing the “Make a volcano erupt” experiment’s combination of vinegar and sodium bicarbonate to make “red-hot lava”).

116. *Id.*

117. This was the case with the initial discovery of noble gases that are inert and do not react. See Edward Renouf, *Review: Lehrbuch der anorganischen Chemie by H. Erdmann*, 13 SCIENCE 268, 268-69 (1901).

118. This would definitely have been the case upon the first discovery of noble gases. *Id.*

nation as to whether a patent meets the nonobviousness requirement or not, and then considers the courts, which handle the enforcement of patents and make their own determinations regarding nonobviousness.¹¹⁹

Based on the USPTO's and federal courts' application of *KSR*, it appears that both types of predictability are being used in patent decisions. More relevantly, when Type II predictability is used, the analysis focuses on a substantially different measurement of patentability—the invention's result by itself and not the extent of the difference between the prior art and the invention as was traditionally the case before *KSR*.

1. USPTO's Usage of Predictability after *KSR*

At the USPTO, obviousness determinations are made both by patent examiners, who review patent applications for patent eligibility,¹²⁰ and administrative law judges on the Patent Trial and Appeal Board (“PTAB”), who review appeals of rejected patent applications and handle *ex parte* and *inter partes* reexamination proceedings.¹²¹

However, practical limitations make it difficult to observe individual examiner decisions made during patent prosecution. The sheer number and lack of efficient search mechanisms of these individual decisions, which come in the form of “office actions,” make investigations at this level infeasible, particularly in any systematic and extensive fashion.¹²²

The Manual of Patent Examining Procedure (“MPEP”) provides insight into how individual examiners, and the USPTO as a whole, interpret and use *KSR* and the concept of predictability. USPTO personnel draft the MPEP as a guide for patent examiners to USPTO procedure and examination.¹²³ Chapter 2100 of the MPEP explains the proper grounds for rejecting applications, including for obviousness.¹²⁴ And, while the MPEP does not legally bind

119. 28 U.S.C. § 1295(a)(4) (2012) (establishing the Federal Circuit's appellate jurisdiction over such cases).

120. 35 U.S.C. § 2(a)-(b) (2012).

121. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 313 (2011) (detailing the decisions the PTAB reviews).

122. *But see* Christopher A. Cotropia et al., *Do Applicant Patent Citations Matter?*, 42 RES. POL'Y 844, 844 (2013) (randomly sampling 1000 patent prosecution histories to determine the usage of applicant-submitted prior art by patent examiners).

However, a brief search of USPTO nonobviousness rejections immediately turned up a Type II predictability based rejection. *See, e.g., Office Action Summary*, U.S. Patent Application No. 11/228,647 at 8 (July 16, 2010), available at <http://portal.uspto.gov/pair/view/BrowsePdfServlet?objectId=GBMTJEI6PPOPY5&lang=DINO> (“It would have been a simple substitution of parts that would have been obvious to one o[sic] ordinary skill in the art as it would have provided the same predictable results.”).

123. *See* *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1425 (Fed. Cir. 1988) (quoting *Patlex Corp. v. Mossinghoff*, 758 F.2d 594, 605 (Fed. Cir. 1985) (“The MPEP states that it is a reference work on patent practices and procedures and does not have the force of law, but it has been held to describe procedures on which the public can rely.”)).

124. MPEP, *supra* note 13, § 2141.

examiner actions, patent examiner behavior should, and likely does, fall in line with its guidance.¹²⁵

Additionally, PTAB decisions control USPTO decisions and are thus another source in determining the Office's interpretation and usage of *KSR*.¹²⁶ These PTAB decisions likely have a broader impact on examining procedure than do individual examiner determinations. Some PTAB decisions are marked precedential and explicitly control examiner activity in all examinations.¹²⁷ The other, non-precedential decisions, while only controlling examiner action in that specific patent application, are still of higher profile than individual examiner actions. Thus, an examiner is likely to follow a nonprecedential decision outside of the context of the decision's specific patent claims and examiner action.

Both of these sources—the MPEP and PTAB decisions—demonstrate usage of both types of predictability. They are explored in detail below.

a. Manual of Patent Examining Procedure

The last version of the MPEP issued prior to *KSR*, the 8th Edition, Revision 5, made only two mentions of predictability in its discussion of 35 U.S.C. § 103.¹²⁸ Both of these discussions focused on the *lack* of predictability as an indicator of nonobviousness. Unpredictability as an indicator of nonobviousness is opposite from predictability as set forth in *KSR*, where predictability is an indicator of obviousness.

The first discussion of predictability in the pre-*KSR* version of the MPEP, Section 2143.02, discussed predictability in the context of “Reasonable Expectation of Success,” where the lack of predictability is a secondary consideration of nonobviousness.¹²⁹ Section 2143.02 instructed examiners that obviousness findings require a reasonable expectation of success.¹³⁰ Without “some degree of predictability” as to how the invention will operate, there cannot be a finding of obviousness.¹³¹ The discussion focused on cases involving various chemical and biological technologies where the interaction of the prior art is difficult to predict, and thus such interactions are nonobvious.¹³² As discussed above, this was the typical usage of predictabil-

125. Examination Guidelines Update: Development in the Obviousness Inquiry After *KSR v. Teleflex*, 75 Fed. Reg. 53,644 (Sept. 1, 2010).

126. Leahy-Smith America Invents Act, Pub. L. No. 112-29, sec. 7, § 6(b), 125 Stat. 313 (2011); Michael Fleming, *Board of Patent Appeals and Interferences Standard Operating Procedure 2 (Revision 7) Publication of Opinions and Binding Precedent*, USPTO (Mar. 23, 2008), <http://www.uspto.gov/web/offices/dcom/bpai/sop2.pdf>. Precedential PTAB decisions are available at <http://www.uspto.gov/ip/boards/bpai/decisions/prec/>.

127. Fleming, *supra* note 126.

128. MPEP, *supra* note 13, § 2143.

129. *Id.* § 2143.02.

130. *Id.*

131. *Id.*

132. *Id.*

ity prior to the *KSR* decision—as a secondary consideration proving nonobviousness.¹³³

Predictability was also discussed in the pre-*KSR* version of the MPEP in the context of “Obviousness of Species When Prior Art Teaches Genus,” in Section 2144.08.¹³⁴ In this section, just as with the previous section, predictability was used to negate a finding of obviousness. Examiners were instructed to use predictability in one particular situation—when the prior art discloses a genus and the invention is a species of that genus.¹³⁵ As MPEP § 2144.08 explained, “[i]f the technology is unpredictable, it is less likely that structurally similar species will render a claimed species obvious because it may not be reasonable to infer that they would share similar properties.”¹³⁶ Here, again, the MPEP’s use of predictability mirrors the secondary considerations’ unexpected results inquiry—as a rebuttal to determinations of obviousness.¹³⁷

In sharp contrast, after *KSR*, later editions of the MPEP—Revision 6, and all subsequent revisions¹³⁸—make heavy use of the concept of predictability as an indicator of obviousness—no longer limiting it to rebutting a *prima facie* case of obviousness.¹³⁹ In Section 2141, the MPEP now describes predictability in both of the ways the Supreme Court utilizes the concept—both as a reason to combine or change the prior art, Type I, and as an independent rationale for obviousness, Type II.

The MPEP instructs examiners that the predictability of the combination—the likelihood that the prior art would have been combined at the time of the invention—can be a rationale to support a finding of obviousness.¹⁴⁰ This is the Type I strain of predictability discussed in *KSR*. The MPEP recites two specific rationales that apply predictability in this way:

- (E) “Obvious to try”—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.¹⁴¹

Both of these reasons to combine the prior art consider, at least in part, whether a skilled artisan could have predicted the combination, not the re-

133. See *supra* notes 100-103.

134. MPEP, *supra* note 13, § 2144.08.

135. *Id.*

136. *Id.*

137. See *supra* notes 100-103.

138. The relevant sections remain the same in the latest revision of the MPEP.

139. MPEP, *supra* note 13, § 2141.

140. *Id.*

141. *Id.*

sult. Under “obvious to try,” the focus is on whether the resulting combination—the creation of the solution—is predictable.¹⁴² The second rationale has the same focus—whether the “variation[]”—the invention—is predictable in light of the prior art.¹⁴³ These rationales focus on how large the gap is between the prior art and the invention. In turn, these rationales ask how likely and how easily an inventor would cross the gap. These predictability rationales fall within the Court’s request to make the nonobviousness determination process flexible by considering all evidence that goes towards measuring the gap.¹⁴⁴

In the same section, the MPEP also instructs examiners to use predictability in the other way discussed in *KSR*—predictability as to results, or Type II predictability. Three of the rationales for obviousness ask the examiner to evaluate whether the invention produces predictable results, not whether the invention’s creation itself was predictable.¹⁴⁵ These rationales are:

- (A) Combining prior art elements according to known methods to yield predictable results;
- (B) Simple substitution of one known element for another to obtain predictable results.
- . . .
- (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results.¹⁴⁶

As explained by the MPEP, there needs to be no finding that a skilled artisan *would* have combined the prior art in the same way as the invention.¹⁴⁷ Instead, there simply needs to be a finding that they *could* have made the combination and that its results would have been predictable.¹⁴⁸ This line of analysis—focusing on the predictability of the invention’s results, not of the prior art’s combination—accords with *KSR*’s Type II predictability analysis.¹⁴⁹ This discussion also highlights the substantive shift Type II predictability introduces—a shift away from focusing on the technological

142. See, e.g., *Wm. Wrigley Jr. Co. v. Cadbury Adams USA L.L.C.*, 683 F.3d 1356, 1364-65 (Fed. Cir. 2012) (quoting *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)) (“Under these circumstances, it is fair to say that there were ‘a finite number of identified, predictable solutions’ to the problem of finding physiological cooling agents for chewing gum This case is thus one in which a person of ordinary skill in the art would find it ‘obvious to try’ the combination recited in claim 34.”).

143. See MPEP, *supra* note 13, § 2141.

144. See *supra* Part II.A.1.

145. See MPEP, *supra* note 13, § 2141.

146. *Id.*

147. *Id.*

148. *Id.* § 2143.

149. See *supra* Part II.A.2.

advancement from the prior art to the invention to the behavior of the invention itself.¹⁵⁰

b. Patent Trial and Appeals Board

Similar to the changes in the MPEP, the PTAB has also changed its use of predictability in nonobviousness decisions after *KSR*.

Prior to *KSR*, the PTAB did not commonly use predictability terminology in its nonobviousness decisions. I searched PTAB decisions to determine the frequency of use of the term “predictable” (and its variations) in nonobviousness decisions.¹⁵¹ Prior to *KSR*,¹⁵² 110 of the 8183 nonobviousness decisions used the phrase “predictable” or some variation thereof.¹⁵³ Fifty-two of these used the phrase “predictable results” or some derivation. And, during the pre-*KSR* period, there were no precedential decisions that focused on using predictability in determining nonobviousness.

In comparison, after *KSR*, the PTAB’s use of the predictability terminology is quite common. As of August 27, 2012, 6455 of 31,414 nonobviousness decisions invoked the term.¹⁵⁴ More than three fourths, 4954 cases, used the phrase “predictable results” or some derivation. This is a change from 1.3% to 20.5% of the nonobviousness determinations that invoked the term “predictability” and a change from 0.6% to 15.8% in use of the phrase “predictable results.” These are statistically significant differences and provide further evidence that the USPTO views *KSR* as interjecting a new predictability standard into the nonobviousness analysis—specifically Type II predictability.¹⁵⁵

This change is confirmed when looking at some of the post-*KSR* PTAB opinions in depth, which is done in detail below. The post-*KSR* PTAB opinions use both types of predictability presented in *KSR*.

Many PTAB opinions use Type I predictability—predictability as evidence of a reason to combine or change. As one recent example, in *Ex Parte*

150. See MPEP, *supra* note 13, § 2141 (showing that the focus is on the results, not the act of combining).

151. The Westlaw database FIP-PTO was searched. This database, whose full name is Federal Intellectual Property – Patent & Trademark Office Decisions, begins its coverage in January of 1987. The database is therefore not complete, but does include administrative decision prepared by the PTAB. Again, this is of the universe of PTAB decisions available on Westlaw.

152. The specific search was from 1987, the beginning of the FIP-PTO database, to the date of the *KSR* decision—an over twenty year period.

153. Again, this finding derives from the universe of PTAB decisions available on Westlaw. The variations found included phrases such as “predictable result” or “predictable outcome.”

154. The larger differential in the number of PTAB nonobviousness decisions over this five year period as compared to the pre-*KSR*, twenty year period is likely due to the recent exponential increase in pending patent applications and rate of appeal to the PTAB.

155. This difference is statistically significant, with a p-value < .0001.

Tzong In Yeh,¹⁵⁶ the PTAB reviewed the obviousness of a “slider”—“a device suitable for sliding on various surfaces such as a bodyboard, a snowboard, a snow sled, a grass sliding board, sand sliding board, or the like.”¹⁵⁷ The patent claimed a slider where the top layer is “entirely heat laminated” to the top of a “foam core.”¹⁵⁸ The invention also required that the top surface of the slider have a “plurality of concaves forming depressions.”¹⁵⁹

The PTAB focused on whether the invention was a “predictable variation” of the prior art.¹⁶⁰ Relying on *KSR* to establish the legal standard, the PTAB inquired whether the top layer’s construction “would not have been merely a predictable variation, especially considering [the prior art’s] numerous teachings as to the desirability of covering the surfaces of the board as to prevent water absorption. . . .”¹⁶¹ This analysis focused on the predictability of the invention’s changes to the prior art from the perspective of a skilled artisan. That is, the PTAB inquired as to extent of the gap and likelihood a skilled artisan would have crossed it and made the invention given what she knew from the prior art.

Additionally, the PTAB has also used predictable results—Type II predictability—as evidence of obviousness. Such was the case in one of the PTAB’s precedential decisions after *KSR*, *Ex Parte Smith*.¹⁶² In *Smith*, the PTAB focused on the predictability of the invention’s operation—its results. The PTAB examined the nonobviousness of “a pocket insert for a bound book, which includes at least one pocket adapted to receive and retain supplemental material that cannot easily be bound directly to the book binding, such as a diskette or CD-ROM.”¹⁶³ The PTAB considered whether it was obvious to improve a pocket insert by creating two pockets from a single pocket by using an additional line of adhesive.¹⁶⁴

While finding some reasons to combine, the Board went out of its way to note that:

Appellant’s claims [] were combinations which only unite old elements with no change in their respective functions and which yield predictable results. Thus, the claimed subject matter likely would have been obvious under *KSR*. In addition, neither Appellant’s Specification nor Appellant’s arguments present any evidence that

156. *Ex Parte Tzong in Yeh* Appellant, No. 2010-009006, 2010 WL 5132689 (B.P.A.I. Dec. 14, 2010).

157. *Id.* at *1.

158. *Id.*

159. *Id.* at *2.

160. *Id.* at *10.

161. *Id.*

162. 83 U.S.P.Q. 2d 1509 (B.P.A.I. 2007) (precedential).

163. *Id.* at 1510-11.

164. *Id.* at 1513-14.

the modifications necessary to effect the combination are uniquely challenging or difficult for one of ordinary skill in the art. Because this is a case where the improvement is no more than “the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement,” *KSR*, 127 S.Ct. at 1740, 82 USPQ2d at 1396, no further analysis was required by the Examiner.¹⁶⁵

Under this analysis, the focus was not on whether there was any likelihood that a skilled artisan would have come up with the combination. Instead, the analysis focuses on whether, once given the idea to make the combination, a skilled artisan could actually have constructed it and predicted what it would have done. Thus, *Smith* relies on Type II predictability in finding the invention obvious.¹⁶⁶

2. Federal Courts’ Use of Predictability After *KSR*

Federal courts also make nonobviousness determinations, which typically occur in two situations: patent infringement litigation, where the patentee is accusing someone of practicing the claimed invention, or appeals from the USPTO, where a patent applicant, or third party, is challenging the USPTO’s determination as to nonobviousness.¹⁶⁷

Accordingly, this Part examines decisions by both the Federal Circuit and district courts to determine how they apply the predictability discussion in *KSR*. Notably, both courts apply the two types of predictability to decide nonobviousness. And, most apparent at the district court level, there is disagreement as to whether Type II predictability is a viable standard for determining nonobviousness. District courts also explicitly discuss how Type II predictability changes the fundamentals of the nonobviousness standard.

a. Federal Circuit

The Federal Circuit employs both types of predictability in its nonobviousness opinions after *KSR*. Most notably, the court has used Type II predictability to invalidate a patent.

i. Type I Cases

The Federal Circuit relied on Type I predictability in its recent nonobviousness decisions. Unsurprisingly, Type I predictability continues to play a significant role in Federal Circuit nonobviousness decision-making. Below is sampling of such decisions.

165. *Id.* at 1518.

166. *Id.* at 1518-19.

167. 35 U.S.C. § 282 (2012).

The Federal Circuit's decision in *Wyers v. Master Lock Co.* provides a good example of Type I predictability.¹⁶⁸ The patent at issue in *Wyers* covered a trailer hitch pin used to secure the trailer to the car's hitch.¹⁶⁹ The patent claimed a hitch pin with a lock on one end, to prevent theft, and removable sleeves, to make the pin fit different hitches, making the pin adaptable.¹⁷⁰ The prior art disclosed lockable hitch pins and also disclosed the use of sleeves to better connect trailers to hitches, but did not disclose both in the same piece of prior art.¹⁷¹

Citing *KSR*, the Federal Circuit concluded "that the invention [] represents no more than 'the predictable use of prior art elements according to their established functions,'" and found the invention obvious.¹⁷² This Type I predictability inquiry asked whether a skilled artisan would have expected to solve the known problem of needing an adaptable hitch pin that was also lockable by combining the prior art.¹⁷³ The court concluded such a reasonable expectation existed that, when added to the common sense of the skilled artisan, rendered the combination predictable and, therefore, obvious.¹⁷⁴

A similar Type I analysis occurred in *Ball Aerosol & Specialty Container, Inc. v. Ltd. Brands* as part of the court's analysis on the motivation to combine.¹⁷⁵ In *Ball Aerosol*, the patent claimed a candle tin where the removable cover also acted as a base to the candle that, by having raised feet, prevented the candle from scorching the surface it was sitting on.¹⁷⁶ The prior art knew of this problem and disclosed candleholders that had feet.¹⁷⁷ The prior art also disclosed removable covers that could be used as bases, although these covers did not have feet.¹⁷⁸ These two types of art had never been combined before the invention.

The court concluded that combining these two was a "predictable variation" of the prior art and thus obvious.¹⁷⁹ Just as in *Wyeth*, the court relied on the Type I predictability set forth in *KSR*.¹⁸⁰ It was well known in the prior art that feet helped prevent scorching and using a candle's cover as bases was also prevalent.¹⁸¹ Combining these two was a predictable step for a skilled artisan. Put another way, the variation was something a skilled artisan

168. *Wyers v. Master Lock Co.*, 616 F.3d 1231 (Fed. Cir. 2010).

169. *Id.* at 1233-34.

170. *Id.* at 1234-36.

171. *Id.* at 1237-38.

172. *Id.* at 1245.

173. *Id.*

174. *Id.* at 1245-47.

175. *Ball Aerosol & Specialty Container, Inc. v. Limited Brands, Inc.*, 555 F.3d 984 (Fed. Cir. 2009).

176. *Id.* at 987-88.

177. *Id.* at 988.

178. *Id.*

179. *Id.* at 992-93.

180. *Id.*

181. *Id.*

was likely to try and thus obvious.¹⁸² Accordingly, “the combination would have been entirely predictable and grounded in common sense.”¹⁸³

ii. Type II Cases

Importantly, the Federal Circuit has also invoked Type II predictability in its decisions. In at least one case, *Ecolab, Inc. v. FMC Corp.*, Type II predictability was one of multiple rationales supporting a finding of obviousness in a single case.¹⁸⁴ The patent in *Ecolab* claimed a combination of antibacterial chemicals in a single sanitizer for beef and poultry processing.¹⁸⁵ One of the claims at issue required application of this sanitizer to take place under a specific spray pressure.¹⁸⁶ The prior art disclosed “rapidly spraying” the same chemical combination on beef and poultry, but did not discuss at what pressure.¹⁸⁷ Other prior art that did not disclose the same antibacterial solution did disclose spraying at a pressure range including the patentee’s claimed pressure.¹⁸⁸

The Federal Circuit found the invention obvious because there were both reasons to combine these two pieces of prior art and evidence of the combination’s predictable results.¹⁸⁹ There were reasons for a skilled artisan to try the specific spray pressure method with other antibacterial combinations, including the one claimed in the patent at issue,¹⁹⁰ and a skilled artisan would have known to make the patented combination.¹⁹¹ However, the court pointed out that the combination would “yield predictable results,” and this further supported a conclusion of obviousness.¹⁹² Thus, Type II predictability played a role, but not the sole role, in rendering the claims obvious.¹⁹³

182. *Id.* at 991-92 (noting the Supreme Court’s statement in *KSR* recognition of an “obvious to try” analysis).

183. *Id.* at 993.

184. *Ecolab, Inc. v. FMC Corp.*, 569 F.3d 1335 (Fed. Cir. 2009).

185. *Id.* at 1340-41.

186. *Id.* at 1349.

187. *Id.* at 1349-50.

188. *Id.* at 1348-49.

189. *Id.* at 1350.

190. *Id.* at 1349-50.

191. *Id.*

192. *Id.*

193. *Id.* This usage of both Type I and Type II predictability, together, to prove obviousness also occurred in *In re ICON Health & Fitness, Inc.*, where the court used evidence of predictable results to rebut an argument that a certain prior art taught a skilled artisan away from combining the prior art. *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1381 (Fed. Cir. 2007) (“As Icon recognizes, Teague instructs that single-action springs provide exactly that result. Indeed, ‘[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.’ [KSR Int’l Inc. v. Teleflex Inc., 127 S.Ct. 1727, 1739]. Accordingly, Teague does not teach away from using single-action springs in Icon’s invention.”). Predictable results provided a reason for a skilled artisan to combine the prior art, not be discouraged from combining it. *Id.* at 1381-82. And in *In re Schwemberger*, in addition to relying on evidence of “predictable use,” the court empha-

More significantly, the Federal Circuit has relied solely on Type II predictability to hold an invention obvious. The court's decision in *Agrizap, Inc. v. Woodstream Corp.* is such a case.¹⁹⁴ *Agrizap* involved a patent claiming a pest control device that uses the pest's contact with a resistive switch to complete an electric circuit and trigger a high voltage shock to "send the pest towards its demise."¹⁹⁵ The prior art was the "Gopher Zapper" that used a mechanical pressure-switch that, when physically pressed by a gopher, would complete the circuit and generate an electrical charge.¹⁹⁶ The difference between the prior art and the invention was "the type of switch used to complete the circuit that triggers the generator."¹⁹⁷ Other prior art such as a cattle prod—although not a pest control device—used an animal's body as a resistive switch to complete a circuit for the generation of an electric charge.¹⁹⁸

The *Agrizap* court viewed these facts as "a textbook case of when the asserted claims involve a combination of familiar elements according to known methods that does no more than yield predictable results."¹⁹⁹ The court quoted *KSR's* recitation of "predictable results" as a basis for obviousness²⁰⁰ and concluded that combining the Gopher Zapper and a cattle prod would create a product that would perform like the invention, and this performance is predictable.²⁰¹

The Federal Circuit has also relied on Type II predictability to affirm USPTO rejections of patent applications as obvious.²⁰² In *In re Clark*, the court concluded that an application covering the transmitting of therapeutic electromagnetic signals to an area of the human body was obvious, because "[i]n total, the evidence shows that equipping the LISTEN system disclosed in the LISTEN manual with an FM transmitter in 1998 involved the combination of familiar elements according to known methods and would yield predictable results."²⁰³ A similar reliance on Type II predictability occurred in *In re Lackey*, with the court concluding that "[i]n this case, the claimed invention may be obtained merely by making Ericson's valve out of either

sized that combining two of the prior art surgical instruments "is no more than 'the combination of familiar elements according to known methods . . . [with] predictable results.' . . . Therefore, the Board correctly determined that claim 9 is obvious over the combination of [the prior art]." *In re Schwemberger*, 410 Fed. Appx. 298, 303-04 (Fed. Cir. 2010).

194. *Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337 (Fed. Cir. 2008).

195. *Id.* at 1339-40.

196. *Id.* at 1343-44.

197. *Id.* at 1344.

198. *Id.*

199. *Id.*

200. *Id.* at 1343-44.

201. *Id.*

202. Perhaps with the underlying USPTO decisions driven by the MPEP's heavy reliance on Type II predictability as a sole basis for obviousness, the Federal Circuit in turn simply relied on this rationale as well when deciding these appeals from these examiner decisions.

203. *In re Clark*, 420 Fed. Appx. 994, 999 (Fed. Cir. 2011).

copper, black steel or cast iron as taught by Kohn. This is simply the substitution of one known material for a generic metal to obtain predictable results.”²⁰⁴

Thus, the Federal Circuit has clearly used both types of predictability in its decisions after *KSR*. And, in cases such as *Agrizap*, *In re Clark* and *In re Lackey*, the court appears willing to rely solely on Type II predictability to hold a claim obvious.

b. District Courts

Just like the Federal Circuit, district courts have used both types of predictability. Some district courts have even explicitly distinguished between the two types of predictability *KSR* introduced into the nonobviousness analysis. Some of these district courts have subsequently rejected using Type II predictability, because it deviates from the fundamental underpinnings of nonobviousness doctrine.²⁰⁵

i. Type I Cases

District courts after *KSR* have used Type I predictability—determining whether the inventor’s *use* of prior art elements was predictable. The decision by then-district court judge (now Federal Circuit judge) O’Malley in *Oatey Co. v. IPS Corp.* is a good example of such usage.²⁰⁶ *Oatey* involved a patent on a washing machine’s outlet box that included a common “tailpiece,” which connected the washer’s expelled water to the home’s drainage system, combined with two drain ports.²⁰⁷ The alleged infringer asserted that the patent was obvious in light of prior art that placed the drain ports side-by-side and prior art that used a funnel-shaped common tailpiece to combine multiple wastewater streams.²⁰⁸

In analyzing this claim, the district court first articulated the standard for nonobviousness, stating that, based on *KSR*, “a designer is not entitled to patent protection for solving an apparent problem by virtue of an apparent solution to achieve a predictable result.”²⁰⁹ The court concluded that “[t]he Supreme Court thus instructed courts to ‘ask whether the improvement is more than the predictable use of prior art elements according to their established functions[.]’”²¹⁰ The court noted that “[a]lthough the court quoted the

204. *In re Lackey*, 371 Fed. Appx. 80, 82 (Fed. Cir. 2010).

205. *See, e.g.*, *Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 526 F. Supp. 2d 162, 170 (D. Mass. 2007), *aff’d in part, rev’d in part, and remanded on other grounds*, 567 F.3d 1314 (Fed. Cir. 2009) (rejecting a jury instruction based on predictability of results as a sole basis for a finding of obviousness).

206. *Oatey Co. v. IPS Corp.*, 665 F. Supp. 2d 830 (N.D. Ohio 2009).

207. *Id.* at 836-38.

208. *Id.* at 865.

209. *Id.* at 843.

210. *Id.* at 843-44.

phrase ‘predictable results,’” the phrase “was [used] in the context of the ultimate question of whether a skilled artisan would find the inventor’s solution itself “predictable.”²¹¹ Thus, it appears the court’s view of “results” is the modification and combination of the prior art, not the operation of the ultimate invention.

One district court went a step further: not only did it adopt Type I predictability, the court explicitly rejected Type II predictability. In *Hynix Semiconductor, Inc. v. Rambus Inc.*, the district court rejected Type II predictability as the sole basis for an obviousness finding.²¹² In *Hynix*, the alleged infringer “argue[d] that *KSR* requires the court to instruct the jury that a ‘combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.’”²¹³ The district court refused to issue this instruction, concluding that, at best, this statement by the *KSR* Court simply reinstated the synergy line of cases—that “easily-made combination of familiar elements must generate some synergy to be non-obvious.”²¹⁴ In the district court’s eyes, the only change from *KSR* was the rejection of a rigid approach to determining whether there is a reason to combine. The court concluded that *KSR* did not introduce a new, Type II predictability standard for determining nonobviousness.²¹⁵

Another lower court decision, in *Depuy Spine v. Medtronic Sofamor Danek, Inc.*, noted that Type I predictability is the main focus of the nonobviousness analysis.²¹⁶ In *Depuy Spine*, the alleged infringer specifically argued that, under *KSR*, “predictability of success is the sole criterion of the obviousness inquiry and that it is irrelevant whether a person would be motivated to make the proposed combination in the first place.”²¹⁷ The defendant cited the Court’s discussion in *KSR* of *Adams* and *Sakraida* to support this conclusion.²¹⁸ The district court rejected this notion that predictable results, by themselves, can render a patent claim obvious.²¹⁹ Instead, the court concluded that Type II predictability could be a factor, but, under *KSR*, “identifying the reason for combining prior art references in the first place remains ‘important.’”²²⁰ To put this statement in the context of nonobviousness the-

211. *Id.*

212. *Hynix Semiconductor, Inc. v. Rambus Inc.*, No. C-00-20905 RMW, 2009 WL 112834 (N.D. Cal. Jan. 16, 2009).

213. *Id.* at *17 (quoting *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739).

214. *Id.*

215. *Id.*

216. *Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 526 F. Supp. 2d 162, 170 (D. Mass. 2007), *aff’d in part, rev’d in part, and remanded on other grounds*, 567 F.3d 1314 (Fed. Cir. 2009).

217. *Id.*

218. *Id.* at 170-71.

219. *Id.* at 171.

220. *Id.*

ory—the court concluded that measuring the gap is the main focus of the nonobviousness analysis, not measuring the results of the invention by themselves.

ii. Type II Cases

In sharp contrast to these cases, other district courts have, in relying on language in *KSR*, affirmatively adopted Type II predictability as a nonobviousness test.

In *Board of Trustees Leland Stanford Jr. Univ. v. Roche Molecular Sys., Inc.*, the district court cited with approval the USPTO's MPEP rationales for finding obviousness under *KSR*, including those that rely solely on predictable results to establish obviousness.²²¹

The district court in *Church & Dwight Co. v. Abbott Labs.* went a step further and instructed the jury on Type II predictability.²²² The court told the jury that “[i]f the claimed invention combined elements known in the prior art and the combination yielded results that were predictable to a person of ordinary skill in the art at the time of the invention, then this evidence would make it more likely that the claim was obvious.”²²³ These courts come to the opposite conclusion of *Depuy* and *Hynix*, finding that Type II predictability can prove that an invention is obvious.

Moreover, district courts have even invalidated patents based on mere evidence of Type II predictability. In *Se-Kure Controls, Inc. v. Diam USA, Inc.*²²⁴ the patent-in-suit claimed a sensor for an alarm system where the sensor cord, attached to the valuable item being monitored, was retractable.²²⁵ The invention allowed the user of the item to move the item into a comfortable position while the sensor was still attached.²²⁶ Two pieces of prior art were at issue: an alarm system with a fixed-length sensor cord,²²⁷ and a retractable telephone cord device.²²⁸

The court in *Se-Kure* concluded that the invention was obvious because, when the prior art was combined, the result was predictable.²²⁹ The court noted that “[t]elling, plaintiff does not contest the fact that the additional of a retractable telephone cord device . . . to the [fixed-length alarm system] would have produced a predictable result. Ultimately, ‘[t]he combination of

221. Bd. of Trustees of Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 563 F. Supp. 2d 1016, 1037-38 (N.D. Cal. 2008), *vacated and remanded on other grounds by* 583 F.3d 832 (Fed. Cir. 2009).

222. Church & Dwight Co., Inc. v. Abbott Labs., No. 05-2142 (GEB)(JJH), 2008 WL 2566193 (D.N.J. June 24, 2008).

223. *Id.* at *7.

224. 662 F. Supp. 2d 1006 (N.D. Ill. 2009).

225. *Id.* at 1009.

226. *Id.*

227. *Id.* at 1013-14.

228. *Id.*

229. *Id.* at 1016-17.

familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.’”²³⁰ “[T]he ultimate result” of combining the prior art “was expected and predictable.”²³¹ Notably, this analysis does not focus on the likelihood the two pieces of prior art would be combined, but on whether their combination would work in a manner that was expected by skilled artisan. This is the Type II predictability analysis introduced by *KSR*—predictability of results.

A similar nonobviousness analysis focused on Type II predictability occurred in *Seirus Innovative Accessories, Inc. v. Balboa Mfg. Co.*²³² The patent at issue claimed a mask that could be worn on a person’s mouth and nose with a scarf portion attached that would be worn around the person’s neck.²³³ This invention could keep the person’s face warm from the nose down, while allowing that person to also wear goggles or other eye protection, and a hat.²³⁴ The prior art included numerous pieces of head gear, none exactly like the invention, but each disclosing at least an aspect of the invention—as examples, either a scarf for the neck, or a full ski mask covering the nose and mouth.²³⁵ The issue was whether the invention was obvious in light of each of its individual elements being disclosed in the prior art.²³⁶

The *Seirus* court concluded that the invention was obvious because the individual elements of the mask were well known and the results of their combination were predictable.²³⁷ As the court noted, “[t]he record shows that combining the various elements using known methods, as shown in the prior art, would yield predictable results for cold weather head gear.”²³⁸ Relying heavily on *KSR*, the court simply inquired whether the individual elements were well known and whether their combination would “produce[] predictable results.”²³⁹ Since there was no triable issue of fact on these two issues, the patent was obvious.²⁴⁰ There was little additional inquiry as to whether there would be any reason for a skilled artisan to make such a combination.²⁴¹ Like the *Se-Kure* court, bridging the gap between the prior art and the invention was not the focus of the inquiry. Instead, the inquiry focused on the result of combining the individual elements of the invention together and whether this result was predictable.

230. *Id.* at 1016-17.

231. *Id.* at 1017.

232. *Seirus Innovative Accessories, Inc. v. Balboa Mfg. Co.*, No. 09-CV-2274, 2012 WL 423760 (S.D. Cal. Feb. 3, 2012).

233. *Id.* at *1.

234. *Id.*

235. *Id.* at *4-5.

236. *Id.* at *5.

237. *Id.* at *6.

238. *Id.* at *5.

239. *Id.* at *6.

240. *Id.*

241. *Id.* at *6-7.

Thus, district courts disagree as to whether Type II predictability alone can form the basis of an obviousness conclusion after *KSR*. In contrast to the Federal Circuit, district courts clearly recognize the two kinds of predictability introduced in *KSR*. The dispute among the district courts is then whether there truly is a distinct, Type II predictability test for nonobviousness. Some district courts see Type II predictability as just another articulation of Type I predictability—predictability as to use of the prior art, and thus a reason to combine or change the prior art. Others view Type II predictability as similar to synergy and thus not focused on predictability as much as a new or greater result from a given combination. And, finally, some district courts recognize Type II predictability as its own, independent nonobviousness test—allowing the predictable operation of the invention alone to form the basis for an invention’s invalidity.²⁴²

III. IMPLICATIONS OF USING TYPE II PREDICTABILITY AS A NONOBVIOUSNESS STANDARD

The USPTO and some federal courts, including the Federal Circuit, clearly use Type II predictability in determining nonobviousness after *KSR*. Notably, this type of predictability has even formed the sole basis for rendering an invention obvious on more than one occasion after *KSR*.²⁴³

What makes this usage of Type II predictability so significant is that the standard introduces a new, and very different, substantive approach to non-obviousness.²⁴⁴ Whether the results of a combination or change to the prior

242. These courts using Type II predictability could have come to the same conclusion under Type I predictability. However, as explained in more detail *infra*, Type II predictability favors the patentability of some technologies over others, *see infra* Part III.C, and also runs counter to basic patent policy, *see infra* Part III.D.

243. *See supra* notes 194-220, 224-41 (collecting such cases).

244. Interestingly, most commentators have focused on other parts of *KSR*, not its introduction of Type II predictability. *See, e.g.*, Timothy J. Le Duc, *Apples are Not Common Sense in View of Oranges: Time to Reform KSR’s Illusory Obviousness Standard?*, 21 DEPAUL J. ART, TECH. & INTELL. PROP. L. 49 (2010) (critiquing *KSR*’s flexible standard for obviousness); Timothy J. Le Duc, *The Role of Market Incentives in KSR’s Obviousness Inquiry*, 11 WAKE FOREST J. BUS. & INTELL. PROP. L. 33 (2010) (discussing *KSR*’s market and design forces rationale under the flexible nonobviousness approach); Gregory N. Mandel, *Another Missed Opportunity: The Supreme Court’s Failure to Define Nonobviousness or Combat Hindsight Bias in KSR v. Teleflex*, 12 LEWIS & CLARK L. REV. 323, 324 (2008) (concluding that *KSR* “still [did] not define[] what the standard actually requires”); Joseph Scott Miller, *Remixing Obviousness*, 16 TEX. INTELL. PROP. L.J. 237 (2008) (explaining how *KSR* brings the skilled artisan to the forefront in the nonobviousness analysis).

Commentators have discussed the number of analytical tools available when applying the fourth step under *Graham* and whether this has substantively changed the nonobviousness standard. *See, e.g.*, Durie & Lemley, *supra* note 4, at 991-92 (arguing that nonobviousness after *KSR* “should be reconceived as a truly realistic inquiry, one that focuses on what the PHOSITA and the marketplace actually know and believe, not what they might believe in a hypothetical, counterfactual world”); Fromer, *supra* note 4, at 77 (suggesting that the Court’s approach in *KSR* should focus on “the correct object to be analyzed for obviousness . . . the

art are predictable focuses not on whether there was a reason to make the change to the prior art in the first place. Nor does Type II predictability care whether the change has synergy by producing something that is greater than the original, prior art parts. Instead, when asking whether the results of an invention are predictable, the USPTO and courts assume the combination or change as given and then turn to whether the invention works as a skilled artisan would think it would work. This approach shifts the substantive question from the difference between the prior art and the invention—the gap—to an inquiry solely focused on the invention and how it operates.

As a nonobviousness test, Type II predictability not only substantively changes the law, it also introduces a number of disadvantages into the patent system. First, the change violates the plain language of Section 103 and the statutorily-mandated focus on the difference between the prior art and the invention instead of the result itself. Second, the change also increases the likelihood of hindsight bias because the perspective of the skilled artisan is changed from being prospective to being retrospective. This in turn increases the likelihood of errors in nonobviousness determinations. Third, Type II predictability also biases patent protection against simple and predictable technologies and can result in unwarranted protection of unpredictable technologies. All of these disadvantages create a nonobviousness standard that is contrary to patent theory, because this standard focuses on the technological accomplishments of the result, not the risks of journeying down a development path that an ordinary skilled artisan would not have taken.

A. Type II Predictability Violates Section 103's Statutory Requirements

Section 103 of the Patent Act sets forth the conditions for finding an invention obvious.²⁴⁵ The statute requires a finding of obviousness “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the

union of two different aspects of invention important to patent law: (1) the concept of the invention; and (2) the reduction to practice of a working model”); Tun-Jen Chiang, *A Cost-Benefit Approach to Patent Obviousness*, 82 ST. JOHN'S L. REV. 39 (2008) (articulating a cost-benefit approach allows patentability to be an objective, empirical question).

Some have gone further to determine whether *KSR*'s introduction of flexibility has heightening or lowering the nonobviousness standard. See, e.g., Lunney, Jr. & Johnson, *supra* note 4 (finding that *KSR* has not restored the strength of the nonobviousness requirement to “its former self” before the creation of the Federal Circuit); Michelle Friedman Murray, *Non-obviousness Standards for Hardware and Software Before and After KSR: What is the Difference?*, 93 J. PAT. & TRADEMARK OFF. SOC'Y 259 (2011) (examining a handful of Federal Circuit cases and concluding that *KSR* raised the skill of the art in the software arts to the same level as in hardware).

245. 35 U.S.C. § 103 (2012). The AIA changed the definition of prior art, with the relevant timeframe being prior to filing instead of prior to invention, but the operative statutory test for nonobviousness stays the same.

time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.”²⁴⁶

The statute thus focuses the inquiry on the “differences” between the invention and the prior art.²⁴⁷ The statute requires that the determination of whether this difference is obvious be made through the eyes of a “person having ordinary skill in the art” “at the time of the invention.”²⁴⁸

These plain language requirements of Section 103 are reiterated in the first Supreme Court opinion to interpret the statute—*Graham*. The *Graham* Court noted that the “first sentence of this section,” Section 103, “place[s] emphasis on the pertinent ar[t] [sic] existing at the time the invention was made and both are implicitly tied to advances in that art.”²⁴⁹ The statute focuses on the perspective at the time of the invention’s creation and looks at the distance, the amount of change, to travel from the prior art to the invention.²⁵⁰ The Court explained that Section 103 sets the “emphasis on non-obviousness [as] one of inquiry, not quality.”²⁵¹ This discussion dismissed any thought that nonobviousness focuses on testing the quality of the invention—the result of changes to the prior art—by itself. Instead, per this discussion, the nonobviousness analysis should be an inquiry into the distance crossed to get there.²⁵²

In *Graham*, the Court articulated the factors that further emphasize measuring this difference to determine an invention’s nonobviousness, based on the Court’s interpretation of the then newly-minted Section 103.²⁵³ These factors focus on first defining the gap, then defining the individual through whom the gap is judged, and, finally determining, “[a]gainst this background, the obviousness or nonobviousness of the subject matter is determined.”²⁵⁴ The factors reinforce Section 103’s focus—on the gap between the prior art and the invention and the ease and likelihood, or lack thereof, by which a skilled artisan could have crossed this gap at the time the invention was created.²⁵⁵

Accordingly, a Type II predictability standard that looks at predictable results violates that plain language of Section 103 and the Supreme Court’s interpretation of the statute in *Graham*. Asking whether an invention pro-

246. *Id.*

247. *See supra* Part I.A.

248. 35 U.S.C. § 103 (2012). That is, obviousness is determined from the perspective of a skilled artisan standing at the beginning of the gap—at the time of the invention. *See Cotropia, supra* note 36, at 24-25.

249. *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966).

250. *Id.*

251. *Id.*

252. *See Cotropia, supra* note 36, at 27-29 (explaining how *Graham* establishes a “gap measuring” test for nonobviousness).

253. *Graham*, 383 U.S. at 17.

254. *Id.*

255. *See Cotropia, supra* note 36, at 27-29

vides predictable results ignores any differences between the prior art and the invention. Instead, predictability of the results looks at the invention itself.²⁵⁶ Type II predictability also shifts the perspective of the nonobviousness test away from a forward-looking inquiry into the differences present at the time of the invention to a retrospective one, by taking the invention as a given and then asking about properties of the invention's components and how they operate together.²⁵⁷ Both of these aspects of Type II predictability—focusing on the invention itself, not the gap, and the retrospective perspective²⁵⁸—run counter to the plain language of Section 103.

One could argue that the predictability of an invention's results provides some insight into the likelihood the combination would happen in the first place. As the Federal Circuit in *DePuy Spine* explained, predictability of both the use of the prior art as well as the results once combined can speak to the invention's obviousness.²⁵⁹ Predictable results could have second-order implications as to the extent of the difference, on which Section 103 focuses.

There is no real linkage between Type II predictability and Section 103's gap, however. Predictability of the operability of an invention's individual elements has no real bearing on whether they will ever be put together in the first place. Skilled artisans are sometimes motivated to combine elements when their predictive interactions are unknown or, at the very least, unpredictable.²⁶⁰ This happens routinely in a variety of technologies.²⁶¹ And skilled artisans are also known to not attempt to put two elements together even though they would know what the result would be.²⁶² This situation—where the inventor actions are needed to create the invention in the first instance, even though the results produced by the invention are predictable—is also commonplace in a variety of technologies.²⁶³ Accordingly, although there could be a second-order linkage, other evidence is needed to see if the difference truly is nonobvious, as defined by Section 103. And this other evidence—in the form of some reason to combine or change the

256. See *supra* Part II.B.

257. See *supra* Part II.B.

258. See *supra* Part II.B.

259. See *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 526 F. Supp. 2d 162, 170-71 (D. Mass. 2007), *aff'd in part, rev'd in part, and remanded on other grounds*, 567 F.3d 1314 (Fed. Cir. 2009).

260. See *supra* note 104 (detailing the common usage of the uncertainty principle in applied physics).

261. *Id.*

262. See *supra* notes 108-111 (detailing such simple inventions such as liquid paper and Post-It Notes, where the results are highly predictable once the combination is known, but there was no motivation for anyone to make the inventions in the first instance—the inventor's insight was needed).

263. See *supra* notes 108-111.

prior art—is the type of evidence the statute, Section 103, and *Graham* require in order to find an invention obvious.²⁶⁴

B. *Type II Predictability Makes the Analysis More Susceptible to Hindsight Bias*

Hindsight bias is the inclination to see outcomes that have already occurred as being more likely than they actually were before they took place.²⁶⁵ The observed outcome influences the decision-maker's conclusion as to how the question would have been answered, because the tendency is for the answer to mimic the actual outcome observed.²⁶⁶ A classic hindsight bias is the “Monday morning quarterback” scenario, in which a decision-maker concludes that a pass should have not been thrown, based not on the information available at the time the pass was made, but on the results—say an interception or incompleteness—of that pass.²⁶⁷

The change in perspective introduced by Type II predictability correspondingly introduces additional hindsight bias into the nonobviousness analysis. The nonobviousness inquiry is already susceptible to hindsight bias because the inquiry asks whether the invention was obvious at the time of the invention, which is a period of time necessarily in the past.²⁶⁸ Moreover, this question is asked with the outcome (the invention) already in front of the decision-maker.²⁶⁹ A Type II predictability analysis adds to this hindsight bias by shifting the timeframe of the nonobviousness question from just before the invention's creation to just after.²⁷⁰ This increased hindsight bias further prejudices the decision-maker towards the invention's obviousness.²⁷¹

264. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (noting the importance in finding a reason to combine); *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966).

265. See Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391, 1400-01 (2006).

266. *Id.* at 1401-02.

267. *Id.* at 1394 (“The hindsight bias is recognized in common wisdom: ‘hindsight is 20/20,’ and being a ‘Monday morning quarterback’ exaggerates one’s foresight.”).

268. See generally Mandel, *supra* note 265; Gregory N. Mandel, *Patently Non-Obvious II: Experimental Study on the Hindsight Bias Issue before the Supreme Court in KSR v. Teleflex*, 9 YALE J. L. & TECH. 1 (2007) (discussing hindsight bias in patent law).

269. See Mandel, *supra* note 265, at 1399-1400 (“The non-obvious standard of § 103(a) requires the decision-maker to make an historical judgment: whether the invention would have been obvious at the time the invention was made in the past. To reach a proper non-obvious conclusion, the decision-maker must step backward in time to a moment when the invention was unknown.”).

270. See *supra* Part II.B.

271. See Gregory Mandel, *The Non-Obvious Problem: How the Indeterminate Nonobviousness Standard Produces Excessive Patent Grants*, 42 U.C. DAVIS L. REV. 57, 95-96 (2008) (noting that hindsight “bias unconsciously and inevitably distorts judgment of the obviousness of an invention, making inventions appear more obvious ex post than they actually were ex ante.”).

Section 103 and the *Graham* factors try to fight hindsight bias in two ways. Under the typical *Graham* approach under Section 103, the decision-maker must at least find a reason for the skilled artisan to cross the difference between the prior art and the invention.²⁷² This decision-maker is forced to answer this question through the lens of someone who does not yet know about the inventor's creation.²⁷³ Certainly hindsight bias might make finding this reason easier, but there must still be a reason articulated to support a finding of obviousness.²⁷⁴ Moreover, the reason must be found in the universe as it existed prior to the invention's creation.²⁷⁵ Although not fool-proof, these two parts of the pre-KSR analysis—by definition—force the decision-maker to not rely solely on outcome information.²⁷⁶ The decision-maker cannot use the invention alone to prove its obviousness.²⁷⁷

Type II predictability can exacerbate the hindsight problem by focusing the nonobviousness inquiry almost solely on the outcome—the invention—while also moving the inquiry away from the difference—the gap—that must be overcome to achieve the invention.²⁷⁸ If Type II predictability is enough to establish obviousness, the analysis is then focused exclusively on the outcome and whether it was predictable.²⁷⁹ This determination is made with the invention squarely before the decision-maker and nothing else.²⁸⁰ The decision-maker does not need to question the circumstances surrounding the invention's creation. The only inquiry is whether the invention's elements act predictably after they are combined. Thus, the parts of the Section 103 and *Graham* analysis that mitigate hindsight bias are removed, making

272. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (noting the importance in finding a reason to combine); *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966); *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999) (“Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”).

273. See *Daiichi Sankyo Co. v. Matrix Labs., Ltd.*, 619 F.3d 1346, 1354 (Fed. Cir. 2010) (“Yet the attribution of a compound as a lead compound after the fact must avoid hindsight bias; it must look at the state of the art *at the time the invention was made* to find a motivation to select and then modify a lead compound to arrive at the claimed invention.”).

274. See *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) (noting the need for reasons, not merely conclusions, to establish obviousness in order to remove hindsight bias).

275. See *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164-65 (Fed. Cir. 2006) (“The first requirement, the motivation to combine references, serves to prevent hindsight bias.”).

276. See *Tokai Corp. v. Easton Enters., Inc.* 632 F.3d 1358, 1378 (Fed. Cir. 2011) (“It is improper to take concepts from other devices and change them in light of the now-known template of the patented device, without some direction in the prior art that would render it obvious to do so.”).

277. *Id.*

278. See *supra* Part II.A.2.

279. See *supra* Part II.A.2.

280. See *supra* Part II.A.2; see also *supra* Part II.B.

such bias more likely to occur.²⁸¹ There does not need to be evidence as to why a skilled artisan *would* have created the invention, nor whether this reason to combine or change the prior art was present *before* the invention's actual creation.

One could point to an additional barrier to hindsight bias present even with Type II predictability—secondary considerations indicating that an invention is nonobvious. These secondary considerations, also referred to as objective factors, can rebut a *prima facie* finding of obviousness.²⁸² As the Supreme Court has noted, one purpose of these considerations is to “serve to ‘guard against slipping into use of hindsight,’ and to resist the temptation to read into the prior art the teachings of the invention in issue.”²⁸³ Such considerations are meant, in part, to make the “factfinder . . . aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.”²⁸⁴

But, by shifting the focus to the invention itself, a Type II predictability standard removes the typical front-line defense to hindsight bias—the requirement for a reason to create the invention in the first place. Type II predictability side steps this forward-looking inquiry that works with secondary considerations to counteract hindsight bias. Furthermore, courts and scholars have documented the failure of secondary considerations to overcome a *prima facie* case of obviousness in most cases.²⁸⁵ Courts and the USPTO rarely change their conclusions in light of objective indicia of non-obviousness.²⁸⁶ Moreover, the standard being applied to admit such evidence of secondary considerations continues to rise, devaluing such information

281. See *supra* Part II.A.2; see also *supra* Part II.B.

282. See *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1350 (Fed. Cir. 2012) (“This is precisely the sort of hindsight bias that evaluation of objective evidence is intended to avoid.”).

283. See *Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966).

284. *Id.* at 36 (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (1964)) (“They may also serve to ‘guard against slipping into use of hindsight,’ and to resist the temptation to read into the prior art the teachings of the invention in issue.”).

285. See Mandel, *supra* note 265 at 1422 (“Secondary consideration evidence does not significantly ameliorate the hindsight problem for two basic reasons: it is often not available, and even when it is available, it is not particularly probative of whether an invention was non-obvious.”).

286. See Christopher A. Cotropia, *Nonobviousness and the Federal Circuit: An Empirical Analysis of Recent Case Law*, 82 NOTRE DAME L. REV. 911, 929 (2007) (finding the irrelevance of secondary considerations in most nonobviousness analysis); John Paul Putney, *Are Secondary Considerations Still “Secondary”?: An Examination of Objective Indicia of Nonobviousness Five Years After KSR*, 4 AM. U. INTELL. PROP. BRIEF 45, 59 (2012) (“Although very recent cases hint at room for change, that clear pattern following *KSR* sees a rather ‘unpersuasive’ role for objective indicia.”).

further in the nonobviousness analysis.²⁸⁷ Accordingly, the *Graham* factors, and the focus on the difference between the prior art and the invention, play an ever-increasing role in reducing hindsight bias. Type II predictability removes these checks against such bias and, thus, is more likely to introduce additional bias into the analysis.

C. Type II Predictability Introduces Bias Against Simple and Predictable Technologies

Focusing on Type II predictability also biases patent protection against simple and predictable technologies. By definition, the operation and interaction of these technologies is easy to predict. Therefore, if the test for non-obviousness is whether an invention has predictable results, then uncomplicated technologies are unlikely to be deemed nonobvious and therefore unlikely to receive patent protection. The simpler the technology, the easier it is for a skilled artisan to predict how it will behave. Under the reasoning underlying Type II predictability, patent applications and issued patents covering these technologies will fare poorly both at the USPTO and courts and are more likely to be found obvious.

Mechanical, electrical, and computer software technologies are commonly considered to be predictable technologies, while chemical and biological ones are not.²⁸⁸ The way mechanical elements interact is generally easy to predict, as the basics of mechanics are well understood and documented.²⁸⁹ The same is true of electrical devices and computer software, especially in the digital, binary-based technology space.²⁹⁰ And, perhaps most importantly, these conclusions regarding predictable behavior are already embedded in patent case law, where courts have routinely found these

287. See, e.g., *Western Union Co. v. MoneyGram Payment Sys., Inc.*, 626 F.3d 1361, 1372-73 (Fed. Cir. 2010) (placing the burden on the patentee to prove a nexus between secondary considerations and the invention).

288. See Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 *BERKELEY TECH. L.J.* 1155, 1156-57 (2002) (“This implication is closely tied to the Federal Circuit’s designation of some technologies as belonging to the ‘unpredictable arts’; the court treats biotechnology as if the results obtained in that art are somehow outside the control of those of skill in the art, whereas computer science is treated as if those of skill in the art have their outcomes well in hand.”); Sean B. Seymore, *Heightened Enablement in the Unpredictable Arts*, 56 *UCLA L. REV.* 127, 136-39 (2008) (setting forth these commonly thought of predictable and unpredictable technology areas). One notable exception is the use of quantum mechanics in these technological fields. See *supra* note 104.

289. See *In re Vaeck*, 947 F.2d 488, 496 (Fed. Cir. 1991) (stating that mechanical and electrical inventions behave predictably). Again, a notable exception is the use of quantum mechanics in these technological fields. See *supra* note 104.

290. See *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 943 (Fed. Cir. 1990) (“The great weight of the expert testimony on both sides was that a programmer of reasonable skill could write a satisfactory program with ordinary effort. This requires the conclusion that the programs here involved were, to a skilled programmer, routine.”).

technologies to behave predictably.²⁹¹ In contrast, chemical and biology-based technologies are generally considered unpredictable.²⁹² Specifically, the interactions between various chemicals or biological elements are more likely to behave unpredictably.²⁹³ Regardless of the actual truth of these propositions, courts commonly come to these blanket conclusions when deciding patent issues in these technological spaces.²⁹⁴

Accordingly, Type II predictability standards make it harder to find mechanical, electrical, and computer software inventions nonobvious. If courts consider these inventions to be predictable, these areas would receive less patent protection under a predictable results standard. In contrast, chemical and biological inventions would be more likely to get a free pass.²⁹⁵

Not surprisingly, decisions involving patents in the mechanical and electrical arts often invalidate the patents as obvious under Type II predictability.²⁹⁶ Moreover, when predictability establishes obviousness in the chemical or biological space, the courts are applying a Type I predictability analysis.²⁹⁷

This bias against simple and predictable technologies is detrimental. The bias introduced by *KSR*'s Type II predictability standard discourages beneficial technologies. The standard also causes patent law to be industry-biased, which runs counter to current patent law principles. These impacts of Type II predictability are detailed below.

First, one of the purposes of patent law is to incentivize the production and distribution of technologies society finds valuable,²⁹⁸ and simple tech-

291. See Burk & Lemley, *supra* note 288, at 1156 (observing that due to the presumption of predictable behavior, “[t]he Federal Circuit has essentially excused software inventions from compliance with the enablement and best mode requirements.”).

292. See *Mycogen Plant Sci. v. Monsanto Co.*, 243 F.3d 1316, 1330 (Fed. Cir. 2001) (calling the chemistry and biology “unpredictable arts”); Karen S. Canady, *The Wright Enabling Disclosure for Biotechnology Patents*, 69 WASH. L. REV. 455, 457-58 (1994) (explaining the assumed, unpredictable nature of biotechnology in patent law).

293. See, e.g., *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995) (noting that chemistry is a “less predictable field[] . . . where minor changes in a product or process may yield substantially different results”).

294. See Seymore, *supra* note 288, at 136-39.

295. The Federal Circuit has even recognized this fact. See *Eisai Co. v. Dr. Reddy's Labs., Ltd.*, 533 F.3d 1353, 1359 (Fed. Cir. 2008) (“To the extent an art is unpredictable, as the chemical arts often are, *KSR*'s focus on these ‘identified, predictable solutions’ may present a difficult hurdle because potential solutions are less likely to be genuinely predictable.”).

296. See, e.g., *Agrizap Inc. v. Woodstream Corp.*, 520 F.3d 1337, 1339-40 (Fed. Cir. 2008) (using Type II predictability on mechanical patent); *Se-Kure Controls, Inc. v. Diam USA, Inc.*, 662 F. Supp. 2d 1006, 1009 (N.D. Ill. 2009) (using Type II predictability on electro-mechanical patent).

297. See, e.g., *Novo Nordisk A/S v. Caraco Pharm. Labs., Ltd.*, 719 F.3d 1346, 1354 (Fed. Cir. 2013) (using Type I predictability on pharmaceutical patent).

298. See Christopher A. Cotropia, *What is the Invention?*, 53 WM. & MARY L. REV. 1855, 1892-95 (describing the basic incentive to invent theory of patent law).

nologies can be incredibly valuable to society.²⁹⁹ In fact, simplicity itself can be the very reason a technology is valuable.³⁰⁰ Simple inventions can be the most technologically advanced and socially beneficial.³⁰¹ Patent law, accordingly, should encourage the creation of these simple, socially beneficial inventions.

Second, patent law is meant to be industry and technologically neutral, particularly when it comes to the nonobviousness requirement.³⁰² The law adapts the nonobviousness standard to the invention's particular technological area by using the metric of ordinary skill in the art.³⁰³ As such, the operative nonobviousness standard shifts with the state of the relevant technology, and thus should prevent any bias against whole swaths of technologies a one-size-fits-all standard would introduce.³⁰⁴ Patent law exists to promote advancement in all technological areas, as long as the standards for protection are met.³⁰⁵ The market is then tasked with sorting out the level of value by varying demand for different inventions.³⁰⁶

Finally, patent law has intended to foster mechanical and electrical inventions and thereby the underlying technology.³⁰⁷ As long as the patentability requirements are met, these industries are as much a target of patent

299. See, e.g., *Tokai Corp. v. Easton Enters., Inc.* 632 F.3d 1358, 1373 (Fed. Cir. 2011) (Newman, J., dissenting) (lauding the simplicity of the patented design as one of the invention's great advantages and rejecting the majority's application of Type II predictability in finding the invention obvious).

300. See, e.g., JEWKES ET AL., *supra* note 110, at 71 ("Inventors, groping for solutions along complicated and expensive roads, have missed the target completely, while an individual entering the field with a fresh approach, crude equipment, and a generous smattering of common sense has achieved success along a path which, in retrospect, looks perfectly simple."); JOHN MAEDA, *THE LAWS OF SIMPLICITY: DESIGN, TECHNOLOGY, BUSINESS, LIFE* (2006) (noting the value of simplicity in innovations); STEVEN J. PALEY, *THE ART OF INVENTION: THE CREATIVE PROCESS OF DISCOVERY AND DESIGN* (2010) (same).

301. *Id.*; see also *Van Veen v. U.S.*, 386 F.2d 462, 465 (Ct. Cl. 1968) ("Experience has shown that some of the simplest advances have been the most nonobvious.").

302. See Craig Allen Nard, *Legal Forms and the Common Law of Patents*, 90 B. U. L. REV. 51, 100-03 (2010) (noting that by design, the patent system is meant "to apply and develop seemingly neutral principles to divergent industries").

303. See Burk & Lemley, *supra* note 288, at 1156 ("[W]hile patent law is technology-neutral in theory, it is technology-specific in application.").

304. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1648-51 (2003) ("[B]ecause application of the PHOSITA standard causes nominally unitary patent rules to be applied very differently—indeed in directly contradictory ways—in different industries, we have included it among the ways in which patent law can accommodate the characteristics of particular industries.").

305. See Sean B. Seymore, *Atypical Inventions*, 86 NOTRE DAME L. REV. 2057, 2058-59 (2011) ("This framework in theory allows the patent system to adapt flexibly to both old and new technologies, encompassing anything under the sun that is made by man." (internal quotation marks omitted)).

306. See Burk & Lemley, *supra* note 304, at 1576-77, 1580.

307. See Michael Risch, *America's First Patents*, 64 FLA. L. REV. 1279, 1308 (2012) (showing in a table that mechanical patents constitute the top twelve historical patent classification).

policy as the less-predictable arts, such as chemistry and biology. Patent protection exists for all of these technical disciplines under the general notion that protection is needed to promote invention.³⁰⁸ But Type II predictability does not vary protection based on this “but for” criteria.³⁰⁹ Instead, Type II predictability creates a higher bar for large swathes of technologies, while heavily favoring others, all regardless of the need for incentives.

D. Type II Predictability Conflicts With Basic Patent Theory

Type II predictability as a method of determining nonobviousness also runs contrary to basic patent theory because patents are intended to incentivize investments in unknown development paths, not just those inventions with unknown results.³¹⁰ Traditional patent theory views patents as incentivizing the creation of inventions (the “incentive-to-invent” theory).³¹¹ Patents are the carrots that entice inventors to bridge a gap, from the prior art to the invention.³¹² That is, patents are meant to incentivize inventors to take the road less traveled. In contrast, Type II predictability does not focus on inventions that are unlikely to be developed, but instead on just those inventions with a particular type of result—an unpredictable one.

The incentive-to-invent theory is the classic justification for the patent system.³¹³ Under this theory, patent law incentivizes the creation of inventions by giving the inventor a mechanism by which she can recoup her development costs—exclusivity.³¹⁴ This theory assumes that the process of creating inventions is fraught with costs and uncertainty.³¹⁵ An inventor will not engage in this process unless she knows, if successful, she will be able to recoup her costs.³¹⁶ Patent law gives her this ability via exclusivity over the invention.³¹⁷ Exclusivity allows her to price the invention, once sold, above

308. Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 993 (1997) (“Intellectual property is fundamentally about incentives to invent and create.”).

309. See Abramowicz & Duffy, *supra* note 20, at 1603-20 (describing the “inducement standard” for determining patentability).

310. See, e.g., Lemley, *supra* note 308.

311. See MERGES & DUFFY, *supra* note 6, at 9-12; CRAIG NARD, *THE LAW OF PATENTS* 31 (2d ed. 2011) (detailing the incentive-to-invent theory); Cotropia, *supra* note 298, at 1892-95 (setting forth this basic patent theory). Another commonly discussed patent theory, the Prospect Theory articulated by Edmund Kitch, is not explored given that Kitch believed, under that theory, that there was no need for a nonobviousness requirement. See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 280-84 (1977).

312. See MERGES & DUFFY, *supra* note 6, at 9-12.

313. See NARD, *supra* note 311 at 31-32 (detailing the incentive to invent); Cotropia, *supra* note 298, at 1892.

314. See NARD, *supra* note 311 at 31-32; Cotropia, *supra* note 298, at 1892.

315. See Cotropia, *supra* note 298, at 1892-95.

316. *Id.*

317. See Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 247 (1994) (explaining how patent law solves the “appropriability problem”).

the mere cost of materials to make or implement the invention and recover her development expenditures and turn a profit.³¹⁸ By facilitating such a recovery, patents create a carrot to prompt would-be inventors to take the plunge and try to invent something that is patentable.³¹⁹

Patents are meant to play a role in the *development* process. The incentive-to-invent theory makes the process of creating the invention less risky.³²⁰ This theory is not focused solely on the actual operation and results of the invention itself. Instead, it focuses on the path toward conceptualizing and creating the invention and the role patent law plays in enticing people to proceed down this path, which can be fraught with uncertainty.³²¹

This patent law theory does not grant protection to only those inventions that have a certain outcomes or effects. The value of the resulting invention is irrelevant to whether patent protection is needed, as is the commercial need for the invention.³²² The incentive to invent theory tasks the market, not patent law, with making the ultimate determination on the invention's value.³²³ The low utility requirement for patent protection bears this out—commercial and societal need is not part of the test for patent protection.³²⁴ Patent law instead focuses on getting the invention created, society then does the rest to either reward the inventor with high demand or not.³²⁵

The Section 103 and *Graham*-based nonobviousness test focus on the process of inventing, and whether patent protection is needed to incentivize this process.³²⁶ Nonobviousness is often viewed as implementing a “but for” test for patent protection—if the invention would not have been created but for the incentive of patent protection, then such protection should be

318. *Id.*; Cotropia, *supra* note 298, at 1892-95.

319. Cotropia, *supra* note 298, at 1892-95.

320. See Christopher A. Cotropia, “*After-Arising*” *Technologies and Tailoring Patent Scope*, 61 N.Y.U. ANN. SURV. AM. L. 151, 170 (2005) (“The incentive to invent is maintained by the would-be inventor’s perception that she will get adequate protection to recoup costs.”).

321. See, e.g., Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 88-96 (2009) (explaining the filing of patent protection to overcome the uncertainty surrounding the technological development process).

322. See, e.g., PHILLIP AREEDA & LOUIS KAPLOW, *ANTITRUST ANALYSIS* 441 n.49 (4th ed. 1988) (indicating that 80-90% of all patents may be without any commercial value); Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1, 21 (2005) (noting that patents “convey little information about the potential commercial value of the invention”); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 355 (2010) (“First, the patent laws do not require inventions to be in a commercialized form to garner protection.”).

323. Sichelman, *supra* note 322, at 356-60.

324. See *Fuller v. Berger*, 120 F. 274, 275 (7th Cir. 1903) (articulating the test for utility as questioning whether the invention “is incapable of serving any beneficial end”); Cotropia, *supra* note 321, at 75-76.

325. See Cotropia, *supra* note 321, at 82-85 (explaining the commonly understood benefits to early filing as a foundation to commercialization).

326. See Cotropia, *supra* note 11.

granted.³²⁷ Accordingly, looking to find reasons to combine or change the prior art, and therefore cross the gap between the prior art and the invention, is an investigation to determine if something more is needed for that development path to be taken.³²⁸ The traditional rationale behind nonobviousness therefore accords with the incentive-to-invent theory.

But a nonobviousness test that focuses on Type II predictability instead of Type I predictability fails to test whether incentives are necessary for the development path to be taken: Type II predictability does not ask whether society needs help getting to the invention in the first place. Instead, the inquiry takes a snapshot at the end of development, at least at the final invention stage, and asks about the resulting invention's behavior.³²⁹

One could argue for the necessity of incentivizing individuals to attempt to make inventions that will have unpredictable results. The lack of predictability of the end product makes the path unpredictable as well—or at least risky enough that patent protection is necessary to soak up some of that risk. Accordingly, an argument could be made that Type II predictability does fit in line with classic patent theory's focus on the development path.

Although this line of reasoning has some viability, evaluating the gap directly—as opposed to the result—is more likely to tie patent protection to underlying patent theory.³³⁰ Patent law is meant to incentivize inventors to overcome the uncertainty and unpredictability inherent in the process of conceptualizing and creating the invention.³³¹ To be sure, the fuzziness of how the resulting invention will behave has some bearing on an inventor's decision to proceed in the first place. This causal linkage is not always the case, however,³³² and this lack of a link is particularly true when using predictable results as evidence of obviousness. The law has, for some time, accepted unexpected results as evidence of nonobviousness—good evidence that the path is unlikely to be traveled because the end is unpredictable.³³³ In contrast, predictability of the results, particularly for those in the predictable arts, means little or nothing as to whether the skilled artisans will even start down the development path.³³⁴ For these technologies, there is still the crucial initial decision to even embark on putting the pieces together and making the necessary modification to create the invention. This development and

327. *Id.*; see also Abramowicz & Duffy, *supra* note 306, at 1599, 1603-20.

328. Abramowicz and Duffy refer to this general concept as "inducement." Abramowicz & Duffy, *supra* note 309, at 1603-1620.

329. *Id.*

330. The assumption is that patent law should be tied to underlying patent theory. See, e.g., Cotropia *supra* note 298 (evaluating claim interpretation methodology and the disclosure requirements in light of patent theory).

331. See, e.g., Merges, *supra* note 6, at 2-4 (discussing patent law's push to prompt inventors to journey into the uncertain and unknown).

332. See *supra* notes 104-111.

333. See *supra* notes 101-102.

334. See *supra* notes 104-111.

creation is what patent law is focused on incentivizing.³³⁵ These are the paths that are less traveled, not because the end result is unpredictable, but because the path itself is difficult to even recognize.³³⁶ Type II predictability ignores the presence or absence of such recognition by the skilled artisan, while patent theory is based upon it.

Accordingly, the proper test for granting patent protection should be the nonobviousness standard articulated in *Graham*, which asks whether reasons to travel down the same path the inventor took existed at the time that the invention was made. If such reasons existed—that is there were reasons to combine or change the prior art, such as Type I predictability—then patent law doesn't need to help incentive the creation of the invention. However, if the path has a large enough gap, and a skilled artisan would have been unlikely to cross the gap, then patent law steps in and entices someone to jump the gap and arrive at the invention.

CONCLUSION

Given the negative implications of Type II predictability standards, the USPTO, the Federal Circuit, and some lower courts should reconsider their use of Type II predictability and their interpretation of this part of the *KSR* decision. The simplest solution is for the USPTO and courts to take a narrow reading of the “predictable results” language in *KSR*, and read out any basis for Type II predictability. Although the holding in *KSR* is controlling,³³⁷ the decision's text, particularly on the concept of predictability, leaves room for interpretation. As some courts have already recognized,³³⁸ when using the phrase “predictable results,” the result the Court may have been talking about was the creation of the invention itself, not the consequences of the invention's operation.³³⁹ This interpretation would bring predictable results—Type II predictability—under the umbrella of Type I predictability and in line with the Court's discussion of “predictable solutions.”³⁴⁰ This interpretation of *KSR* would also be supported by the fact that, if the Supreme Court were trying to so fundamentally change nonobviousness doctrine, it would have done so explicitly. At the very least, such an interpretation, particularly by the Federal Circuit, would highlight the issues

335. See *supra* notes 326-328.

336. See *supra* notes 326-328.

337. However, the Federal Circuit is frequently charged with not following Supreme Court precedent. See Lucas S. Osborn, *Instrumentalism at the Federal Circuit*, 56 ST. LOUIS U. L.J. 419, 452-53 (2012) (“Not only does the Supreme Court reverse the Federal Circuit often, but also its rhetoric toward the Federal Circuit has been described as ‘severely critical’ and ‘testy,’ ‘increasingly disdainful,’ and ‘harsh,’ particularly when it comes to the Federal Circuit's failure to follow Supreme Court precedent.”) (footnotes omitted).

338. See *supra* Part II.B.2.b.i.

339. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-17 (2007).

340. *Id.* at 417 (“[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.”).

surrounding Type II predictability and the interpretation of *KSR*'s synergy discussion, possibly forcing the Supreme Court to address whether *KSR* was meant to introduce such a massive doctrinal shift in nonobviousness law.

