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THE FEDERAL CIRCUIT'S NEW OBVIOUSNESS  
JURISPRUDENCE: AN EMPIRICAL STUDY

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ABSTRACT

*In 2007, following the Supreme Court's first opinion addressing obviousness in the Federal Circuit era of patent law, Rebecca Eisenberg and Harold Wegner, two of the most prominent voices in patent law, offered competing predictions about the effect KSR International Co. v. Teleflex, Inc. would have on the Federal Circuit's obviousness jurisprudence. Seeing KSR as part of a broader admonishment against the use of rigid rules rather than providing any substantive guidance, Eisenberg foresaw a future in which KSR changed what the Federal Circuit said about obviousness but not what it did. Wegner, in contrast, predicted that KSR would change case outcomes: inventions that were nonobvious the day before KSR would suddenly become obvious after the Court's opinion.*

*This study empirically examines these two predictions using a novel dataset comprised of all pre- and post-KSR Federal Circuit decisions on obviousness over a fifteen-year period. This data reveals strong evidence that KSR has indeed altered the outcomes of the Federal Circuit's obviousness determinations, a change that has manifested in large part through an increase in the deference that the Federal Circuit is giving to district court determinations that patents are obvious as opposed to a shift in the substance of the law itself.*

*Moving beyond an examination of outcomes alone, this study uses the technique of content analysis to explore the heart of the second prediction: that KSR would affect what the Federal Circuit says about obviousness. This analysis*

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*demonstrates that the Federal Circuit has indeed changed what it says. Essentially gone is the use of the Federal Circuit's ubiquitous pre-KSR "teaching, suggestion, or motivation" ("TSM") framework in analyzing obviousness. Furthermore, while the underlying requirement that patent challengers identify some "reason to combine" or "reason to modify" prior art references has endured, it is hardly a reincarnation of TSM, either in terms of vigor or structure. Instead, the Federal Circuit's new obviousness framework allows substantial flexibility in the obviousness analysis.*

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## INTRODUCTION

In 2007, following the Supreme Court's first opinion addressing the issue of obviousness in the Federal Circuit era of patent law, Rebecca Eisenberg and Harold Wegner, two of the most prominent voices in patent law, offered competing predictions about the effect *KSR International Co. v. Teleflex, Inc.*<sup>1</sup> would have on the Federal Circuit's obviousness jurisprudence. Seeing *KSR* as part of a broader admonishment against the use of rigid rules rather than providing any substantive guidance, Eisenberg foresaw a future in which *KSR* changed what the Federal Circuit said about obviousness but not what it did.<sup>2</sup>

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

2. Rebecca S. Eisenberg, Commentary, *The Supreme Court and the Federal Circuit: Visitation and Custody of Patent Law*, 106 MICH. L. REV. FIRST IMPRESSIONS 28, 33 (2007),

Wegner, in contrast, predicted that *KSR* would change case outcomes: inventions that were nonobvious the day before *KSR* would suddenly become obvious after the Court's opinion.<sup>3</sup>

Over five years have passed since *KSR*, and logically only one prediction could have come to pass. This Article empirically examines these two predictions by analyzing a novel data set comprised of all pre- and post-*KSR* Federal Circuit decisions on obviousness over a fifteen-year period. Using this data set, this study tests whether Wegner's prediction that *KSR* would affect the outcome of obviousness determinations was correct or whether Eisenberg correctly forecast the opposite.

Yet outcomes paint only a piece of the Federal Circuit's post-*KSR* jurisprudence. Moving beyond an examination of outcomes alone, this study employs the methodological technique of content analysis to explore the heart of Eisenberg's prediction: that *KSR* would affect what the Federal Circuit *says* about obviousness.

This examination of what the Federal Circuit *does* and *says* about obviousness is important for reasons beyond simply evaluating Eisenberg and Wagner's predictions; it is also of critical significance to the ongoing debate over the obviousness requirement. Despite being made over five years ago, Eisenberg and Wegner's predictions capture a deep divide in contemporary obviousness scholarship. On one side are those who argue that little has changed in the Federal Circuit's obviousness jurisprudence in the wake of *KSR v. Teleflex*.<sup>4</sup> On the other side are those who argue the opposite: that the court's

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<http://www.michiganlawreview.org/firstimpressions/vol106/eisenberg.pdf> ("The Court's general admonitions to avoid the use of rigid and mandatory formulas will more likely change what the Federal Circuit says than what it does, making the Federal Circuit's decisions more opaque and harder to follow.").

3. Harold C. Wegner, Commentary, *Making Sense of KSR and Other Recent Patent Cases*, 106 MICH. L. REV. FIRST IMPRESSIONS 39, 41 (2007), <http://www.michiganlawreview.org/firstimpressions/vol106/wegner.pdf> ("As a result, inventions that were nonobvious the day before *KSR* suddenly became obvious to this modern man of ordinary skill in the art.").

4. See, e.g., *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1258–59 (Fed. Cir. 2007) (characterizing *KSR* as having "reiterated the basic principles for an obviousness inquiry" and as having "corrected a rather straightforward error"); Tom Brody, *Obviousness in Patents Following the U.S. Supreme Court's Decision*, *KSR International Co. v. Teleflex, Inc.*, 92 J. PAT. & TRADEMARK OFF. SOC'Y 26, 26 (2010) ("While the intellectual property community has expressed alarm by the possible adverse effect of *KSR* in making it easier to reject claims for obviousness, at least in the courtroom setting, this article demonstrates that *KSR* has had little or no influence on patent prosecution."); Tun-Jen Chiang, *A Cost-Benefit Approach to Patent Obviousness*, 82 ST. JOHN'S L. REV. 39, 53 (2008) ("Ultimately, *KSR*'s holding is rather akin to the 'implicit motivation' standard that the Federal Circuit had already adopted in response to the Court's grant of certiorari."); Mark D. Janis, *Tuning the Obviousness Inquiry After KSR*, 7 WASH. J.L. TECH. & ARTS 335, 343 (2012) ("*Translogic* and other post-*KSR* decisions appear to have put the Federal Circuit firmly back into the practice of invoking the TSM test, albeit flexibly."); Edward L. Pencoske & Matthew W. Johnson, *So What's a Patent Prosecutor to Do in This Post-KSR World?*, 2 LANDSLIDE 31, 32 (2010) ("*KSR* perhaps breathed new life into an already established downward trend in

obviousness jurisprudence has changed substantially following *KSR*.<sup>5</sup> For judges, practitioners and scholars, this divide presents a tension at the heart of patent law because nonobviousness is, after all, the “ultimate condition of

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the allowance rate, but given that the allowance rate had already fallen steadily from about 71% in 1999 to about 51% in 2006, it is clear that *KSR* was not the catalyst for the decline.”); Emer Simic, *The TSM Test Is Dead! Long Live the TSM Test! The Aftermath of KSR, What Was All the Fuss About?*, 37 AIPLA Q.J. 227, 229–30 (2009) (“The Federal Circuit has not interpreted the *KSR* decision as having substantially altered the traditional test for obviousness, but instead stresses that it is only the method of applying the TSM test that has changed.”); Jonathan M. Spenner, *Obvious-to-Try Obviousness of Chemical Enantiomers in View of Pre- and Post-KSR Analysis*, 90 J. PAT. & TRADEMARK OFF. SOC’Y 475, 510 (2008) (“The Supreme Court’s unanimous decision in *KSR* did not substantively change the law of obviousness and only directed the Federal Circuit to follow its own precedent.”); Justin Lee, Note, *How KSR Broadens (Without Lowering) the Evidentiary Standard of Nonobviousness*, 23 BERKELEY TECH. L.J. 15, 46 (2008) (arguing that “[t]he Federal Circuit has long offered a flexible version of the TSM test that allows evidence of motivation from various sources” and “the sweeping statements in the Supreme Court’s opinion should not be understood to lower the evidentiary burden protecting against hindsight bias.”); Nick A. Thornburg, Comment, *The Fate of the Teaching, Suggestion, or Motivation Test After KSR v. Teleflex*, 12 INTELL. PROP. L. BULL. 61, 90 (2007) (“Overall, the procedural changes that the Federal Circuit will have to make will not be difficult to implement, nor too much of a departure from current precedent.”); Joff Wild, *Federal Circuit Judge Reveals KSR Secret*, INTELL. ASSET MGMT., (May 21, 2007), <http://www.iam-magazine.com/blog/Detail.aspx?g=b53c64ee-fc33-455e-b760-cdc9d9059474> (reporting comments by Federal Circuit Judge Randall Rader that “the judgment in the first CAFC decision on obviousness post-*KSR* had actually been written before the Supreme Court’s decision was handed down and ‘did not require one iota of change’”).

5. See, e.g., John F. Duffy, Commentary, *KSR v. Teleflex: Predictable Reform of Patent Substance and Procedure in the Judiciary*, 106 MICH. L. REV. FIRST IMPRESSIONS 34, 36 (2007), <http://www.michiganlawreview.org/firstimpressions/vol106/duffy.pdf> (“That simple, clear statement heralded a revolution in the field by disavowing years of lower court precedent.”); 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, 49 (2010) (“*KSR*’s flexible standard for patentability has significantly impacted the U.S. patent system.”); Janice M. Mueller, *Chemicals, Combinations, and “Common Sense”: How the Supreme Court’s KSR Decision Is Changing Federal Circuit Obviousness Determinations in Pharmaceutical and Biotechnology Cases*, 35 N. KY. L. REV. 281, 283 (2008) (“The prima facie case of obviousness for a chemical invention is undoubtedly easier to establish post-*KSR* . . .”); Theresa Stadheim, *How KSR v. Teleflex Will Affect Patent Prosecution in the Electrical and Mechanical Arts*, 91 J. PAT. & TRADEMARK OFF. SOC’Y 142, 148 (2009) (“In *KSR*, the Supreme Court raised the bar as to what constitutes sufficient ‘innovation.’”); c.f. Douglas W. Schelling, *Has the Bar Been Moved Higher?: Obviousness in Patent Law*, FED. LAW., July 2007, at 14 (predicting that “the Court’s ‘expansive and flexible’ approach to the test will result in more findings of claimed inventions being obvious as compared to the ‘rigid’ approach,” but also observing that “[t]he Court did not change the test used for the obviousness inquiry; rather, the decision simply reinforced the proper way to apply the test”). There are also those who take the position that neither the Federal Circuit nor the Supreme Court has ever really articulated a clear obviousness framework. See 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, 336 (2008) (“In sum, Supreme Court and Federal Circuit precedent do not define, or provide significant meaning for, the legal non-obvious standard.”).

patentability,”<sup>6</sup> “one of the most crucial legal innovations in patent jurisprudence.”<sup>7</sup> A complete picture of what the Federal Circuit’s obviousness jurisprudence looks like today and how, if at all, it is still changing is thus central to our understanding of patent law.<sup>8</sup>

The results of the study reported here help to assemble this picture. Among the results, this study finds the following:

- *Following KSR the Federal Circuit has become less favorable to patentees on the issue of obviousness.*
- *The rate at which the Federal Circuit is affirming lower tribunals suggests that the Federal Circuit is granting greater deference to lower tribunal determinations that patents are obvious and is less consistent with the conclusion that the Federal Circuit is applying a substantively changed law of obviousness.*
- *The Federal Circuit’s ubiquitous pre-KSR requirement that patent challengers identify a “teaching, suggestion, or motivation” (“TSM”) to combine or modify the prior art has largely disappeared, at least in formal terms.*
- *Although the concept underlying TSM has endured in the form of a “reason to combine” requirement, the post-KSR form of that requirement differs substantially from its pre-KSR incarnation.*

Taken together, these findings suggest a Federal Circuit that is more willing to conclude that the inventions it reviews are obvious. They also point to a new obviousness jurisprudence that offers substantial flexibility to district courts ruling on the issue.

These findings are of particular significance when coupled with the increased importance of obviousness in the modern patent landscape.<sup>9</sup> During

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

7. Janis, *supra* note 4, at 336.

8. See JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 163 (2008) (“Obvious patents, another type of low-quality patent, are a problem because large numbers of obvious patents make clearance difficult and costly.”); ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT 34–35 (2004) (“As a result of legal and administrative changes made between 1982 and 1990, the PTO has become so overtaxed, and its incentives have become so skewed towards granting patents, that the tests for novelty and non-obviousness that are supposed to ensure that the patent monopoly is granted only to true inventors have become largely non-operative.”).

9. A central tenant of Glynn S. Lunney Jr.’s scholarship is that obviousness is a much diminished doctrine that is invoked far less than it was prior to the creation of the Federal Circuit. See e.g., Glynn S. Lunney, Jr. & Christian Johnson, *Not So Obvious After All: Patent Law’s Nonobviousness Requirement, KSR, and the Fear of Hindsight Bias*, 47 GA. L. REV. 41, 62 (2012). Even by his measures, however, Lunney notes that obviousness has played a more important role in the Federal Circuit’s patent law jurisprudence since *KSR*. See *id.* at 43 (finding that since *KSR*, obviousness was the reason for patentee losses nearly 20% of the time compared with 15% in the pre-*KSR* Federal Circuit era).

the five years prior to *KSR*, there were 157 determinations on obviousness in 148 opinions and summary affirmances; in the five years following, there have been 253 determinations in 235 opinions and summary affirmances—an average annual increase of around 60%.<sup>10</sup> Furthermore the Supreme Court's opinion in *KSR v. Teleflex* seems to have spawned greater disagreement among Federal Circuit judges: in the ten years preceding certiorari there were only nine dissents on the issue of obviousness; in half as much time since *KSR* there have already been twelve.<sup>11</sup>

The remaining parts of this Article proceed as follows: Part I provides background on the law of obviousness with reference to prior empirical studies of the Federal Circuit's obviousness jurisprudence. Part II describes the study's methodology. Part III reports and interprets the results of the study, breaking it into two components: whether the Federal Circuit has changed what it does on the issue of obviousness and whether the Federal Circuit has changed what it says on the issue of obviousness. Part IV offers some thoughts on the long-term implications of the Federal Circuit's new approach to obviousness.

## I. THE THEORY AND DOCTRINE OF THE LAW OF OBVIOUSNESS

### A. *The Requirement that Patented Inventions be Nonobvious*

To be valid, a patent must meet several substantive requirements. The invention it claims must be the type of invention that may be patented,<sup>12</sup> must be useful,<sup>13</sup> new,<sup>14</sup> and nonobvious,<sup>15</sup> and it must be adequately disclosed in

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10. These data come from the study itself, and thus reflect the period from April 30, 2007–April 30, 2012. This increase could be a result of an increase in patent appeals generally, although the statistics maintained by the Federal Circuit for the period 2002–2011 cut against this conclusion. See *Statistics*, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/the-court/statistics.html> (last visited August 1, 2012) (indicating an average of 438 appeals per year in patent infringement suits for fiscal years 2002–2006 and an average of 402 appeals per year in patent infringement suits for fiscal years 2007–2011).

11. These data were collected as part of this study. Based on my own experiential sense (i.e., I have not conducted a formal study), it is entirely possible that dissents in Federal Circuit cases are up generally since the Supreme Court began playing a major role in patent law starting in 2006–07.

12. 35 U.S.C. § 101 (2006); *Bilski v. Kappos*, 130 S. Ct. 3218, 3221 (2010) (“There are three specific exceptions to the Patent Act’s broad patent-eligibility principles, namely laws of nature, physical phenomena, and abstract ideas; while these exceptions are not required by the statutory text, they are consistent with the notion that a patentable process must be new and useful, and the concepts covered by these exceptions are part of the storehouse of knowledge of all men, free to all men, and reserved exclusively to none.”).

13. 35 U.S.C. § 101; *Banning v. Southwestern Bell Tel. Co.*, 384 F. Supp. 831, 837 (S.D. Tex. 1974) (“It is not necessary that a patented invention function flawlessly in all situations to be considered useful, but it is necessary that device be capable of a practical application in industry.”).

14. 35 U.S.C. § 102; *King-Seeley Thermos Co. v. Refrigerated Dispensers, Inc.*, 354

the patent.<sup>16</sup> Of these requirements, two focus on prior art (in other words, what has been done before): the “newness” requirement of anticipation and the requirement of nonobviousness.

Anticipation is simple in concept if not always in application: if a single piece of prior art, such as a prior patent or a previously sold product, discloses either expressly or inherently the identical “invention” that the later application or patent claims, no patent will issue or, if it has already issued, that patent is invalid.<sup>17</sup>

Not all inventions that meet the anticipation requirement may (or should) issue as patents, however. Consider, for example, a nineteenth century inventor who creates a new type of doorknob by combining a metal shank with a clay knob.<sup>18</sup> No one has ever before created such a doorknob—previous doorknobs consisted of solid metal and while clay was used in cabinet knobs, those knobs were solid clay as opposed to the shaft-and-knob configuration of a doorknob. There are no prior patents on a metal shank and clay knob doorknob, no printed publications describing the doorknob, no evidence of prior public uses or sales of the doorknob. Were the inventor to seek a patent on the doorknob, it would not be anticipated.<sup>19</sup>

Yet despite being new—in the sense that no one has ever created such a doorknob before—the “invention” represents a trivial advance, something merely slightly different from the prior art.<sup>20</sup> The doorknob is nothing more than the substitution of a known material in a known product.<sup>21</sup> In the formal

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F.2d 533, 537 (10th Cir. 1965) (“An invention or discovery is new or possesses requisite element of ‘novelty’ if it involves the presence of some element, or the new position of an old element in combination, different from anything found in any prior structure.”).

15. 35 U.S.C. § 103; *B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582 (Fed. Cir. 1996) (quoting *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050 (Fed. Cir. 1988)) (“Obviousness under 35 U.S.C. § 103 is a legal conclusion involving four factual inquiries. These inquiries consist of: ‘(1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of nonobviousness.’”).

16. 35 U.S.C. § 112; *Johns Hopkins Univ. v. CellPro*, 931 F. Supp. 303, 322 (D. Del. 1996) (“Factors to consider [in determining whether patent has been enabled] include: 1) the amount of experimentation necessary; 2) the amount of direction or guidance presented; 3) the presence or absence of working examples; 4) nature of invention; 5) the state of prior art; 6) the relative skill of those in art; 7) the predictability or unpredictability of the art; and 8) the breadth of claims.”), *aff’d in part and vacated in part*, 152 F.3d 1342 (1998).

17. *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 348 F.Supp.2d 713, 761 (N.D. W. Va. 2004) (noting that to prevail on a claim that a patent is invalid as anticipated, the defendant must prove by clear and convincing evidence that every limitation of asserted claim was contained, either expressly or inherently, in single prior art reference).

18. This example is from the classic case of *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850), which is generally credited as introducing the concept of nonobviousness into U.S. patent law Lunney, *supra* note 9, at 55.

19. See 35 U.S.C. § 102.

20. Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 13 (1992).

21. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (“The combination of

words of the 35 U.S.C. § 103, the modern statutory basis for obviousness, 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.”<sup>22</sup>

The primary purpose of the nonobviousness requirement is to prevent the patenting of those inventions that do not represent a significantly large advance over the prior art to justify the exclusionary right (and attendant public costs) of a patent.<sup>23</sup> Such “inventions” typically fall into two categories: (1) those that differ only slightly from the prior art, and hence represent a minimal advance over what has been done before;<sup>24</sup> and (2) those that would have been created even without the incentive of a patent.<sup>25</sup> The reason for not permitting patents in the first instance should be apparent: allowing them would result in a crushing panoply of patents that would be impossible to search and even more difficult to insulate oneself from through licenses.<sup>26</sup> Individually, the patent might not impose significant costs, but a host of patents on such trivial variations would significantly reduce public welfare.<sup>27</sup> The second category is even more significant: if the reason for the technological advance was, say, market pressures (perhaps the cost of metal has gone up dramatically while the cost of clay has fallen), then allowing a patent on an invention that competitors

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familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

22. 35 U.S.C. § 103 (2006).

23. Lee Petherbridge, *On the Development of Patent Law*, 43 *LOY. L.A. L. REV.* 893, 907–08 (2010).

24. See, e.g., Christopher A. Cotropia, *Nonobviousness and the Federal Circuit: An Empirical Analysis of Recent Case Law*, 82 *NOTRE DAME L. REV.* 911, 916 (2007) (quoting ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY* 647 (3d ed. 2002)) (“The [nonobvious] requirement ensures that patent protection is not given to inventions that have no social benefit because they are of minimal advance over what has already been done and ‘others would have developed the idea even without the incentive of a patent.’”); Merces, *supra* note 20, at 13 (“Without it, anything differing only slightly from the prior art would be patentable.”).

25. ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY* 646 (3d ed. 2002). A counterargument is that patent law accelerates inventions that would happen anyways by dangling a further reward. See Chiang, *supra* note 4, at 41 (“The true benefit of a patent system is that it speeds up the inventive process, that is, patent incentives accelerate inventions.”). Perhaps, the argument might go, a lack of a nonobviousness requirement might cause inventions that might occur far in the future to be made much sooner. I am skeptical, however, that dangling the additional prospect of a patent is going to cause obvious advances to be made more quickly than they might otherwise because market pressures alone are already likely to result in the creation of truly obvious inventions regardless of the possibility of patenting those advances. Accord Merces, *supra* note 20, at 9 n.25 (“I would point out that this is another justification for the nonobviousness requirement. Although society may wind up granting monopoly rights over inventions that would have been made even in the absence of a patent system, at least it will not do so where the inventions are completely trivial.”).

26. MERGES & DUFFY, *supra* note 25, at 647.

27. Merces, *supra* note 20, at 13–14.



are independently developing contemporaneously with the patentee would result in a restriction on competition without any associated benefit—a windfall for the patentee, as it were, that comes from the public’s tree.

While this purpose is one with which nearly all would agree, identifying which patents are obvious is the real challenge. Much of this difficulty flows from the rather subjective nature of the obviousness inquiry: what is obvious to one is not necessarily obvious to another.<sup>28</sup> Perhaps, upon reading the doorknob example above, you were shocked that anyone might consider that invention to be obvious. “It sounds revolutionary to me,” you thought, “and maybe the inventor overcame some special problem in combining the metal shank with a clay knob.”<sup>29</sup> The problem is especially great when no further analytical framework is provided; in other words, simply being asked whether an invention is obvious or not is likely to lead to highly variable and unpredictable results.

Thus, the principal challenge courts face in dealing with the requirement of nonobviousness has been to develop some structure, some analytical framework in which the obviousness inquiry can be grounded.<sup>30</sup> The analysis has always started with the prior art—in other words, the evidence of what has been done before.<sup>31</sup> Beyond this starting point, however, the terrain becomes more variable.

Prior to *KSR*, there were at least three distinct stages in the development of the nonobviousness doctrine. The first stage was characterized by the inception of the doctrine, followed by a century of turmoil. In the middle of the nineteenth century, the Supreme Court crafted what would become the concept of nonobviousness in response to the doorknob scenario described above.<sup>32</sup> In its initial incarnation, the concept was referred to as the requirement of “invention.”<sup>33</sup> That invention requirement, however, was applied

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28. Gregory Mandel’s study of hindsight bias provides empirical support for the claim that obviousness is perspective-dependent (I hesitate to go so far as to call it subjective at the present time). Upon presenting two obviousness scenarios to a large group of pre-first year law students, he obtained results indicating that while some students thought the invention obvious, others did not. Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L. J. 1391, 1409 (2006).

29. Indeed, my own reaction on reading about the combination of a heater and a spreader in an asphalt-paving machine described in *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969), was that it was rather clever. The Supreme Court thought otherwise. *Id.* at 60 (“We conclude that the combination was reasonably obvious to one with ordinary skill in the art.”).

30. Petherbridge, *supra* note 23, at 906–07.

31. Using the prior art as a starting point is likely the result of obviousness’s outgrowth from the novelty requirement, as illustrated by *Hotchkiss*, 52 U.S. at 271 (1850). It is difficult to see any other starting point, however, or at least one grounded in any form of evidence.

32. *Id.*

33. The term “nonobvious” didn’t actually come into usage until its codification in the 1952 patent act; prior to that, it was often referred to as the requirement of “invention.” *See*

inconsistently; as Judge Learned Hand expressed in 1950, the Court's incarnation of the doctrine was "as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts."<sup>34</sup> The Court repeatedly attempted to articulate a practical, useful definition of the invention requirement,<sup>35</sup> and repeatedly failed, although by the 1940's, a dominant line of reasoning had developed that embraced the notion that to be patentable, an invention must "reveal the flash of creative genius, not merely the skill of the calling"; there must be "inventive genius," not merely that "expected of a mechanic skilled in the art."<sup>36</sup> This, the Court concluded, was grounded in the Constitution itself: Article I, Section 8, Clause 8 explicitly says "invention."<sup>37</sup> Yet there was a significant problem with the Court's "flash of creative genius" test. It failed to recognize that most technical advances are made by ordinary folks—engineers, scientists, and others who struggle with technological problems and whose hard work pushes technology forward—not just great men.<sup>38</sup> This gap between rule and practice led to the second stage in the development of the nonobviousness doctrine.

In response to a growing concern with what was perceived as an overly high standard of patentability, Congress enacted 35 U.S.C. §103 in an attempt to cabin the nebulous doctrine within a more structured framework.<sup>39</sup> Section

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Gregory Mandel, *The Non-Obvious Problem: How the Indeterminate Nonobviousness Standard Produces Excessive Patent Grants*, 42 U.C. DAVIS L. REV. 57, 82 (2008).

34. *Harries v. Air King Prods. Co.*, 183 F.2d 158, 162 (2d Cir. 1950).

35. *See, e.g., Enameled Metals Co. v. W. Conduit Co.*, 269 F. 620, 625 (6th Cir. 1920) ("[A]ll of the claims first contained in Patterson's application for a patent were rejected, 'as devoid of invention, covering an obvious choice of well-known steps to produce the desired result.'"); *In re Stevens*, 173 F.2d 1015, 1019 (C.C.P.A. 1949) ("The presence of invention is as essential to the granting of a design patent as to the granting of a mechanical patent, and obvious changes in arrangement and proportioning are no more patentable in one case than in the other."); *In re Diederichs*, 102 F.2d 215, 217 (C.C.P.A. 1939) ("In passing upon the patentability of combination claims we have frequently combined references and held that, in view of such references, an alleged new combination would be obvious to one skilled in the art, and hence unpatentable."); *Nat'l Casket Co. v. Stoltz*, 127 F. 158, 160 (C.C.S.D.N.Y. 1904) ("This change was obvious to an ordinarily skilled mechanic acquainted with the business of making coffins. No such advance in the art is perceived as to entitle the improvement to a patentable construction."), *aff'd*, 135 F. 534 (2d Cir. 1905); *Union Paper-Bag Co. v. Nixon*, 24 F. Cas. 649, 653 (C.C.S.D. Ohio 1873) ("The patentee will be protected from obvious modes, readily adopted without invention, for accomplishing the same end.").

36. *Cuno Eng'g Corp. v. Automatic Devices Corp.*, 314 U.S. 84, 91-92 (1941).

37. *See id.* ("Tested by that principle Mead's device was not patentable. We cannot conclude that his skill in making this contribution reached the level of inventive genius which the Constitution, Art. I, s 8, authorizes Congress to reward.").

38. John F. Duffy and Robert P. Merges, *The Story of Graham v. John Deere Company: Patent Law's Evolving Standard of Creativity*, in *INTELLECTUAL PROPERTY STORIES* 119 (Jane C. Ginsburg & Rochelle Cooper Dreyfuss eds., 2006).

39. 35 U.S.C. § 103(a) (2006) ("A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, 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

103 sought to add some formal structure and boundaries to the nonobviousness requirement: it expressly referenced the baseline standard (a person having ordinary skill in the art), it explicitly used the word “obvious” as opposed to alternatives such as “flash of genius” or “inventive requirement,” and it expressly noted that “[p]atentability shall not be negative by the manner in which the invention was made.” In other words, simply because an invention was created through hard work, as opposed to a flash of genius, would not preclude patentability.<sup>40</sup>

A crucial hurdle remained, however: whether the Supreme Court would conclude that this statutory codification of obviousness was inconsistent with the Constitution’s “invention” requirement.<sup>41</sup> In 1966, the issue came before the Court in a trio of cases headlined by *Graham v. John Deere Co.*<sup>42</sup> In *Graham*, the Court recognized Congress’s concern in enacting Section 103, but carefully avoided addressing the Constitutional issue directly.<sup>43</sup> Instead, the Court focused on the language Congress had enacted, articulating a series of steps for analyzing obviousness:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.<sup>44</sup>

While *Graham* and its accompanying cases represented the most detailed analysis of obviousness until *KSR* in 2007, over the decade following *Graham* the Court did address the issue three more times, each time concluding that the patent was obvious.<sup>45</sup> In addition, during this period two new noteworthy obviousness rules developed: the idea that, to be nonobvious, an invention that combines prior art elements must be “synergistic,” that is, have an effect greater than the sum of their parts; and that an invention that “simply arranges old elements with each performing the same function it had been known to perform, although perhaps producing a more striking result than in previous combinations” is unpatentable.<sup>46</sup>

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ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.”).

40. MERGES & DUFFY, *supra* note 25, at 120.

41. *Id.*

42. 383 U.S. 1 (1966).

43. MERGES & DUFFY, *supra* note 25, at 135–38.

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

45. *See* *Dann v. Johnston*, 425 U.S. 219 (1976) (holding automatic record-keeping machine was obvious); *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976) (holding that barn cleaning system was obvious); *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969) (holding that concrete paving machine was obvious).

46. *Sakraida*, 425 U.S. at 282. Although the Court articulated these rules with

The third stage of the nonobviousness requirement began with the creation of the Court of Appeals for the Federal Circuit in 1983. The “Federal Circuit,” as it is colloquially called, was created with many of the same goals in mind that led to the 1952 Patent Act: to bring uniformity, stability, and consistency to patent law, and by doing so, to promote innovation.<sup>47</sup> Obviousness was a crucial component of this reform effort. During the first twenty-some years of its existence, the Federal Circuit developed a highly structured approach to obviousness that attempted to achieve these goals, much as it did in other areas of patent law.<sup>48</sup> As part of this process, the Federal Circuit imposed a fundamental requirement for any invention to be considered obvious: there must have been some “teaching, suggestion, or motivation” that would have led a person having ordinary skill in the art to create the invention.<sup>49</sup> Broadly characterized, “the Federal Circuit began to insist that a decision maker explain *why* a person having ordinary skill in the art would find a patent claim to be obvious.”<sup>50</sup>

While this “Teaching, Suggestion, Motivation” (or “TSM,” as it became known) requirement was not deployed by the court in every opinion,<sup>51</sup> it represented a reasonably stable analytical framework<sup>52</sup> for addressing the most challenging aspect of the obviousness inquiry: given the available prior art and the knowledge of a person of skill in the art, how does one actually determine whether the invention in a patent is obvious or not? The TSM requirement provided a framework in which parties could argue, and courts could analyze, this issue. It also offered a relatively bright-line test under which the Federal Circuit could evaluate district court determinations on obviousness, not simply because the court required the patent challenger to establish a teaching, suggestion or motivation, but because the Federal Circuit effectively cabined the places one could look for the necessary teaching, suggestion or motivation.

The Supreme Court’s grant of certiorari in *KSR v. Teleflex* on June 26, 2006,<sup>53</sup> however, cast a dark shadow over the continued existence of the TSM test, in large part because the petitioner in *KSR* presented a direct challenge to

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reference to what it referred to as a “combination patent,” that is, a patent for an invention that consists of a combination of prior art elements in a new way, it is worth noting that almost every invention can be characterized as a combination of prior art elements. Thus, the reference to “combination patents” as a discrete category is not one that has been used to cabin this rule. *C.f.* *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[I]nventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.”).

47. Lee Petherbridge & R. Polk Wagner, *The Federal Circuit and Patentability: An Empirical Assessment of the Law of Obviousness*, 85 *Tex. L. Rev.* 2051, 2058 (2007).

48. *Id.* at 2059.

49. Petherbridge, *supra* note 23, at 910–12.

50. *Id.* at 911.

51. Petherbridge & Wagner, *supra* note 47.

52. *Id.*

53. *KSR Int’l Co. v. Teleflex Inc.*, 548 U.S. 902 (2006) (mem.).

the Federal Circuit's TSM requirement. That shadow materialized when the Court sharply rejected the specific way the Federal Circuit had been using TSM. Yet, despite its apparent rejection of TSM, the Court's opinion offered a grab bag of obviousness rules and principles.<sup>54</sup> While the Court criticized what it perceived as the Federal Circuit's overly rigid application of the TSM test,<sup>55</sup> it did not condemn the test in its entirety; to the contrary, it commented that the TSM test offered a "helpful insight" into the obviousness inquiry.<sup>56</sup> Similarly, while the Court emphasized the flexible nature of the obviousness inquiry and offered variations on the theme that an improvement is likely unpatentable if it "is no more than the predictable use of prior art elements according to their established functions,"<sup>57</sup> the Court appeared to concede that to be obvious, there must be "an apparent *reason* to combine the known elements in the fashion claimed by the patent at issue."<sup>58</sup> That reason, however, might come from several sources: "interrelated teachings of multiple patents," "the effects of demands known to the design community or present in the marketplace," "the background knowledge possessed by a person having ordinary skill in the art,"<sup>59</sup> or in some cases, "common sense."<sup>60</sup>

Given this mixed bag offered by *KSR*, predictions of the effect it would have on the Federal Circuit's obviousness jurisprudence varied widely. As Ali Mojibi noted a few years after the Court's decision, disagreement over even just the basic question of whether the Supreme Court rejected or left intact the

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54. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). For those wishing more detail on the case itself, there are innumerable summaries of *KSR*. See, e.g., Symposium, *KSR v. Teleflex: The Nonobviousness Requirement of Patentability*, 17 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 875 (2007); Daralyn J. Durie & Mark A. Lemley, *A Realistic Approach to the Obviousness of Inventions*, 50 *WM. & MARY L. REV.* 989 (2008); Mandel, *supra* note 5; Joshua Sarnoff, *Analysis of Supreme Court Patent Law Decision in KSR v. Teleflex*, AM. U. PROGRAM INFO. JUST. INTELL. PROP., <http://www.wcl.american.edu/pijip/ksr.cfm> (last visited May 13, 2013).

55. *KSR*, 550 U.S. at 415 ("We begin by rejecting the rigid approach of the Court of Appeals. Throughout this Court's engagement with the question of obviousness, our cases have set forth an expansive and flexible approach inconsistent with the way the Court of Appeals applied its TSM test here.").

56. *Id.* at 418 ("When it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious, the Court of Customs and Patent Appeals captured a helpful insight.").

57. *Id.* at 417.

58. *Id.* at 418 (emphasis added). The Court went on to note that "[a]lthough common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id.*

59. *Id.*

60. *Id.* at 420 (referencing the ability of a person having ordinary skill in the art to use common sense to "fit the teachings of multiple patents together like pieces of a puzzle"). The Court also stated that "[r]igid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *Id.* at 421.

TSM test persisted in the wake of *KSR*.<sup>61</sup> And that disagreement continues.<sup>62</sup>

The purpose of this study is to help resolve this disagreement through empirical analysis.

### B. *Prior Empirical Studies on Obviousness*

This study represents the first comprehensive examination of whether and how the Federal Circuit's obviousness jurisprudence has changed since *KSR*. While scholars have previously conducted studies of the obviousness doctrine, nearly all of these studies involved cases decided before *KSR v. Teleflex*, and thus provide only a baseline from which to examine changes.<sup>63</sup> The two studies that were conducted after *KSR* have involved relatively short time periods that heavily circumscribe the inferences that may be drawn from them.<sup>64</sup>

## II. STUDY DESIGN AND METHODOLOGY

### A. *Overall Approach*

The basic methodology of this study is an application of the established technique of "content analysis," in which researchers systematically read and empirically analyze textual data sources.<sup>65</sup> Underlying the technique of content

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61. Ali Mojibi, *An Empirical Study of the Effect of KSR v. Teleflex on the Federal Circuit's Patent Validity Jurisprudence*, 20 ALB. L.J. SCI. & TECH. 559, 572-73 n. 65 (2010).

62. See *supra* notes 4-5 and accompanying text.

63. In addition to the Wagner & Petherbridge study, the studies of which I am aware are: Cotropia, *supra* note 24, at 925; Mojibi, *supra* note 61, at 575; and 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 (2010). In addition, Glynn S. Lunney Jr. has empirically examined the percentage of patentee losses that are due to obviousness. See Glynn S. Lunney, Jr., *E-Obviousness*, 7 MICH. TELECOMM. & TECH. L. REV. 363 (2001); Lunney & Johnson, *supra* note 9. This Article is not intended to provide a comprehensive overview of prior empirical studies of obviousness; however, where relevant prior studies are referenced and discussed. For a more detailed summary of prior empirical studies of obviousness, see Mojibi, *supra* note 61, at 570-71.

64. Mojibi, *supra* note 61, at 575 (including cases decided between September, 1, 2004 and February 28, 2009); Nock & Gadde, *supra* note 63, at 382 (including cases decided during the two and a half years following *KSR*). There are additional limitations of these studies. Nock and Gadde, while coding for a variety of obviousness parameters, examined only post-*KSR* decisions and then compared their results with Cotropia's pre-*KSR* study. Such cross-study comparisons present significant problems that may skew the results. For example, Cotropia's data set included Rule 36 summary affirmances on the issue of obviousness while Nock and Gadde do not mention including these determinations. Mojibi's analysis, in turn, analyzed obviousness determinations regardless of source, conflating appeals arising from the PTO with those arising from the district courts. This practice may mask what is really going on, as discussed in Part III.

65. Mark A. Hall & Ronald F. Wright, *Systematic Content Analysis of Judicial Opinions*, 96 CALIF. L. REV. 63, 67-76 (2008) (describing the methodology of content analysis in the context of legal studies). Numerous studies have applied this methodology in

analysis is the fundamental idea that judicial opinions should be read systematically and relevant information about each opinion recorded while or shortly after the opinion is read.<sup>66</sup> Content analysis thus holds as its goal the creation of a set of systematically collected data—that, ideally, can be empirically tested—about the shape and contours of the law, and stands in contrast to other approaches to legal scholarship that focus on carefully interpreting a small set of opinions that are considered “important.”<sup>67</sup>

The process of content analysis involves three fundamental steps.<sup>68</sup> First, the investigator assembles a set of cases likely to contain information about the issues being explored. Second, those cases are systematically read and coded to collect both information about the case (such as its name and date) as well as information about its content as it relates to the relevant legal issues. Finally, the resulting data is analyzed, with patterns described and hypotheses tested.

There are, of course, limitations to consider when applying content analysis. Reliability—the ability of others to reproduce the results of the study—is an important concern.<sup>69</sup> To maximize reliability and reproducibility, a researcher must follow a set of standardized procedures when collecting data. The specific procedures this study employs are provided in the project Codebook and include detail in far greater depth than it would make sense to provide here.<sup>70</sup>

A second concern about reliability arises in the form of subjectivity. Although on a theoretical level almost every piece of information about a case may involve at least a measure of subjectivity,<sup>71</sup> subjectivity may be minimized and reproducibility maximized by following a set of best practices.<sup>72</sup> For

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the area of patent law. *See, e.g.*, John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185 (1998); Kimberly A. Moore, Markman *Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231 (2005); Lee Petherbridge et al., *The Federal Circuit and Inequitable Conduct: An Empirical Assessment*, 84 S. CAL. L. REV. 1293 (2011); Petherbridge & Wagner, *supra* note 47.

66. Hall & Wright, *supra* note 65, at 64 (“Using this method, a scholar collects a set of documents, such as judicial opinions on a particular subject, and systematically reads them, recording consistent features of each and drawing inferences about their use and meaning.”).

67. Petherbridge & Wagner, *supra* note 47, at 2070.

68. *Id.* Although Petherbridge and Wagner refer to four “general components” (selecting cases, coding cases, counting case contents, and analyzing case coding), I see these four components boiling down to three basic steps.

69. *Id.* at 2074.

70. A codebook is a set of instructions for recording relevant information about each document or unit of analysis in a study. The codebook for this project also contains the procedure used to collect the dataset. The codebook is available upon request to the author.

71. Even a variable as seemingly totally objective, such as case name, can involve some subjective determinations: should abbreviations be used? Should it be recorded in short or long form? Should cases involving “In re” be recorded using the party’s full name or just the last name? Virtually everything contains some element of subjectivity, but it may often not make much of a real difference.

72. Hall & Wright, *supra* note 65, at 66 (describing a set of “best practices” for use in studies employing content analysis).

example, in this study some pieces of information, such as case name and opinion date, were obtained through direct downloads from Westlaw and involved no human determinations. Much of the information used in this study, however, was necessarily collected by humans and involved inherently subjective determinations. Here, too, procedures were followed so as to minimize subjectivity. For example, the human coding was categorical, requiring coders to independently place an assessment into a set of predetermined and predefined categories.<sup>73</sup> This approach helped minimize the subjectivity of determinations.<sup>74</sup>

Issues of reliability and subjectivity were also addressed through the use of independent coders who read a sample set of cases and coded applicable fields. The reliability of the coding was assessed using a measure of coder agreement known as Cohen's kappa, with the results reported in the Appendix.<sup>75</sup> This measure provides some indication of the degree of reproducibility and subjectivity of the results reported in this article.

While reliability is an important issue to consider in all content analysis studies, studies of cases raise additional concerns that spring from the substrate itself: unobserved reasoning, selection bias, strategic behavior, and the question of who is actually drafting the opinions.<sup>76</sup> Drawing conclusions about the law from judicial opinions assumes that the facts and reasoning in an opinion accurately reflect those of the decisionmaker.<sup>77</sup> But that assumption may be false. An opinion author might present a biased view of the facts or might not reveal his or her true reasoning. Selection bias is also a concern: the set of cases reviewed at the appellate level is a subset of the set of cases that involved a final determination at trial, which is itself a subset of cases in which a lawsuit was filed, which itself is a subset of all potential cases in which a lawsuit might be filed.<sup>78</sup> There is also the potential for strategic behavior by parties or judges, such as the decision to emphasize one legal issue over another or the desire to

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73. Petherbridge et al., *supra* note 65, at 1307.

74. Hall & Wright, *supra* note 65, at 107-09.

75. *See id.* at 113-14 (identifying this technique as a best practice); Petherbridge et al., *supra* note 65, at 1352 (assessing intercoder reliability by this measure).

76. Petherbridge & Wagner, *supra* note 47, at 2070. Notably, these three concerns are present in conventional legal scholarship as well. *Id.*

77. Petherbridge et al., *supra* note 65, at 1304.

78. *Id.* at 1304-05; *see also infra* Part III.A.2 (discussing the effects of selection bias in this study). Note that at the case level, at least, there is good reason to think that parties may be unable to exercise substantial selection effects simply because most final determinations at the district court stage are likely to be appealed, and thus there is relatively little room for selection effects to operate. *See* David L. Schwartz, *Pre-Markman Reversal Rates*, 43 LOY. L.A. L. REV. 1073, 1103 (2010) (“[O]nce a final, appealable judgment has been entered, most cases involving claim construction disputes are appealed. The cost of appeal is low compared with the amount in dispute and the cost of litigating in the district court.”). This is not to say that selection effects may be occurring at the *issue* level, as parties choose which issues to focus their resources on. Nevertheless, given the centrality of the obviousness determination to a patent case, it seems likely that in most cases where obviousness is a significant issue, it is likely to be the subject of an appeal.



address a certain doctrine.<sup>79</sup>

A related concern is that judicial opinions reflect only what is actually in the opinions themselves, and one must keep in mind who the initial drafters of those opinions frequently are: judicial clerks.<sup>80</sup> Thus, it may be that the use of Supreme Court precedent, for example, reflects more the judicial clerks' knowledge of and reference to Supreme Court precedent than the judges'.

This concern is tempered, however, by three observations. First, although clerks frequently do write the initial draft of Federal Circuit opinions, it is the judges who are ultimately responsible for the contents of their opinions—not the clerks.<sup>81</sup> In addition, Federal Circuit judges are likely to be especially conscious of the contents of their opinions following a major Supreme Court decision reversing the court on a doctrinal territorial over which the Federal Circuit had enjoyed relatively free rein since its creation. Third, as an empirical matter, the data presented in Part III.C reflect changes in opinions over a period of several years. Such a long-term pattern seems unlikely to be merely the work of a clerk or two choosing to use Supreme Court precedent for his or her own personal reasons.

A final limitation relates to the predictive power of a study of this type. This study describes what happened over a specific historical time period. Predictive conclusions based on this analysis should be made with caution, particularly given the ever-changing nature of the law.<sup>82</sup> Judges change; new cases and fact patterns arise; new issues come to the forefront. External changes may affect the future as well. Perhaps the patent office becomes stricter about obviousness, thus causing patents that might otherwise issue to be appealed to the Federal Circuit. Change happens and will inevitably affect what

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79. For example, shortly after the Supreme Court granted certiorari in *KSR v. Teleflex*, the Federal Circuit issued several opinions addressing the issue of obviousness that were widely viewed as an attempt to defend itself from criticism by the Supreme Court and others. See *KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (citing intervening Federal Circuit cases and noting that “the Court of Appeals has since elaborated a broader conception of the TSM test than was applied in the instant matter.”). A plausible conclusion to draw from these opinions is that the Federal Circuit sought to make a certain statement about its position on the TSM requirement as opposed to merely resolving the dispute before it.

80. Thanks to Jeffrey Lefstin for suggesting this concern.

81. This is not to say that clerks may not have a stake in the outcome of the judge's decision. See Janet A. Sniezek & Lyn M. Van Swol, *Trust, Confidence, and Expertise in a Judge-Advisor System*, 84 *ORG. BEHAV. & HUM. DECISION PROCESSES* 288, 289 (2001) (“Judges typically depend on Advisors for information and opinions and possibly support for their decisions. The Advisor, in turn, may have some stake in the Judge's decision. . . Outcome interdependency is not uncommon; the Advisor may get a percentage of the profits from the Judge's decision or suffer loss of reputation or job security following negative outcomes from the Judge's decision following advice.”).

82. Allison & Lemley, *supra* note 65, at 205 (“[E]ven the best predictive efforts in this area encounter fundamental limitations imposed by the fact that law and the litigation process change over time.”); see also Cotropia, *supra* note 24, at 929 (discussing the limited predictive ability of studies of past cases).

the court does in the future.

Yet despite these limitations, content analysis studies are a useful and important undertaking. True, there may be subjectivity involved, and there may be concerns that not everything about the court's jurisprudence is revealed through its opinions. But consider how legal analysis is typically performed: by reading court opinions and drawing conclusions about their meanings—in other words, analyzing their content. Content analysis takes this process a step further, requiring that cases be read systematically, with results methodically recorded. By engaging in this process, aspects of the law that have gone unobserved may be revealed and trends that were missed because of a focus on particular cases may emerge.<sup>83</sup> The real strength of content analysis lies in providing “an objective understanding of a large number of decisions where each decision has roughly the same value,”<sup>84</sup> a situation that arguably well describes the Federal Circuit's post-*KSR* obviousness jurisprudence.

Furthermore, because courts will decide future cases with reference to present opinions, this study does provide patent holders and challengers with a sense of what the future is likely to hold, despite the limitations discussed above. If, as this study finds, the court *has* developed a body of precedent that favors conclusions that patent claims are obvious more often than not, and that cites with approval the Supreme Court's references to common sense and predictable uses of prior art elements, then this represents a substantial shift that practitioners, judges, and scholars will need to take into account.

### B. *Data Collection*

The goal of the study was to systematically examine and code each observable determination<sup>85</sup> of obviousness for the ten years preceding grant of

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83. See Petherbridge et al, *supra* note 68, at 1305. The opposite may be true as well, as Hall and Wright observe: sometimes content analysis may miss important aspects about the jurisprudence that conventional approaches may spot. See Hall & Wright, *supra* note 65, at 82 (“As a vivid example, Mendelson points to the failure of political scientists to detect through the most sophisticated coding techniques the Supreme Court's subtle signals that it was about to change its attitude to right-to-counsel cases just prior to *Gideon v. Wainwright*. While the existing constitutional doctrine still depended nominally on the presence of ‘special circumstances,’ conventional legal scholars, by tuning in to the hints in the most recent line of cases, were able to predict correctly that the Court would abandon the old rule in favor of a broader right to counsel in felony cases.”).

84. *Id.* at 78.

85. In contrast with nearly all previous studies of obviousness, this study included Federal Circuit Rule 36 summary affirmances in its data set. The Federal Circuit has long employed a procedural mechanism, set forth in Federal Circuit Rule 36, under which it may summarily affirm a lower tribunal's judgment without opinion. See Fed. Cir. R. 36. Although prior studies have reasoned that this information is unlikely to change the results of the study, see Mojibi, *supra* note 61, at 580; *c.f.* Petherbridge & Wagner, *supra* note 47, at 2079 n.139 (indicating that Rule 36 affirmances were not included in the data set), critics of empirical studies of Federal Circuit jurisprudence—particularly those studies that examine outcomes—frequently point to the lack of Rule 36 summary affirmances and posit that they

certiorari in *KSR v. Teleflex* and the five years after the opinion issued.<sup>86</sup> To assemble a baseline dataset, the opinions this study used were obtained by searching Westlaw for opinions containing an obviousness determination. For the time period studied, these results represent the best available data.<sup>87</sup> In order to minimize under-inclusion errors, a broad electronic search was conducted so as to capture all possibly relevant opinions.<sup>88</sup> The resulting opinions were manually reviewed to ascertain whether they contained a determination as to obviousness.<sup>89</sup> This approach—of first conducting a broad

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could affect the results. See Moore, *supra* note 65, at 234–35. Such criticisms are far less relevant to content-analysis that looks at judicial reasoning because, due to the nature of Rule 36 summary affirmances (i.e.: they contain no written analytical substance), they do not provide any information about their underlying reasoning. See Petherbridge et al., *supra* note 65, at 1305 n.41 (2011). Thus, Rule 36 summary affirmances tend to be of relatively little importance in establishing the jurisprudential framework of patent law doctrines, and consequently provide no information relevant to Parts IV.B. For a possible exception to the preceding statement see Jonathan Masur, *Patent Inflation*, 121 YALE L.J. 470 (2011), for an argument that the outcomes of Federal Circuit review of patent office decisions pushes the patent office to expand the boundaries of patent law.

86. This article frequently refers to these two time periods as “pre-” and “post-” *KSR*. These references should be understood to refer to the time period before the Court granted certiorari and the time the opinion issued. The intervening period was not considered to be relevant to this study because of the high likelihood that the Federal Circuit’s behavior was altered by the Court’s grant of certiorari. See Mojibi, *supra* note 61, at 584–85.

87. Although some minor variations have been observed in the past between the contents of the WESTLAW “CTAF” database and the LEXIS “Federal Circuit, US Court of Appeals Cases” database, those variations are likely minimal for the time periods studied. See Jason Rantanen, *The Use of Online Databases for Legal Scholarship*, PATENTLY-O (Jan. 11, 2011, 6:30 AM), <http://www.patentlyo.com/patent/2011/01/search-differences-between-westlaw-and-lexis.html>. The same search conducted on the LEXIS Federal Circuit - US Court of Appeals Cases database produced 957 results.

88. The search encompassed all Federal Circuit cases between June 26, 1996 and April 30, 2012 that contained the term “patent” and at least two instances of a permutation of “obvious.” A broader search that included cases with only one permutation of “obvious” could have been used instead; however, given that any actual determination of obviousness is likely to use a permutation of “obvious” more than once, it was deemed acceptable to limit the search in this manner in light of the human time necessary to review each opinion. Due to their lack of substantive content, Rule 36 summary affirmances on the issue of obviousness were collected using a different methodology. To collect these determinations, electronic searches using the term “Fed. Cir. R. 36” and either “district court” or “patent” were conducted. Because there is no substantive content in the opinion itself, the parties’ briefs were reviewed to determine whether a determination on obviousness was necessary to the Court’s disposition. *C.f.* David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 239 (2008) (describing a similar methodology). For further details on these methodologies, see the study codebook, available upon request to the author.

89. Many of the Federal Circuit’s opinions use some permutation of “obvious” but do not involve determinations as to obviousness. Oftentimes the term appears in a background discussion of non-appealed issues. Other times the term is used in a non-dispositive order. Still other times, the opinion uses the word “obviously” to indicate some simplistic point. In addition to these non-relevant instances, specific types of obviousness-related determinations were deemed to be outside the scope of this study. These included: obviousness-type double patenting, obviousness of design patents, the question of an interference-in-fact, and en banc

electronic search and then reviewing the results by hand in order to determine relevance—is common in content analysis studies.<sup>90</sup> The complete procedure for data collection is provided in the codebook for this study, with a short identifier for each field provided in the Appendix to this Article.

A crucial step for analyzing court opinions is to establish the level at which information will be examined. Judicial opinions addressing issues such as obviousness involve a hierarchy of levels at which analyses can be performed and determinations made. For example, the opinion might address the obviousness of individual claims; it might address obviousness at a per-patent level, or it might group multiple patents or claim sets together within a single textual analysis. The opinion might also analyze multiple combinations of prior art references within one of these levels. These varied possibilities, which depend to some extent on the arguments being made to the court and the approach of the judge writing the opinion, can add substantial complexity to the data recording step.

To address this issue, this study reports data at two levels: court opinions and court analyses. Data relating to the appeal generally (such as case title and citation) and data relating to substance of the court's analysis are reported at the court opinion level. The former was automatically collected at the start of the study; the latter is provided at the court opinion level because many of the variables examined best lent themselves to capture at the opinion level (such as whether the Federal Circuit formally invoked the teaching, suggestion, or motivation test) and for interpretative consistency in Part III.B, a decision was made to treat the substance of the court's analysis at that level for all relevant variables.

Recording data at a different hierarchical level was necessary for examining outcomes. Although sometimes an opinion will contain just a single obviousness determination, on occasion the court will make multiple obviousness determinations within a single opinion. To address this, outcome-based coding was performed on a court analysis-specific level. The defining characteristic of a court analysis-specific record entry in the dataset is that it comprises a distinct analysis of an obviousness claim in an opinion for the court.<sup>91</sup> In many instances, a case is equivalent to a record entry. But in some

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denials. This set of exclusions is consistent with prior empirical studies of obviousness. *See* Cotropia, *supra* note 24, at 925; Mojibi, *supra* note 61, at 575; Nock & Gadde, *supra* note 63, at 386; Petherbridge & Wagner, *supra* note 47, at 2072. In addition, appeals of a decision to grant or deny a preliminary injunction were not included in the results due to the different standard applicable to such determinations, *see* *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1358-59 (Fed. Cir. 2001), a procedure consistent with the Cotropia study. Cotropia, *supra* note 24, at 924.

90. *See, e.g.*, Mojibi, *supra* note 61, at 575; Petherbridge & Wagner, *supra* note 47, at 2072.

91. This approach is typical of those used in prior empirical studies on outcomes in order to address the multiple-determination issue. Petherbridge et al., *supra* note 65; Mojibi, *supra* note 61. An alternative approach would be to treat each *patent* as a separate analytical unit, as was done by Cotropia, *supra* note 24. This approach presents several problems,

cases involving multiple patents, or multiple sets of claims within a patent, a case gives rise to multiple record entries because different patents or sets of claims are subject to different analyses. To be clear, if an opinion involved a claim by the patent challenger that four patents were obvious, and the court's analysis addresses all of the patents in a single analysis, then a single record entry was made in the dataset. By contrast, if the court used one analysis to conclude that one of the patents was obvious and then used a separate analysis to find that the other three were not, then two record entries are made in the dataset.<sup>92</sup>

The resulting dataset consisted of 389 court opinions and 158 Rule 36 summary affirmances on obviousness, containing a total of 583 outcome-based court analyses.<sup>93</sup> Approximately 57% of the obviousness determinations issued in the ten years before the Court granted certiorari in *KSR v. Teleflex* and

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however. First, because patents are made up of claims, and the validity of each claim is technically independent of other claims (even though for practical purposes all claims often stand and fall together), single patents may sometimes involve multiple determinations, thus raising the multiple analyses issue, as discussed by Cotropia. See Cotropia, *supra* note 24, at 925. Second, even single claims may be subject to multiple, completely distinct obviousness analyses. Consequently, using patents (or even claim sets) as the analytical unit does not solve the problem of multiple analyses in a single opinion. Furthermore, it is often the case that the court does not address patents independently in its analyses. For example, in *MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250 (Fed. Cir. 2012), five patents were at issue in the court's obviousness determination, all of which the court addressed collectively in a single textual analysis. Counting each of these patents as a separate analytical unit would overweigh this analysis relative to other analyses in which the court addressed only a single patent. Since the purpose of this study was to focus on the outcomes of actual determinations made by the Federal Circuit, not on the number of patents impacted by those determinations, a decision was made to avoid any confounding effects due to the presence of non-random variations in the numbers of patents involved in Federal Circuit appeals of obviousness.

92. Note that much of the language in the second half of this paragraph is taken directly from Petherbridge et. al., *supra* note 68, at 1305-1306 (on which I am a co-author). This was done intentionally in order to maximize the consistency of methodology across studies that I conduct. In addition, it should be noted that this study employed a relatively conservative approach to what constitutes a distinct unit of analysis in that multiple *arguments* as to obviousness were not treated as separate units of analysis nor was insubstantial parsing of separate claims. For example, if a patent challenger presented three separate combinations of prior art references and argued that all three rendered a single patent obvious, and the Federal Circuit analyzed all three combinations separately, it was nevertheless recorded as a single court analysis. Similarly, if the Federal Circuit discussed the obviousness of each claim of a patent, but in such a way that was insubstantially distinct, it was treated as a single court analysis. The reasoning for this study design decision was to avoid introducing variation due to the often indeterminate task of parsing out separate obviousness arguments, arguments that are frequently closely related to each another. One of the main differences between the results of various studies appears to stem from variations in what constitutes court analysis, specifically how "thinly" the analysis is sliced. To limit the effect of this variable, a conservative approach was selected so as to maximize reproducibility.

93. As previously noted, some opinions and two summary affirmances contained multiple outcome-based court analyses.

approximately 43% issued in the five years after the Court's opinion.<sup>94</sup> The Federal Circuit issued 18 opinions and summary affirmances between certiorari and the Court's opinion. These intervening opinions were not included in the analysis.<sup>95</sup>

### C. Analysis

The analyses provided in this study involve the use of several statistical techniques. The simple descriptive techniques, such as graphical representations, are self-explanatory or are explained in the text and footnotes. Other times the analysis draws upon the statistical argument that results are "significant," a contention that the observed results are not simply due to chance—that is, that there might be real differences in certain variables.

As a starting point, the coded cases represent essentially the entire universe of opinions during the time period.<sup>96</sup> Because this study reports data from the entire universe, the numbers are meaningful without any further statistical analysis and are, by definition, a statistically significant representation of the population.<sup>97</sup> Thus, when this study reports that during the five years following *KSR* the Federal Circuit reached a conclusion of "obviousness" in 168 out of the 229 post-*KSR* analyses in which it rendered a final disposition on the issue, it does not base this conclusion on a sample of the Federal Circuit's post-*KSR* analyses; it bases it on an examination of all the Federal Circuit's dispositions on obviousness during the five year period following *KSR*.<sup>98</sup>

Notwithstanding the foregoing, formal statistical analysis allows for

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94. During the ten year period prior to the grant of certiorari in *KSR v. Teleflex*, the Federal Circuit made determinations on obviousness 330 times in 242 opinions and 70 Rule 36 affirmances; following *KSR*, the Federal Circuit made 253 determinations in 147 opinions and 88 Rule 36 affirmances. Some caution should be used in interpreting the absolute numbers of Rule 36 affirmances pre-*KSR*, as the quantity may be affected in part by a reduced availability of Federal Circuit briefs in Westlaw. *Cf.* Jason Rantanen, *Recalibrating Our Empirical Understanding of Inequitable Conduct*, 3 IP Theory 98, 104 (noting the reduced availability of district court pleadings in Westlaw for the year 2000 compared with 2007).

95. For an analysis of Federal Circuit decisions on obviousness between the time certiorari was granted in *KSR v. Teleflex* and the time the opinion issued, *see* Mojibi, *supra* note 61, at 584–90 (concluding that the Court's grant of certiorari, alone, may have affected the Federal Circuit's decision-making during the intervening period).

96. I say "essentially" because it is possible that, particularly for the period prior to 2000, there may have been a small number of Rule 36 dispositions for which briefs are not available on Westlaw, and thus it was not possible to determine whether they involved obviousness determinations.

97. Hall & Wright, *supra* note 65, at 117-18; Petherbridge et al., *supra* note 65, at 1308.

98. This conclusion is, necessarily, subject to the identified population limitations and coder error. For example, this figure does not include analyses of obviousness in the context of preliminary injunctions.

stronger inferences to be drawn,<sup>99</sup> and thus was conducted here where appropriate. The primary statistical technique employed was a goodness-of-fit analysis using a Chi-Square test. The goodness-of-fit analysis compares observed values to values that would be expected based on prior knowledge in order to determine whether the variation is due to chance alone.<sup>100</sup> Thus, the null hypothesis being tested is that the observed data are consistent with the expected distribution, while the alternate hypothesis is that the observed data are not consistent with the expected distribution.<sup>101</sup>

The main question this study addresses is whether the observed post-*KSR* data are consistent with or not consistent with the data that would be expected based on the Federal Circuit's pre-*KSR* jurisprudence. Thus, to determine each relevant value that would have been expected after *KSR* based on the pre-*KSR* data, an expected frequency was calculated by dividing the total number of analyses post-*KSR* by the total number of analyses pre-*KSR* and multiplying that value by the actual pre-*KSR* value.<sup>102</sup> Using the values that would be expected after *KSR* and the values actually observed, a Chi-Square analysis was performed. In essence, the goodness-of-fit Chi-Square analysis employed here asks, "Is the Federal Circuit's practice after *KSR* consistent with its practice before *KSR*, given a pool of analyses that is the same size as the Federal Circuit's actual number of post-*KSR* analyses?"<sup>103</sup>

Using Table 1 as an example, in order to calculate the number of expected post-*KSR* determinations of "obviousness" (72) and "nonobviousness" (60), the pre-*KSR* "obviousness" (92) and "nonobviousness" (77) results were multiplied by the ratio of the total post-opinion results to the total pre-certiorari results (0.78 for District Court and ITC analyses).<sup>104</sup> This produced a set of values that would be expected for a total pool of analyses that was the size of the post-*KSR* data set. These numbers were then evaluated against the observed post-*KSR* determinations of "obviousness" (75) and "nonobviousness" (57).<sup>105</sup>

For purposes of these formal statistical analyses, significance is indicated by the letter *p*, which stands for probability.<sup>106</sup> Any *p*-value of 0.05 or lower is

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99. See Petherbridge et al., *supra* note 68 at 1308 (treating the dataset as a subset of a super-population despite having endeavored to collect the entire population of written decisions over the period studied).

100. DAVID S. MOORE, *THE BASIC PRACTICE OF STATISTICS* 579-83 (2010); see also ASTHANA & BRAJ BHUSHAN, *STATISTICS FOR SOCIAL SCIENCES (WITH SPSS APPLICATIONS)* 82-83 (2007).

101. Moore, *supra* note 100.

102. *Id.*

103. It should be noted that a Chi-Square test for independence, which would ask whether the outcomes from the two time periods are independent of one another, was not employed. This is because the question was not whether the two time periods were independent, but whether there had been a change from the court's behavior in the earlier time period.

104. See *infra* Table 1.

105. See *infra* Table 1.

106. ASTHANA & BHUSHAN, *supra* note 100, at 94.

considered statistically significant because it indicates that the probability that the results are due to chance is less than five percent.<sup>107</sup> Values between 0.05 and 0.1 are considered marginal, indicating that the probability that the observed results are due to chance is between five and ten percent.<sup>108</sup> In the case of the above example, the probability of the observed data being consistent with the expected data due to chance alone is 0.009, which is less than the significance threshold. Thus, the null hypothesis (that the observed post-*KSR* data are consistent with the expected post-*KSR* data) is rejected, providing evidence supporting the conclusion that the outcomes of the Federal Circuit's obviousness determinations after *KSR* are indeed different than those prior to *KSR*.

### III. RESULTS AND DISCUSSION

The overall goal of this study is to answer the question of whether the Federal Circuit changed its approach to the issue of obviousness after *KSR*, both in terms of what it did and what it said. The empirical data and analysis reported below suggest that the answer to both questions is yes. Since *KSR*, patentees and applicants have been less successful on the issue of obviousness (discussed in Part III.A). At the same time, the Federal Circuit has modified its approach to the question of obviousness to become more flexible (discussed in Part III.B).

#### A. Patentees Are Less Successful on Obviousness After *KSR*

How might one determine whether the Federal Circuit changed what it did on the issue of obviousness after *KSR*? One measure that is particularly important is the ultimate conclusion on the issue of obviousness that the Federal Circuit reaches in each case.<sup>109</sup> In other words, in what proportion does the Federal Circuit conclude that claims before it are obvious?

An important note on terminology: Throughout this article I frequently refer to "claims" for purposes of convenience and brevity. It should be understood that, unless otherwise clear from the context, I am collectively referring to the claims found in both patents and patent applications, the latter of which are commonly involved in appeals from the patent office. As discussed further below, while the same doctrinal framework of obviousness applies to both, differences in the procedural framework for analyzing these

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107. *Id.*

108. Petherbridge, Rantanen & Mojibi, *supra* note 68, at 1307.

109. Nearly every empirical study relating to obviousness reports on the ultimate conclusion of obviousness or nonobviousness. *See, e.g.*, Cotropia, *supra* note 24 (reporting obviousness); Mojibi, *supra* note 61 (reporting obviousness); Nock & Gadde, *supra* note 63 (reporting obviousness); Petherbridge & Wagner, *supra* note 47 (reporting obviousness); *c.f.* Petherbridge, Rantanen & Mojibi, *supra* note 88 (reporting data on inequitable conduct conclusions by the Federal Circuit).



two subsets can affect how the Federal Circuit treats them.

### 1. *A Caution About Overall Rates of Obviousness*

This study does not analyze the Federal Circuit's collective rate of obviousness determinations. Instead, it breaks obviousness determinations down into two main sets: those arising from the Patent Office and those arising from the district courts and International Trade Commission. These two categories are necessarily distinct because the basic character of appeals arising from the Patent Office differs greatly from those that arise from the trial courts.<sup>110</sup> Those cases that are appealed from the Patent Office consist almost entirely of rejections of patent applications on the ground that they do not meet the requirements of patentability.<sup>111</sup> For purposes of this and other studies examining the issue of obviousness, this means that the appeals involve a review of the Patent Trial and Appeal Board's<sup>112</sup> decision to affirm a patent examiner's rejection of a set of claims because they are obvious. Thus, three things can be noted about these appeals. First, they are reviews of an examiner's determination that an application is obvious within the context of an

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110. Included within the category of appeals arising from Patent Office are appeals involving rejections of patent applications, *see* 35 U.S.C. § 141 (2006), post-grant review proceedings, such as *ex parte* reexamination, *see* 35 U.S.C. § 306 (2006), and interference proceedings where a conclusion about the validity of a patent or application due to obviousness was involved, *see* 35 U.S.C. § 135 (2006) (Note that interference proceedings are in the process of being phased out as a result of the America Invents Act of 2011. Future studies will need to consider the newly created derivation proceedings as well, although those seem unlikely to involve an obviousness component). Included within the second category are all appeals arising from the district courts as well as appeals arising from the International Trade Commission. There were a very small number of appeals from the ITC within the dataset (six court analyses).

111. As noted above in note 110, there are other types of appeals that may arise from the Patent Office. However, even these appeals are different from those arising from the district court in that they often involve an *ex parte* proceeding as opposed to the *inter partes* contest that takes place before district courts and the ITC, they involve a prior review by a specialized patent appellate tribunal, and they apply a different standard of review. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1294 (Fed. Cir. 2012) ("This court reviews the Board's determination of obviousness *de novo* and the Board's factual findings for substantial evidence. Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion . . . . The Board's judgment must be reviewed on the grounds upon which the Board actually relied . . . . However, while we may not supply a reasoned basis for the agency's action that the agency itself has not given we will uphold a decision of less than ideal clarity if the agency's path may reasonably be discerned.") (citations omitted).

112. Prior to September 16, 2012, the Board of Patent Appeals and Interferences (BPAI) was the administrative tribunal that heard appeals arising within the patent office. On September 16, 2012, the BPAI was renamed the Patent Trial and Appeal Board as a result of the Leahy-Smith America Invents Act. *See Pending Appeals Not Impacted by BPAI->PTAB Transformation*, PATENTLYO.COM (Sept. 16, 2012), <http://www.patentlyo.com/patent/2012/09/pending-appeals-not-impacted-by-bpai-ptab-transformation.html>.

ex parte proceeding, where the applicant argues the patentability of the application with no one opposing.<sup>113</sup> Second, the Patent Office is subject to well-recognized externalities that favor the granting of patents.<sup>114</sup> Third, the applicant must be unwilling or unable to amend the claims so as to secure allowance; otherwise, the applicant would likely amend the claims or propose new claims to obtain the patent.<sup>115</sup> Taken together, these considerations suggest that the set of appeals arising from the Patent Office are likely to involve claims that are obvious by any reasonable measure.<sup>116</sup> If one were to envision a spectrum of obviousness, these are inventions that mainly fall toward the obvious end.<sup>117</sup>

In contrast, appeals arising from the district courts are likely to involve much harder analyses that tend to fall closer to the nonobvious end of the spectrum. This is because these cases entail confrontations between two parties with diametrically opposed interests: a patent holder seeking a judgment of liability and an accused infringer seeking the opposite result. The accused infringer succeeds by successfully pushing for patent invalidity while the patent holder must push back hard to prevent that outcome. Incentives thus differ greatly from those involved in the patent application proceedings discussed above.<sup>118</sup> In addition, these claims have already passed through the filtering

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113. Masur, *supra* note 85, at 487.

114. Jason Rantanen & Lee Petherbridge, Debate, *The America Invents Act Jeopardizes American Innovation*, 160 U. PA. L. REV. PENNUMBRA 229, 240 (2012), <http://www.pennumbra.com/debates/pdfs/AmericaInvents.pdf>; see also Masur, *supra* note 85, at 498 (discussing the PTO's incentives to favor granting patents).

115. As Christopher Cotropia points out, there is a countervailing possibility: that some portion of these appeals may be filed by applicants who believe the PTO's position is so weak that an appeal is a better option than amending the claims. See Cotropia, *supra* note 27, at 940. For these appeals, the bias may flow towards claims that are likely nonobvious. While it is an empirical question as to how often this happens, if this bias is especially strong, the results from Table 1 showing that the Federal Circuit reaches a conclusion of obvious in the vast majority of appeals arising from the PTO would be especially surprising.

116. To this can be added that appeals from the PTO involve a prior review by a highly specialized patent appellate tribunal, the BPAI. One might then view the Patent Office as a series of filters, with each successive layer filtering out more of the set of inventions that might be considered obvious until only the really obvious inventions make it to Federal Circuit review. *Cf.* Masur, *supra* note 85, at 474 (discussing the PTO's proclivity to grant any plausible patent and the tendency of only the inventions that push the boundaries of patentability being presented to the Federal Circuit).

117. See Lisa Larrimore Ouellette, *What Are the Sources of Patent Inflation? An Analysis of Federal Circuit Patentability Rulings*, 121 YALE L.J. ONLINE 347, 359 (2011) (examining appeals of patent application rejections during five years over the period 1990-2010 and finding that the Federal Circuit reversed the PTO in only nine of those cases). Note that simply because it may be an empirical reality that appeals arising from the PTO tend to involve patents that are, as a general matter, fairly obvious does not mean that this is the best result from a normative perspective. Indeed, given the extremely high affirmance rate of PTO obviousness decisions discussed below, there is good reason to question whether the PTO is being too deferential to applicants in its analysis of the issue of obviousness.

118. Joseph Farrell & Robert P. Merges, *Incentives To Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent*

mechanism discussed above, weeding out the easiest, most obvious patent claims,<sup>119</sup> and unlike patent applications examined by the PTO, are given a presumption of validity.<sup>120</sup> The result is a set of appeals involving claims that tend to be less obvious than those arising from the PTO and involving cases that are much harder fought.

Because the sets of appeals arising from these two sources have the potential to have a substantially different degree of obviousness—one containing inventions that mostly fall on the obvious end of the spectrum and the other containing inventions that are probably distributed closer to the middle—caution should be exercised when interpreting outcome-based data derived from a combination of both sets. For example, this study found that prior to *KSR*, the Federal Circuit found obviousness at an overall rate of 61%,<sup>121</sup> suggesting an obviousness requirement that is reasonably strong.<sup>122</sup> However, when this figure is examined more closely, and the two relevant pools broken out, a different story is revealed. The 61% figure turns out to be a combination of a high rate of finding claims in appeals from the Patent Office to be obvious—around 83%—and a much lower rate of finding claims appealed from the district courts to be obvious—around 46%.<sup>123</sup> These figures are strikingly different (and different from the 61% overall figure), and represent a more useful measure of patentee success on the issue of obviousness.<sup>124</sup>

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*Review Might Help*, 19 BERKELEY TECH. L.J. 943 (2004).

119. Masur, *supra* note 85, at 515 (noting that “[c]ases that reach the Federal Circuit will have run two selection gauntlets”). While Masur further supports his argument by applying Priest-Klein’s hypothesis that easy cases will settle, leaving only the most uncertain issues for judicial resolution, as I have explained elsewhere Priest-Klein does not apply to specific issues. See Jason Rantanen, *Why Priest-Klein Cannot Apply to Individual Issues in Patent Cases*, (U. Iowa Legal Studies Research Paper, Working Paper No. 12-15) available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2132810](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2132810). I would add to the above that cases decided in the district courts are probably less subject to the externalities that affect PTO determinations because district court judges lack (or at least, one hopes they lack) a vested interest in deciding patent cases in favor of one side or the other.

120. 35 U.S.C. § 282 (2006).

121. The sample size was 516. *Accord* Petherbridge & Wagner, *supra* note 47, at 2087 (reporting an overall rate of pre-*KSR* findings of obviousness of about 58%). Note that both figures represent only instances in which the court made a final determination on obviousness.

122. *See id.* at 2088 (“[H]aving reached an outcome of obvious nearly 60% of the time that it tested the issue, the Federal Circuit seems to have little problem finding claims obvious.”).

123. *See* Table 1; *see also* Cotropia, *supra* note 24, at 938 (reporting a pre-*KSR* rate of 85% obviousness for appeals from the PTO and and 48% obviousness for appeals from the district courts for the period from January 1, 2002–December 31, 2005).

124. In addition to the differences in patent versus patent application makeup discussed above, the two pools may potentially be subject to different collective standards of review, a point that further suggests that they should be analyzed separately. Appeals from the Patent Office that involve issues of obviousness frequently attack the PTO’s findings of facts, an issue on which it is accorded deference. *Cf.* Dennis Crouch, *How [Not] to Fight PTAB*

While this issue is substantial in terms of measuring outcomes, it is much less so when it comes to assessing the jurisprudential *content* of those opinions. This is because regardless of the procedural posture in which it is rendered, the court's legal pronouncements on the issue of obviousness apply with legal weight to both appeals arising from the district courts and appeals arising from the PTO.<sup>125</sup> Thus, while empirical analyses of outcomes should be careful to look at appeals arising from the two sources independently, there is less reason to do so when examining what the court is saying in those opinions.<sup>126</sup>

With this difference in mind, the next section examines how patentee success changed after *KSR*.

## 2. *The Federal Circuit Is Finding Obviousness More Often*

If the Federal Circuit has changed what it does when reviewing obviousness determinations, that change should be reflected in the court's ultimate conclusion on the issue of obviousness. If the Federal Circuit has become less favorable to patentees on obviousness—raising the bar for the validity of patent claims—then it should be concluding that claims are obvious more often than it did prior to *KSR*. Conversely, if the Federal Circuit has not changed what it does on the issue of obviousness, then one should not expect to see a change in the rate at which it concludes patent claims are obvious.<sup>127</sup> As Table 1 shows, the empirical results support the first hypothesis, that is, over the five-year period after *KSR* the Federal Circuit concluded that the claims it reviewed were obvious at a higher rate than during the ten-year period prior to the Supreme Court's grant of certiorari in *KSR*.

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*Obviousness Decisions*, PATENTLYO.COM (Jan. 8, 2013), <http://www.patentlyo.com/patent/2013/01/how-not-to-fight-ptab-obviousness-decisions.html> (“Conclusions of fact made by the USPTO’s appellate board are reviewed for substantial evidence.”). Appeals from the district courts, on the other hand, often arise in the context of summary judgment, review of which is without deference. In the case of obviousness, however, it is worth noting the ultimate determination of obviousness is a question of law, which the court reviews without deference. *See* *Therasense, Inc. v. Becton, Dickson and Co.*, 593 F.3d 1325, 1336 (Fed. Cir. 2010) (concluding that asserted claims would be obvious as a matter of law). This is not to say that deference to factual determinations is irrelevant to the obviousness determination; merely to point out that within the obviousness determination the court possesses a mechanism under which it need not defer to findings made at the trial court level.

125. *See* *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (appeal arising from PTO citing Federal Circuit opinion in appeal arising from district court as precedent); *Cross Med. Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1322-23 (Fed. Cir. 2005) (appeal arising from district court citing Federal Circuit opinion in appeal arising from PTO as precedent).

126. As is done in Parts III.B and C.

127. At this point, you may be saying, “Wait, there’s a potential selection bias issue, in that perhaps patent holders and challengers have changed their own behavior, and thus the Federal Circuit’s jurisprudence has changed even while standing still.” Read on.

TABLE 1. FEDERAL CIRCUIT DETERMINATIONS OF OBVIOUSNESS BEFORE AND AFTER  
*KSR*<sup>128</sup>

	Nonobvious	Obvious
<i>Appeals arising from District Courts and ITC</i>		
Pre-Certiorari	92 (54%)	77 (46%)
Post-Opinion	57 (43%)	75 (57%)
Expected if no change	72	60
<i>Appeals arising from PTO</i>		
Pre-Certiorari	20 (17%)	98 (83%)
Post-Opinion	4 (4%)	93 (96%)
Expected if no change	16	81

Chi-square for actual post-opinion versus expected  $p < 0.01$  for appeals arising from District Courts and ITC.<sup>129</sup> Chi-square for actual post-opinion versus expected  $p < 0.01$  for appeals arising from the PTO.<sup>130</sup>

128. Table 1 reports the results where the Federal Circuit has reached a final determination on the issue of obviousness. This is not always the case. In some instances, the Federal Circuit remands to the lower tribunal for further action on the issue of obviousness. These opinions can take a variety of forms, such as those in which the Federal Circuit vacates a summary judgment of obviousness or remands a case to the Patent Office for further findings.

129. In order to calculate the number of expected determinations of obvious and nonobvious, the obvious and nonobvious pre-*KSR* results were multiplied by the ratio of the total post-opinion results to the total pre-certiorari results. This produced a set of values that would be expected for a total pool of analyses that was the size of the post-*KSR* data set. *See supra* Part II (discussing methodology).

130. Another way to present this data would be to include instances where the Federal Circuit reached no final determination on obviousness, generally because it vacated the lower tribunal's determination and remanded for further proceedings. Prior to *KSR*, the Federal Circuit reached no final determination on obviousness in appeals arising from the district court and ITC 37 times and PTO determinations 6 times; after *KSR*, it reached no final determination in appeals arising from the district courts and ITC 18 times and from the PTO 6 times. Including this in the statistical analysis reported above does not change the result; both categories continue to exhibit statistically significant differences.

Table 1 provides data for two categories: (1) appeals arising from the district courts and International Trade Commission (ITC), another forum where patent infringement suits are decided, and (2) appeals arising from the Patent Office. The Table reports the results for both written opinions and lower tribunal findings that were summarily affirmed under Federal Circuit Rule 36.

The data indicate that prior to *KSR*, when the Federal Circuit reached a final determination on the question of obviousness, the court concluded that the patent was obvious 43% of the time in appeals arising from the district courts and ITC. After *KSR*, the court reached a conclusion of “obvious” in appeals arising from these tribunals 57% of the time. This difference is statistically significant; that is, at the most commonly accepted level of statistical significance  $p < .05$ , one can conclude that it is not due to random chance alone.<sup>131</sup>

The same is true of appeals arising from the patent office: prior to *KSR*, the Federal Circuit concluded that the subject matter of these appeals was obvious 83% of the time; after *KSR*, the Federal Circuit concluded that they were obvious 96% of the time. During the five years following *KSR*, the Federal Circuit concluded that the patent was obvious in all but four appeals arising from the Patent Office in which it reached a final determination on the issue of obviousness.<sup>132</sup>

Perhaps, however, this data is simply an artifact of party selection bias affecting the underlying population of appeals that the court is reviewing. In other words, if the Federal Circuit has been reviewing more lower tribunal findings in which the subject matter of the appeal was objectively closer to the obvious end of the spectrum, the above results might not support a conclusion that the court has not become less favorable to patentees on the issue of obviousness. Under this explanation, a rise in the rate at which the Federal Circuit is finding claims to be obvious would be expected; these claims would be, after all, of lower quality than those filed prior to *KSR*. This explanation, however, is highly unlikely for several reasons.

First, if there was a selection bias following *KSR* it would logically push toward a situation in which the Federal Circuit is reviewing more patents that are objectively closer to the nonobvious end of the spectrum than the obvious end. This is because to the extent *KSR* was perceived by the community of patent litigators and prosecutors as having an effect, it was perceived as

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131. The differences were also statistically significant at the  $p = 0.05$  level when Rule 36 summary affirmances were excluded.

132. The three written opinions are: *In re Glatt Air Techniques, Inc.*, 630 F.3d 1026 (Fed. Cir. 2011) (reversing PTO determination that a particulate coating device was obvious); *In re Klein*, 647 F.3d 1343 (Fed. Cir. 2011) (reversing PTO determination that a nectar mixing device was obvious); and *In re NTP, Inc.*, 654 F.3d 1279, 1298–99 (Fed. Cir. 2011) (reversing PTO determination that an electronic mail invention was obvious in the context of affirming other findings of obviousness). The fourth was a summary affirmance of a determination that the patent was obvious under Federal Circuit Rule 36. *Dupaco, Inc. v. Kappos*, 441 Fed. App'x 769 (Fed. Cir. 2011).

lowering the bar for finding a patent to be obvious.<sup>133</sup> No one thought that *KSR* somehow raised the bar and made it more difficult to find a patent obvious. Following *KSR*, attorneys believed that it had become easier to establish that a patent that was obvious.

Thus, to the extent that this perception of *KSR* affected parties' decisions to appeal findings of obviousness, its effect on appeal selection would have resulted in a higher quality pool of patent claims being reviewed (i.e., patents objectively closer to the nonobvious end of the spectrum) than prior to *KSR*. *KSR* likely emboldened patent challengers to contest findings of nonobviousness and stand on findings of obviousness (as opposed to settling), even when the patent would probably not have been obvious prior to *KSR*.<sup>134</sup> Put another way, after *KSR*, accused infringers likely became more aggressive in seeking review of lower tribunal findings of nonobviousness.<sup>135</sup>

Furthermore, this effect of *KSR* would be felt at each layer of the dispute selection process. Thus, to the extent *KSR* was perceived as making a finding of nonobviousness more difficult and a finding of obviousness easier, it may have affected parties' decisions on which patents to sue on and on what settlements to accept during litigation, and it may have emboldened district courts to reach conclusions of obviousness more often. Furthermore, although only a small number of patents involved in this study issued after *KSR*,<sup>136</sup> the Court's opinion may have affected the quality of those patents as well; specifically, they would have been issued in a world where crossing the obviousness threshold was more difficult than before.<sup>137</sup> The cumulative effect of all these individual decisions may have resulted in a selection bias towards a pool of objectively higher quality patents being reviewed by the Federal Circuit in its appeals; it is highly doubtful that it would have produced an objectively lower quality pool of patents.

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133. See *supra* note 5.

134. The general perception of *KSR* would have had a similar effect on the decisions of patent holders: patent holders would be less willing to contest findings of obvious and stand behind findings of nonobvious (as opposed to settling) than they would have been prior to *KSR*.

135. Nock & Gadde, *supra* note 63 at 392 ("This shift toward a larger percentage of nonobvious decisions being appealed is likely attributable to accused infringers being emboldened by *KSR* to appeal findings of nonobvious below.").

136. I reviewed the data for the years in which there was an opinion to see how many patents involved in the action had a number greater than 7,210,169 (the last patent issued before the *KSR* opinion. Eight of the 132 court analyses involved a patent granted after *KSR*.

137. It should be noted that going forward, *KSR* is likely to continue to have a significant effect on patentability decisions. See, e.g., Examination Guidance Update: Developments in the Obviousness Inquiry After *KSR v. Teleflex*, 75 Fed. Reg. 53,643 (September 1, 2010).

TABLE 2. DISTRICT COURT AND ITC DETERMINATIONS OF OBVIOUSNESS BEFORE AND AFTER *KSR*<sup>138</sup>

	Nonobvious	Obvious
Pre-Certiorari	99 (48%)	107 (53%)
Post-Opinion	80 (53%)	70 (47%)
Expected if no change	72	78

Chi-square for actual post-opinion versus expected  $p=0.20$

The empirical evidence is consistent with this story and not consistent with the alternative. Table 2 provides the obviousness posture of the patents being reviewed by the Federal Circuit; this could be called the substrate from which the court works. The columns contain the lower tribunal's conclusion—did it find the patent to be obvious or did it find the patent to be nonobvious—while the rows indicate whether the appeal was decided before or after *KSR*. Prior to *KSR*, 48% of the analyses reviewed by the Federal Circuit for obviousness involved findings of “nonobvious” by the lower tribunals; after *KSR*, that number rose slightly to 53%, a difference that is not statistically significantly different.<sup>139</sup> In other words, following *KSR*, a slightly larger proportion of the analyses being reviewed by the Federal Circuit came before it after a decision had already been made that the patent was nonobvious.

Put another way, the hypothesis that after *KSR* the Federal Circuit was reviewing a lower quality population consisting of objectively more obvious patents is probably not correct—to the contrary, if anything, the data are more consistent with the alternate hypothesis: the patents being reviewed by the Federal Circuit following *KSR* are objectively less obvious than they were prior to the Court's opinion.

Given the foregoing, it is unlikely that selection bias explains the rise in Federal Circuit conclusions of obviousness following *KSR*. Rather, if selection bias is affecting the population of patents that the Federal Circuit is reviewing, it is doing so in a way that makes the Federal Circuit's rulings even more significant: the Federal Circuit is finding the patents it is reviewing to be

138. Table 2 reports the district court and ITC determinations of obviousness that were reviewed by the Federal Circuit; it does not report the entire population of district court and ITC determinations of obviousness, some portion of which may be settled or not appealed.

139. The difference is not statistically significant when examined using a chi-square analysis. If one considers the data provided in Table 2 to essentially constitute the population, then it could be argued that it is necessarily statistically significant. Even in that case, however, the change is relatively modest.



obvious more often than it was prior to *KSR*, even as it considers a pool of patents that were objectively less obvious than it considered prior to *KSR*.

3. *Patent Challenger Success Is Taking the Form of Increased Affirmances of Lower Tribunal Findings that Patents Are Obvious*

If patent challengers are succeeding more often at the Federal Circuit, has that success manifested in a particular way? In other words, since *KSR*, has the law of obviousness changed in terms of its substance or is the Federal Circuit instead granting more leeway to lower tribunal findings that patents are obvious? An answer to these questions might be found in an examination of the Federal Circuit's affirmance rates on the issue of obviousness to determine whether and how the rate at which the Federal Circuit was affirming lower tribunals changed after *KSR*. An overall view of the court's overall affirmance rates is presented in Table 3.

TABLE 3. FEDERAL CIRCUIT DISPOSITION RATES ON OBVIOUSNESS (N=422)

	Affirmed	Reversed	Vacated
Appeals arising from District Courts and ITC			
Pre-Certiorari	135 (66%)	39 (19%)	31 (15%)
Post-Opinion	111 (74%)	24 (16%)	14 (9%)
Expected if no change	98	28	23
Appeals arising from PTO			
Pre-Certiorari	101 (81%)	16 (13%)	7 (6%)
Post-Opinion	94 (91%)	3 (3%)	6 (6%)
Expected if no change	84	13	6

Chi-square for actual post-opinion versus expected for appeals arising from District Courts and ITC,  $p=0.06$ . Chi-square for actual post-opinion versus expected for appeals arising from the PTO,  $p<0.01$ .

Table 3 suggests that the Federal Circuit's affirmance rate post-*KSR* is, if anything, higher than it was prior to *KSR*. There is a statistically significant difference in appeals arising from the PTO, and a borderline difference in the appeals arising from the District Courts and ITC.<sup>140</sup>

One possible explanation for these results is that perhaps they are due to greater doctrinal stability following *KSR*. In their classic study of the Federal Circuit's obviousness jurisprudence, Petherbridge and Wagner measured the doctrinal stability of obviousness by examining the frequency with which the Federal Circuit affirmed, reversed, or vacated the decision of the lower tribunal on the question of obviousness.<sup>141</sup> Even using a more conservative measure of affirmances,<sup>142</sup> the authors found that the Federal Circuit affirmed the lower tribunal on the issue of obviousness 65% of the time during the pre-*KSR* period studied.<sup>143</sup> From this affirmance rate, they drew the conclusion that the Federal Circuit has been somewhat successful in achieving predictability and stability in the obviousness doctrine.<sup>144</sup>

If Petherbridge and Wagner's reasoning is correct, then the results presented above lead to the surprising conclusion that since *KSR* the obviousness doctrine has become, if anything, more stable than prior to *KSR*. Rather than throwing the standard for obviousness into chaos and uncertainty, lower courts seem to be getting it right even more often on the issue of obviousness, at least in the view of the post-*KSR* Federal Circuit.

There is, however, an alternative explanation: perhaps the Federal Circuit has become more tolerant of district court findings of obviousness than it was before *KSR*. In other words, in *KSR*, the Court sent a procedural signal to the Federal Circuit: be a little more tolerant of what the trial courts might do with obviousness. Don't make trial courts explain too hard how the obviousness is actually manifesting. Be more flexible when it comes to lower tribunal

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140. Note that at least a portion of this appears to be due to an increase in the use of Rule 36 summary affirmances on the issue of obviousness. In the ten years prior to *KSR*, the Federal Circuit used Rule 36 summary affirmances to affirm determinations on obviousness by district courts and the ITC 27 times; in the five years following *KSR*, it did so 29 times (more than twice as often).

141. Petherbridge & Wagner, *supra* note 47, at 2076–77.

142. Because Petherbridge and Wagner did not include Federal Rule 36 summary affirmances in their study, they postulated that there are additional cases of obviousness in which the Federal Circuit agreed with the tribunal being reviewed, leading to the conclusion that the actual number of instances where the lower tribunal was affirmed is higher than reported. One countervailing limitation on the Petherbridge and Wagner study is that they used an overall obviousness rate, as opposed to distinguishing between the two categories of tribunals discussed in this article.

143. Petherbridge & Wagner, *supra* note 47, at 2077.

144. *Id.* at 2078. While Petherbridge and Wagner do express some caution in interpreting this measure as a metric of stability, they conclude that—so long as one is somewhat cautious in claims about a solid causal link—the evidence suggests that since the Federal Circuit's affirmance rate on obviousness is higher than many other issues in patent law, its obviousness jurisprudence reflects somewhat greater predictability and stability. *Id.* at 2079.

conclusions that a patent claim is obvious. If this is true, it might appear that lower courts are getting it right more often because the CAFC is applying a lower procedural standard for the quality of the obviousness analysis. The increase in affirmance rates, then, would not indicate a bump in doctrinal uniformity and stability but rather a Federal Circuit that is more tolerant of a lack of that very uniformity and stability.

Table 4 offers a closer look at the Federal Circuit's affirmances by breaking out district court and ITC findings that patents are obvious and nonobvious. Prior to *KSR*, the Federal Circuit affirmed district court and ITC findings of obviousness about 60% of the time; since *KSR*, the Federal Circuit has affirmed these determinations over 80% of the time, a dramatic increase.<sup>145</sup> At the same time, its affirmance rate of lower tribunal findings of nonobviousness has not changed substantially, dropping from 72% to 68%..

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145. Because nearly all appeals from the Patent Office involve a finding of obviousness (122 out of 124 analyses), the increased affirmance rate for this subset is comparable to that of all appeals arising from the patent office. The increase remains of borderline significance ( $p = 0.072$ ).

TABLE 4. FEDERAL CIRCUIT DISPOSITIONS OF DISTRICT COURT AND ITC FINDINGS OF NONOBVIOUS AND OBVIOUS<sup>146</sup>

	Pre-certiorari	Post-opinion
Lower tribunal finding of nonobvious		
Reversed	15 (15%)	18 (23%)
Affirmed	71 (72%)	54 (68%)
Vacated	13 (13%)	7 (9%)
Lower tribunal finding of obvious		
Reversed	24 (23%)	6 (9%)
Affirmed	64 (60%)	57 (81%)
Vacated	18 (17%)	7 (10%)

These results support the conclusion that changes in outcomes on obviousness at the Federal Circuit are due to greater deference being granted to district court findings of obviousness, and are less consistent with the conclusion that the law of obviousness has substantively changed. If the Federal Circuit was truly applying a substantively different law of obviousness, the expectation would be that the rate at which the Federal Circuit affirms findings of nonobviousness would fall substantially at the same time as the rate at which it affirms findings of obviousness rose. This would suggest a substantive change in the law, because that change would be applied equally to both the court's treatment of lower tribunal findings of nonobvious and obvious. Instead, however, the rate at which the Federal Circuit affirms determinations of nonobviousness has changed only marginally, while the rate at which it affirms findings of obviousness has risen dramatically.<sup>147</sup> In other

146. The percentages in this table refer to the percentage of all lower tribunal findings of nonobvious or obvious that were reviewed by the Federal Circuit. For example, during the period of this study prior to the Supreme Court's grant of certiorari in *KSR*, the Federal Circuit reversed district court and ITC determinations of nonobviousness in 15 out of a total of 99 analyses, or 15% of the time.

147. The same point could be made by looking at the rate at which the Federal Circuit reverses and vacates lower tribunal findings of "nonobvious" or "obvious" instead. Prior to *KSR*, the Federal Circuit reversed or vacated lower tribunal determinations of "nonobvious"

words, the pattern of the Federal Circuit's affirmances since *KSR* does not evince a *substantively* changed obviousness jurisprudence; instead, it suggests a jurisprudence in which the Federal Circuit is giving greater deference when lower tribunals reach conclusions that patents are obvious.

Is this change just true for appeals from trials or does it also reflect a change in the Federal Circuit's approach to district court grants of summary judgment on obviousness? Writing shortly after *KSR*, John Duffy predicted that the Court's opinion would be a "Holy Grail" for patent challengers seeking to invalidate patents on the ground of obviousness because it reemphasized the role of judges in the determination.<sup>148</sup> The data in Table 5 are consistent with Duffy's prediction.

TABLE 5. FEDERAL CIRCUIT AFFIRMANCES OF DISTRICT COURT AND ITC FINDINGS OF NONOBVIOUS AND OBVIOUS BY DETERMINATION TYPE<sup>149</sup>

	Pre-certiorari	Post-opinion
Jury/bench finding of nonobvious affirmed	57 (84%)	41 (76%)
Summary judgment of nonobvious affirmed	7 (47%)	6 (46%)
Jury/bench finding of obvious affirmed	35 (66%)	21 (88%)
Summary judgment of obvious affirmed	23 (56%)	33 (80%)

While a high level of deference following a jury or bench trial is to be expected given the standard of review that the Federal Circuit applies to the factual components of the obviousness analysis,<sup>150</sup> the dramatic increase in the

28% of the time while after *KSR* the Federal Circuit reversed or vacated those determinations of "nonobvious" 32% of the time; in contrast, prior to *KSR* the Federal Circuit reversed or vacated lower tribunal determinations of "obvious" 40% of the time; since *KSR*, it has done so only 19% of the time.

148. See Duffy, *supra* note 5, at 37 (predicting that *KSR* would be a "Holy Grail" for accused infringers to challenge patents because it restated that "validity is an issue of law for judges to decide."); see also Justin Lee, How *KSR* Broadens (Without Lowering) the Evidentiary Standard of Nonobviousness, 23 Berkeley Tech. L.J. 15, 43 (2008) (discussing predictions about the effects of *KSR* on summary judgment of obviousness).

149. The percentages in this table refer to the percentage of all lower tribunal findings of nonobvious or obvious that were reviewed by the Federal Circuit. For example, during the period of this study prior to the Supreme Court's grant of certiorari in *KSR*, the Federal Circuit reversed district court and ITC determinations of nonobvious in 15 out of a total of 99 analyses, or 15% of the time.

150. The final determination of whether or not a patent is obvious is ultimately a legal

Federal Circuit's affirmation of summary judgment that patents are obvious is both startling and in line with what Duffy predicted.<sup>151</sup> It thus seems plausible that the Federal Circuit heard a message from the Supreme Court telling it to be more lenient when it comes to obviousness determinations, particularly in the context of summary judgment.<sup>152</sup> After all, *KSR* itself involved a grant of summary judgment that the patent was obvious that the Federal Circuit reversed before it was in turn reversed by the Supreme Court.<sup>153</sup>

While this evidence strongly supports the deference hypothesis, it should not be taken to conclusively establish that the Federal Circuit's obviousness jurisprudence is substantively unchanged. As discussed earlier, it is highly likely that the substrate that the court is examining has changed as a whole; in other words, it is conceivable the Federal Circuit is seeing claims in its analyses of nonobviousness that are themselves closer to the nonobvious end of the spectrum than the claims it reviewed prior to *KSR*. In addition, district courts themselves may be applying a substantively shifted law of obviousness as a

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conclusion; however, it is based on factual findings that the court reviews under a substantial evidence standard (in the case of jury findings) or clear error (in the case of a bench trial). *See, e.g., Duro-Last, Inc. v. Custom Seal, Inc.*, 321 F.3d 1098, 1108 (Fed. Cir. 2003) ("When a party has preserved its right to appeal the jury verdict by filing a valid JMOL motion on obviousness, we first review the underlying factual findings, whether explicitly made by special verdict or presumed as necessary to support the jury verdict, to ascertain whether they are supported by substantial evidence. Then we independently review the legal conclusion on obviousness based on those factual findings.") (citations omitted); *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004) ("While the ultimate determination of obviousness is a legal conclusion reviewed by this court without deference, that determination always entails various factual findings that this court reviews for clear error following a bench trial.").

151. *See, e.g., Eisai Co. Ltd. v. Dr. Reddy's Laboratories, Ltd.*, 533 F.3d 1353, 1356 (Fed. Cir. 2008) (describing the standard of review for summary judgment of obviousness).

152. *See Duffy, supra* note 5, at 37 (predicting that *KSR* would be a "Holy Grail" for accused infringers to challenge patents because it restated that "validity is an issue of law for judges to decide."); *see also* Justin Lee, *How KSR Broadens (Without Lowering) the Evidentiary Standard of Nonobviousness*, 23 *Berkeley Tech. L.J.* 15, 43 (2008) (discussing predictions about the effects of *KSR* on summary judgment of obviousness).

153. There may also be some party selection effects occurring here, although the potential for party selection seems to be relatively small on this issue. This selection would be driven by a perception among patent holders that their chances of success in persuading the Federal Circuit to reverse a grant of summary judgment that a patent is obvious is substantially greater than it actually is and perhaps resulting in some over-selection of clearly losing cases for appeal. Summary judgments are technically reviewed without deference to the district court, and a patent holder who loses at the district court might think it will get a fresh bite at the apple when it presents its case to the Federal Circuit even though in reality the Federal Circuit may be very cautious about reversing any type of obviousness determination after *KSR*. I'm hesitant about the explanatory power of this hypothesis, however, because it seems likely that this selection effect would be essentially the same before and after *KSR*. The vast majority of patent cases that result in a final determination by the district court are likely to be appealed, especially since the costs of an appeal would seem to be very small compared to the costs of invalidation of one's patent. Schwartz, *supra* note 81, at 1103. Thus, it seems likely that patent holders would nearly always appeal invalidation of their patents on the grounds of obviousness whether it occurred before or after *KSR*.

result of *KSR*; that the Federal Circuit is affirming decisions made under this substantively shifted law at about the same rate as it did prior to *KSR* is a possibility that cannot be discounted. That said, if indeed the court is operating under a substantively shifted law that causes it to reverse more findings of nonobvious and affirm more findings of obvious than it otherwise would, the increase in affirmance rates of obviousness after *KSR* suggests an even stronger deference to district court determinations of obviousness than the above data indicate on their face.

#### 4. *Federal Circuit Appeals of Obviousness Determinations Now Involve More Electronic, Chemical, and Biological Inventions*

Another possible explanation for the increase in Federal Circuit conclusions of obvious is that the inventions it is reviewing are themselves more obvious; in other words, perhaps there was a period of time during which the patent office issued a large number of patents and those patents have only recently begun to make their way into litigation.<sup>154</sup>

One way to address this question is to consider changes in the types of technologies that are involved in the appeals. There is a longstanding view that different types of technologies lend themselves better or worse to findings of obvious.<sup>155</sup> Mechanical technologies are perhaps more susceptible to conclusions in that they are simply the sum of their parts, with each component piece generally performing the function that one would expect it to.<sup>156</sup> Electronic inventions may have elements of complexity, and may produce some unexpected results.<sup>157</sup> Chemical inventions are even more likely to exhibit the vaunted “synergies,” thus taking them out of the immediate realm of the obvious.<sup>158</sup> Biological inventions may be particularly unpredictable, and

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154. It is worth noting that patent grant rates alone don't immediately support this hypothesis: from 1998 to 2009, the number of patents that the patent office granted each year remained roughly around 150,000 annually; it was not until 2010 when the current substantial uptick in patent grants began. See *U.S. Patent Statistics Chart Calendar Years 1963-2012*, U.S. PATENT AND TRADEMARK OFFICE (last updated Mar. 19, 2013), [http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us\\_stat.htm](http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm).

155. To see evidence of this view, one need look no further than *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and its companion case *Adams v. United States*, 383 U.S. 39 (1966). *Graham* was a mechanical device case, and the invention was found obvious; *Adams* was a case involving chemicals and electricity, and the invention was found nonobvious (the only instance since the nonobviousness requirement was created in the 1952 Patent Act that the Supreme Court reached this conclusion). But there are also numerous commentaries pointing out this same point. See, e.g., Wegner, *supra* note 3.

156. See *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976).

157. See *Adams*, 383 U.S. at 51.

158. See *Eisai Co. v. Dr. Reddy's Labs., Ltd.*, 533 F.3d 1353, 1359 (Fed. Cir. 2008) observing, in light of the Supreme Court's instruction in *KSR*, that, “[t]o the extent an art is unpredictable, as the chemical arts often are, *KSR*'s focus on . . . identified, predictable solutions' may present a difficult hurdle because potential solutions are less likely to be genuinely predictable”); *In re Mayne*, 104 F.3d 1339, 1343 (Fed. Cir. 1997) (quoting *In re*

even if obvious to try to make, they may be difficult to actually produce.<sup>159</sup>

FIGURE 1. TREND IN TECHNOLOGY DISTRIBUTION IN FEDERAL CIRCUIT OBVIOUSNESS ANALYSES IN APPEALS ARISING FROM THE DISTRICT COURTS AND ITC, 1996-2012<sup>160</sup>



Figure 1 visually presents the changes in distribution of technologies that were the subject of obviousness appeals to the Federal Circuit over the duration of the study.<sup>161</sup> Figure 1 provides a 30-unit moving (lagged) average that

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Soni, 54 F.3d 746, 750 (Fed. Cir. 1995)) (“The basic principle behind this rule is straight forward—that which would have been surprising to a person of ordinary skill in a particular art would not have been obvious. The principle applies most often to the less predictable fields, such as chemistry, where minor changes in a product or process may yield substantially different results.”).

159. See *In re Kubin*, 561 F.3d 1351 (Fed. Cir. 2009).

160. This chart presents a 30-analysis lagged average. Figure 1 includes all Federal Circuit analyses of obviousness in appeals arising from the district courts and ITC for the time period 1996–2012, including Rule 36 affirmances. It thus includes both analyses in which the Federal Circuit reached a final determination as to obviousness and analyses in which the Federal Circuit did not reach a final determination as to obviousness, as well as the set of analyses during the period between when the Court granted certiorari and issued its opinion.

161. Technologies were coded by placing the inventions within the broad categories of mechanical, electronic, chemical and biological. The electronic category included software inventions.



indicates what a person, standing at a given analysis, would see as a distribution of technologies if she looked back at the preceding thirty analyses. The averages are stacked, so that they total 100% at any given point of analysis. For reference, *KSR* was decided around analysis 227.

As is apparent from Figure 1, prior to *KSR* it could be said that approximately half of Federal Circuit obviousness analyses in appeals arising from the district courts and ITC involved mechanical devices, with the remainder being roughly evenly distributed between electronic, chemical, and biological technologies.<sup>162</sup> Since *KSR*, the proportion of analyses that have involved mechanical devices has dropped substantially, while electronic inventions now make up a greater proportion of Federal Circuit obviousness analyses.<sup>163</sup> In short, the technological makeup of Federal Circuit obviousness analyses appears to have shifted, with more challenges to technologies that were traditionally viewed as less predictable, and hence less vulnerable to an obviousness challenge.

The simplest explanation for this shift is that technology—and the technologies that are the subject of litigated patents—has itself shifted since 1996. Allison and Lemley’s seminal 1998 study, for example, reported that nearly 58% of litigated patents studied fell into the “general” category (which included run-of-the mill mechanical inventions), while 23% fell into the chemical category, and 19% were classified as electrical.<sup>164</sup> If the composition of the pool of patents that are litigated has changed since 1998, then perhaps the shift in technologies that are the subject of obviousness determinations is merely reflective of a broader trend in patent litigation, that is, litigations now involve a greater proportion of electronic (particularly software-based) patents than they did fifteen years ago.

Another explanation is that *KSR* made it so easy to find mechanical patents obvious that holders of patents on mechanical inventions have a diminished expectation of success at the appellate level, and thus are less likely to pursue infringement suits. This may be particularly true in light of the rise of the Federal Circuit’s reliance on the predictable variations rule from *KSR*,<sup>165</sup> which

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162. Consistent with this interpretation of Figure 1, this study found that 58% of analyses during the period prior to *KSR* involved mechanical technologies while 14% involved chemical and 25% involved electronic.

163. This study found that during the period after *KSR*, only 34% of analyses in appeals arising from the district courts and ITC involved mechanical technologies while 43% involved electronic and 19% involved chemical. The shift is similar, although less dramatic, in appeals arising from the PTO: prior to *KSR*, electronic technologies made up 37% of the Federal Circuit’s analyses, mechanical technologies made up 50%, and chemical technologies made up 6%; after *KSR*, electronic technologies made up 40%, mechanical technologies 37%, and chemical technologies made up 19%.

164. Allison & Lemley, *supra* note 68, at 217.

165. *See, e.g.*, *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1245 (Fed. Cir. 2010) (quoting *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007)) (“We conclude that the invention of the #649 patent represents no more than ‘the predictable use of prior art elements according to their established functions. . . .’”).

tends to apply especially strongly to mechanical components whose effects are relatively certain. The consequence is that any holder of a patent on a mechanical device that loses at the lower tribunal is probably going to lose at the Federal Circuit level as well. At the same time, *KSR* may have made it easier to find electronic inventions to be obvious, and thus emboldened challengers of those patents to invest more resources in pushing for a finding of obvious.

TABLE 6. TECHNOLOGIES ANALYZED FOR OBVIOUSNESS BY THE FEDERAL CIRCUIT PRE- AND POST-*KSR* BY RESULT IN APPEALS FROM DISTRICT COURTS AND ITC<sup>166</sup>

	Nonobvious	Obvious
Pre-Certiorari		
Biological	3 (75%)	1 (25%)
Chemical	14 (61%)	9 (39%)
Electronic	24 (53%)	21 (47%)
Mechanical	51 (53%)	46 (47%)
Post-Opinion		
Biological	4 (67%)	2 (33%)
Chemical	14 (52%)	13 (48%)
Electronic	21 (36%)	37 (64%)
Mechanical	18 (44%)	23 (56%)

166. Note that Table 6 includes only instances in which the Federal Circuit made a final determination on the issue of obviousness.

Table 6 indicates that, if this explanation is correct, it has worked out well for patent challengers and not so well for patent holders. As Table 6 shows, when the pre- and post-*KSR* rate of nonobvious to obvious determinations by the Federal Circuit is broken down by technology, it is apparent that the rate at which the Federal Circuit found inventions to be obvious went up in all areas of technology, with the largest for electronic inventions. In other words, even as the percentage of electronic inventions the Federal Circuit reviews has increased, the court has determined that a greater proportion of those inventions are obvious. Put in absolute terms, during the ten years prior to *KSR*, the Federal Circuit found 21 out of 45 electronic inventions to be obvious. In half that much time since *KSR*, the Federal Circuit has found 37 out of 58 electronic inventions to be obvious.

Thus, to summarize the evidence that patentees are less successful on obviousness after *KSR*:

- *Over the five years since KSR was decided, the Federal Circuit has reached a final determination of obviousness at a rate about 10% greater than during the ten-year period prior to the Supreme Court's grant of certiorari.*
- *At the same time, the substrate that the Federal Circuit reviewed has either remained the same or shifted to include a substantially greater proportion of findings of nonobviousness by the lower tribunal.*
- *While the overall rate at which the Federal Circuit affirms lower tribunals on the issue of obviousness has remained approximately the same, the rate at which it affirms findings of obviousness has risen while the rate at which it reverses findings of obviousness has fallen.*
- *Over the time period after KSR, a greater proportion of the technologies in which the Federal Circuit reviewed district court and ITC decisions on the issue of obviousness involved technologies that have been conventionally viewed as more complex (biological, chemical, and electronic), while fewer involved mechanical technologies. Nevertheless, the rate at which the Federal Circuit has found inventions to be obvious increased in all technological areas, with the greatest increase in the area of electronic inventions.*

#### B. *The Federal Circuit Has Changed What It Says About Obviousness*

As noted at the outset, following *KSR*, two predictions were made about its effects on the Federal Circuit's obviousness jurisprudence: that the court would change what it did and that the court would change what it said. The evidence discussed in the preceding section suggests that, indeed, patentees are less successful on obviousness after *KSR*. But has the court's articulation of the obviousness requirement—its rules and boundaries and standards and tests—changed since *KSR*?

To answer this question, this study examined the legal rule that was widely accepted as the most significant component of the Federal Circuit's pre-*KSR*

obviousness jurisprudence, asking whether the Federal Circuit's Teaching, Suggestion, or Motivation ("TSM") test remained in the court's lexicography following *KSR* (as some thought it might<sup>167</sup>) and, if not, what (if anything) has replaced it. As discussed below, the results reveal that the Federal Circuit has largely discontinued its formal use of the TSM test. The concept lives on in diminished form: while the requirement has endured that patent challengers identify some "reason to combine" or "reason to modify" prior art references to arrive at the claimed invention, it is hardly a reincarnation of the TSM requirement, both in terms of vigor and analytical structure. Instead, the Federal Circuit has read *KSR* to expand the ways in which a patent can be obvious, permitting the use of common sense as well as the idea that predictable uses of prior art elements according to their established functions are de facto obvious.<sup>168</sup>

As discussed in Part I, prior to *KSR*, the Federal Circuit employed a robust TSM requirement. To be sure, the Federal Circuit did not deploy it in all opinions,<sup>169</sup> but it was a relatively constant—and arguably stable<sup>170</sup>—analytical framework for addressing the most challenging aspect of the obviousness inquiry: given the available prior art and the knowledge of a person of skill in the art, how does one actually determine whether or not the invention in a patent is obvious or not? The TSM requirement provided a framework in which parties could argue, and courts could analyze, this issue.

### 1. *The Abandonment of "Teaching, Suggestion, or Motivation"*

Given the usefulness of this framework, one might reasonably expect that use of TSM would survive *KSR* in at least some form.<sup>171</sup> After all, the Supreme Court did not repudiate the use of TSM altogether.<sup>172</sup> And during the period

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167. See *supra* note 4.

168. *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.").

169. See Petherbridge & Wagner, *supra* note 50. It is also worth noting that it was described in highly flexible terms in a handful of instances as well. See *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1472 (Fed. Cir. 1997) ("[T]he suggestion to combine may come from the prior art, as filtered through the knowledge of one skilled in the art."); *Appl. of Bozek*, 416 F.2d 1385, 1390 (C.C.P.A. 1969) ("Having established that this knowledge was in the art, the examiner could then properly rely, as put forth by the solicitor, on a conclusion of obviousness 'from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference.'). *Bozek*, however, remained the anomaly not the norm.

170. Petherbridge & Wagner, *supra* note 50.

171. See, e.g., Simic, *supra* note 7, at 229–30 ("The Federal Circuit has not interpreted the *KSR* decision as having substantially altered the traditional test for obviousness, but instead stresses that it is only the method of applying the TSM test that has changed.").

172. *KSR*, 550 U.S. at 402 (citing *Graham v. John Deere Co.*, 383 U.S. 1 (1966)) ("There is no necessary inconsistency between the idea underlying the TSM test and the *Graham* analysis.").

between the Court's grant of certiorari and the issuance of its opinion, the Federal Circuit made a concerted effort to emphasize the flexibility of TSM,<sup>173</sup> an effort the Court commented on in *KSR* but explicitly declined to opine upon.<sup>174</sup> Even after *KSR* issued, the Federal Circuit seemed to emphasize the continued viability of its "new" TSM: "as the Supreme Court suggests, a flexible approach to the TSM test prevents hindsight and focuses on evidence before the time of invention."<sup>175</sup>

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173. See *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006) ("Our suggestion test is in actuality quite flexible and not only permits, but requires, consideration of common knowledge and common sense"); *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1291 (Fed. Cir. 2006) ("There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine. . . .").

174. *KSR*, 550 U.S. at 421 ("We note the Court of Appeals has since elaborated a broader conception of the TSM test than was applied in the instant matter . . . . Those decisions, of course, are not now before us and do not correct the errors of law made by the Court of Appeals in this case. The extent to which they may describe an analysis more consistent with our earlier precedents and our decision here is a matter for the Court of Appeals to consider in its future cases.").

175. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1260 (Fed. Cir. 2007). In the years immediately following *KSR*, the Federal Circuit repeated a version of this message several times. See, e.g., *Black & Decker, Inc. v. Robert Bosch Tool Corp.*, 260 F. App'x 284, 290 (Fed. Cir. 2008) ("This court has already said that the teaching, suggestion, motivation test remains good law for obviousness, only a rigid application of that test is problematic."); *Cordis Corp. v. Medtronic Ave, Inc.*, 511 F.3d 1157, 1172 (Fed. Cir. 2008) (quoting *KSR*, 550 U.S. at 402) ("The Supreme Court, however, stated that '[t]here is no necessary inconsistency between the idea underlying the TSM test and the Graham [v. John Deere Co., 383 U.S. 1 (1966)] analysis.'"); *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008) ("As this court has explained, however, a flexible TSM test remains the primary guarantor against a non-statutory hindsight analysis such as occurred in this case.").

FIGURE 2 USE OF TEACHING, SUGGESTION, OR MOTIVATION FRAMEWORK IN FEDERAL CIRCUIT OBVIOUSNESS OPINIONS, 1996-2012<sup>176</sup>



Despite the promise of a renewed use of TSM, Figure 2 shows that to the extent that some form of TSM remained after *KSR*, the Federal Circuit has come to rely on it substantially less often in its opinions. The results presented here are based on whether the court’s opinion used a teaching, suggestion, or motivation in reaching a conclusion on obviousness.<sup>177</sup> In order to be counted, the analysis had to textually reference a teaching, suggestion, or motivation to combine or modify the prior art—references to a “reason” to combine or modify were not counted here—and had to actually use the teaching, suggestion, or motivation to combine or modify in analyzing the issue of obviousness.<sup>178</sup> As the figure reveals, the Federal Circuit’s use of TSM has declined substantially since *KSR*, which issued prior to opinion 258. During the

176. Figure 2 reports a 30-unit lagged average of obviousness opinions of the Federal Circuit from 1996–2012. Note that due to the nature of the lagged analysis, the points on the chart immediately following *KSR* will reflect some Federal Circuit opinions that issued prior to the Supreme Court’s opinion.

177. For purposes of coding this parameter, as long as the Federal Circuit’s analysis expressly assessed whether there was a “teaching,” “suggestion,” or “motivation” to combine or modify references, it was counted as a use of TSM. If the Federal Circuit instead referenced a “reason” to combine or modify, it was not counted as a use of TSM. The purpose of drawing this distinction was to examine whether there was at least some specific reference to, and remnant of, the pre-*KSR* TSM requirement. Furthermore, if the opinion referenced the TSM requirement in the context of noting in passing that the Supreme Court held in *KSR* that the TSM test was not the exclusive way to analyze obviousness but did not actually use the test, it was not counted as a use of TSM.

178. Further supporting the conclusion of a greatly diminished role of TSM following *KSR* was the difficulty of coding this parameter post-*KSR*, as the court rarely described its analysis in formal TSM terms. It is worth noting that this analysis had moderate intercoder agreement. See Appendix A (reporting Cohen’s kappa of 0.48, which is considered moderate agreement coders..

period prior to *KSR*, the court's opinions used some form of TSM 58% of the time, on average; since *KSR*, it has used some form of TSM approximately 29% of the time.

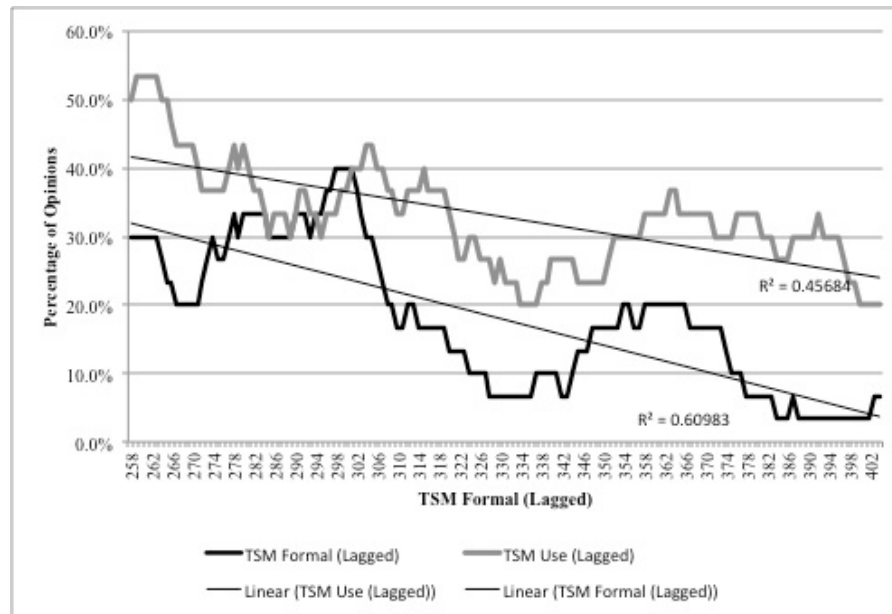
Furthermore, these results for the post-*KSR* period simply reflect some remnant, some fractured artifact of the pre-*KSR* TSM test. They do not reflect the Federal Circuit's use of a rigid pre-*KSR* TSM requirement. Although the Federal Circuit has indeed referred to teachings, suggestions, and motivations in its post-*KSR* opinions, it has repeatedly stressed that it is not applying a rigid pre-*KSR* TSM requirement.<sup>179</sup> In addition, many of the post-*KSR* analyses that make up Figure 4 involve references to some type of "motivation" to combine or modify references<sup>180</sup>—a broad term that is more reasonably read as a synonym for "reason" to combine in the post-*KSR* world, as discussed below—as opposed to a "teaching" or "suggestion." If anything, Figure 2 overstates the Federal Circuit's use of TSM after *KSR*.

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179. See, e.g., *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1260 (Fed. Cir. 2007) (commenting that the Supreme Court had criticized the Federal Circuit's "rigid and mandatory" application of the motivation to combine test); *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356-57 (Fed. Cir. 2007) ("While the *KSR* Court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the Court acknowledged the importance of identifying 'a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does' in an obviousness determination.").

180. See, e.g., *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1240 (Fed. Cir. 2010) (considering whether "the evidence established the existence of a motivation to combine references as to the sleeve patents"), *cert. denied*, 131 S. Ct. 1531 (2011).

FIGURE 3. TRENDS IN TEACHING, SUGGESTION, AND MOTIVATION IN FEDERAL CIRCUIT OBVIOUSNESS OPINIONS FOLLOWING *KSR*<sup>181</sup>



The decline of TSM is even starker when examining the Federal Circuit’s reference to the doctrine in formalistic terms. Figure 3 shows the data from the above figure for the period following *KSR* overlaid on data showing the court’s use of some variation of the terms “teaching,” “suggestion,” and “motivation” in the same sentence.<sup>182</sup> A least-squares trendline has been superimposed on both sets of data; that trendline indicates a gradual decline since *KSR* in both the Federal Circuit’s use of some form of TSM, and a sharp decline in the Federal Circuit’s formal reference to TSM. Indeed, it would not be absurd to conclude that the Federal Circuit has, by this point, largely abandoned the use of any formal version of TSM.

Thus, while it is true that, as Mark Janis has argued, the Federal Circuit

181. Figure 3 provides 30-unit lagged averages of obviousness opinions of the Federal Circuit following *KSR*. Figure 3 begins at point 258 on the previous graph, which is the Federal Circuit’s first opinion to be published following *KSR*. The first 30 points on the chart thus include some fraction of opinions that the Federal Circuit issued before the Court issued its own opinion.

182. Formal references as TSM were considered to be any use of the terms “teach!,” “suggest!,” and “motivate!” within the same sentence in an opinion. Results were based solely on machine-based textual searches of the dataset of opinions and were not manually examined for context other than to exclude hits due solely to Westlaw headnotes. Consequently, this data includes opinions in which the sole reference is in the context of noting in passing that the Supreme Court held in *KSR* that the TSM test was not the exclusive way to analyze obviousness.



continues to invoke a flexible TSM test,<sup>183</sup> it has done so less and less often since *KSR*. Given its greatly diminished role in the obviousness analysis, it seems likely that the formal incarnation of teaching, suggestion, or motivation will continue to recede into the mists of the past.<sup>184</sup>

2. “Reason to Combine”: A Pale Shadow of the Teaching, Suggestion or Motivation Framework

That the Federal Circuit’s use of TSM declined after *KSR* is not particularly unexpected, although the rapidity with which the Federal Circuit has abandoned its formal incarnation is surprising. But what about reincarnation in another form: as the requirement of a “reason” to combine or modify prior art references? This would be the logical form for a continued TSM presence to assume, given that the Supreme Court implicitly authorized this approach in *KSR* by acknowledging that obviousness requires an inquiry into “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue,”<sup>185</sup> and the Federal Circuit leaped on that suggestion shortly after *KSR*.<sup>186</sup> If the Federal Circuit has routinely employed a “reason to combine” analysis since *KSR*, it might be argued that “reason to combine” is just a “motivation to combine” in new clothing. Indeed, my overall impression from reading the post-*KSR* opinions is that when the court uses the term “motivation,” it is basically using it as a synonym for “reason.”<sup>187</sup>

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183. Janis, *supra* note 7, at 343.

184. Note that this change in what the court is saying in its opinions need not necessarily come entirely from the judges themselves. The court’s opinions are necessarily framed by the parties’ briefs and arguments, and if the parties themselves are framing their arguments less often in terms of TSM, then the court will probably be less likely to discuss TSM in its opinions. Regardless of the “why,” however, the contents of the court’s opinions have shifted, and it is those opinions (rather than the parties’ briefs) that serve as precedent for future determinations.

185. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

186. The Federal Circuit’s first reference to a “reason to combine” was in a nonprecedential opinion that issued a month and a half after *KSR*. *See Omegaflex, Inc. v. Parker-Hannifin Corp.*, 243 F. App’x 592, 595-96 (Fed. Cir. 2007) (“The first issue before us is whether the district court erred in holding that a skilled artisan would not have perceived any reason to combine the Sweeney reference with the locating sleeve of the PCF. The Supreme Court recently explained that ‘a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.’ *KSR*, 550 U.S. at 418, ‘[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.’”). Subsequent precedential opinions have adopted this approach. *See Fresenius USA, Inc. v. Baxter Int’l, Inc.*, 582 F.3d 1288, 1300-01 (Fed. Cir. 2009) (quoting *KSR*, 550 U.S. at 418) (“We first note that it remains appropriate for a post-*KSR* court considering obviousness ‘to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.’”).

187. *See, e.g., Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1371 (Fed. Cir. 2011) (need for safer utility lighters provided motivation to combine prior art); *Wyers v. Master*

Systematically examining the content of the Federal Circuit's opinions reveals that the first part of this hypothesis is correct. After *KSR*, the Federal Circuit has indeed considered the concept of a reason to combine in its opinions just a bit less often than prior to *KSR*: before *KSR*, the Federal Circuit considered whether there was a reason to combine or modify the prior art in 59% of its opinions; after *KSR*, it did so 51% of the time.<sup>188</sup> Less often, certainly, but nothing as striking as the court's diminished use of TSM itself.

Yet despite the continued presence of a "reason to combine" in the Federal Circuit's obviousness jurisprudence, the framework of the concept is radically different from the pre-*KSR* approach. To assess how different, I focused on three common articulations of the reason to combine framework prior to *KSR*: the articulation that the reason to combine "must" be found in the prior art;<sup>189</sup> the articulation that the reason to combine "may" come from the prior art references, the knowledge of a person having ordinary skill in the art or the nature of the problem to be solved;<sup>190</sup> and the articulation that there must be a reason to modify or combine the prior art without specifying particular sources.<sup>191</sup> Table 7 reports the results from my perspective.

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Lock Co., 616 F.3d 1231, 1245 (Fed. Cir. 2010) (predictable use of prior art elements according to their established functions provided the motivation to combine).

188. Because the purpose of this aspect of the study was to examine the broader concept of a "reason to combine," as opposed to any formal articulation of the concept, a fairly broad scope of "reason to combine" was used. For example, the use of the TSM test was counted as a "reason to combine," as were instances where the court examined whether a person of ordinary skill in the art "would have" combined the prior art.

189. *See, e.g.*, *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957 (Fed. Cir. 1997) ("It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the prior art, to combine the elements.").

190. *See, e.g.*, *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000) ("The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved.").

191. *See, e.g.*, *Abbott Labs. v. Syntron Bioresearch, Inc.*, 334 F.3d 1343 (Fed. Cir. 2003) ("The issue is whether substantial evidence supports the judgment (under the clear and convincing evidence standard) that a person having ordinary skill in the art would not have been motivated to replace the developing fluid/sample solution combination of Deutsch with flow provided solely by sample fluid.").

TABLE 7. TYPE OF “REASON TO COMBINE” ARTICULATION

	Total Opinions	Prior art only	Prior art, PHOSITA, or problem	Particular sources not specified
Pre-Certiorari	241	14 (6%)	50 (21%)	79 (33%)
Post-Opinion	147	0 (0%)	4 (3%)	71 (48%)

A word of caution about these results: they inherently reflect the contours of the doctrine as viewed through my eyes, rather than a strong objectively-reproducible framework.<sup>192</sup> Nevertheless, they lend further support to the view that, although some manifestation of the reason to combine requirement persists after *KSR*, the requirement is far more flexible than it was pre-*KSR*. Almost every time the Federal Circuit has applied a reason to combine analysis since *KSR*, it has articulated the requirement in such a way that places no limits, express or implied, on how it may be satisfied.

Indeed, a common way for patent challengers to satisfy a flexible reason to combine requirement after *KSR* would have been unthinkable prior to the Court’s opinion: the use of “common sense.” Prior to *KSR*, the Federal Circuit repeatedly confirmed that the use of common sense had no place in the reason to combine portion of the obviousness inquiry.<sup>193</sup> Since *KSR*, it has become, if not routine, at least conceivable for the Federal Circuit to allow common sense to establish a reason to combine, itself invoking the use of common sense 14 times since *KSR*.

Another crucial limitation on the new-form “reason to combine” framework is that it may be bypassed entirely in some circumstances. Drawing

192. Despite the use of categorical, binomial framework, the reproducibility of these results by the independent coder was limited. See Appendix A (reporting Cohen’s kappa and percentage of agreement; the latter ranged from 58% to 87%). To minimize this limitation as much as possible, I have described my reasoning in detail in the study Codebook. This challenge reflects an inherent limitation of content analysis: the deeper one gets into the substance of the analysis, the more difficult it can be to articulate an easily-translatable framework. To be fair, this problem applies to virtually all methodological approaches to the law.

193. See e.g., *In re Sang-Su Lee*, 277 F.3d 1338, 1345 (Fed. Cir. 2002) (“‘Common knowledge and common sense,’ even if assumed to derive from the agency’s expertise, do not substitute for authority when the law requires authority.”). Curiously, the Federal Circuit expressly allowed the use of common sense when addressing the issue of analogous arts (whether the asserted prior art references related to the problem being solved). See *In re Bigio*, 381 F.3d 1320, 1326 (Fed. Cir. 2004) (“In that vein, this court has previously ‘reminded . . . the PTO that it is necessary to consider ‘the reality of the circumstances’-in other words, common sense-in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.”).

upon the Supreme Court's statement in *KSR* that "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions,"<sup>194</sup> the Federal Circuit has concluded that no reason to combine or modify is necessary when predictable elements performing their established functions are involved. Essentially, the predictable use of prior art elements according to their established functions can substitute for the existence of some reason to combine.<sup>195</sup> Even more than the use of common sense, the Federal Circuit has readily invoked this rule since *KSR*, referring to it in over 25% of the post-*KSR* analyses studied.

So as to not paint a picture of the Federal Circuit's post-*KSR* obviousness jurisprudence as involving an absurdly low bar, it is important to note that despite the more flexible use of a reason to combine requirement, the Federal Circuit has emphasized the need for courts to articulate what the reason is, drawing upon language from *KSR*.<sup>196</sup> That requirement applies only for the courts it is reviewing; it does not apply to the Federal Circuit's opinions themselves.<sup>197</sup>

The doctrinal landscape revealed by the above data is, lamentably, incomplete. Nuances of the doctrine were left uncaptured because they were beyond the goal of this study, which was to examine changes to the core obviousness analysis.<sup>198</sup> For example, the question of when something that is "obvious to try" is "obvious" can arise in some obviousness determinations, but

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194. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

195. *See Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1351 (Fed. Cir. 2008).

196. *See Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (quoting *KSR*, 550 U.S. at 418) ("To facilitate review, this analysis should be made explicit."); *TriMed, Inc. v. Stryker Corp.*, 608 F.3d 1333, 1342 (Fed. Cir. 2010) ("Although reliance on common sense does not require a specific evidentiary basis, 'on summary judgment, to invoke 'common sense' or any other basis for extrapolating from prior art to a conclusion of obviousness, a district court must articulate its reasoning with sufficient clarity for review."); *see also In re Tzipori*, 316 F. App'x 975, 984 (Fed. Cir. 2008); *In re Vaidyanathan*, 381 F. App'x 985, 987 (Fed. Cir. 2010), *cert. denied*, 131 S. Ct. 359 (2010); *c.f. Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1330 (Fed. Cir. 2009) (noting that to invoke "'common sense' . . . a district court must articulate its reasoning with sufficient clarity for review."); *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1377 (Fed. Cir. 2012) ("With little more than an invocation of the words 'common sense' (without any record support showing that this knowledge would reside in the ordinarily skilled artisan), the district court overreached in its determination of obviousness.").

197. For example, since *KSR*, the Federal Circuit has affirmed numerous district court and PTO findings of obvious via Rule 36. None of these affirmances contain any substantive discussion of obviousness, let alone an explicit articulation of the reason to combine or modify the prior art references.

198. One difficulty with addressing every possible nuance of a complex doctrine such as obviousness in a study of this type is that the discrete units become too small to be subjected to meaningful statistical analysis. In addition, coding closely-shaven doctrinal components is difficult to do with any robust replicability. Analyzing the full contours of individual components of the obviousness doctrine since *KSR* are tasks probably better suited to a more traditional legal analysis.

was not included in the study's coding.<sup>199</sup> The same was true of the use of a "lead compound" analysis,<sup>200</sup> a particular obviousness framework developed for the chemical arts.<sup>201</sup> Likewise, some obviousness inquiries both before and after *KSR* consider the need for persons of skill in the art to possess a "reasonable expectation of success."<sup>202</sup> Nor was the requirement that obviousness inquiries only be undertaken using "analogous arts" separately analyzed,<sup>203</sup> and this study did not explore the use of secondary considerations.<sup>204</sup> These doctrinal components are left to future studies.

#### IV. DOES THE FEDERAL CIRCUIT'S NEW APPROACH TO OBVIOUSNESS POSSESS LONG-TERM VIABILITY?

Taken as a whole, the results presented above suggest that the Federal Circuit has indeed changed what it does and what it says about obviousness. But more than that, the results reflect a shift in the way the Federal Circuit approaches its review of obviousness determinations. This begs the question: does this new approach possess long term viability or is it, too, likely to go the way of TSM?

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199. Much has been written about "obvious to try" post-*KSR*, probably because of its perceived importance to pharmaceutical patents. See Timo Minssen, *Meanwhile on the Other Side of the Pond: Why Biopharmaceutical Inventions That Were "Obvious to Try" Still Might Be Non-Obvious—Part I*, 9 CHI.-KENT J. INTELL. PROP. 60 (2010); Andrew V. Trask, "Obvious to Try: A Proper Patentability Standard in the Pharmaceutical Arts?," 76 *FORDHAM L. REV.* 2625 (2008).

200. See, e.g., *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1361 (Fed. Cir. 2011) ("A prima facie case of obviousness in the chemical arts is often based on a known compound, called a 'lead compound,' which serves as a starting point for a person of ordinary skill developing the claimed invention."), *cert. denied*, 132 S. Ct. 1755 (2012); *Yamanouchi Pharm. Co., Ltd. v. Danbury Pharmacal, Inc.*, 231 F.3d 1339, 1344 (Fed. Cir. 2000) ("Danbury did not show sufficient motivation for one of ordinary skill in the art at the time of invention to take any one of the following steps, let alone the entire complex combination: (1) selecting example 44 as a lead compound . . .").

201. See Janis, *supra* note 7, at 344–45.

202. See *In re Kubin*, 561 F.3d 1351 (Fed. Cir. 2009) ("Or stated in the familiar terms of this court's longstanding case law, the record shows that a skilled artisan would have had a resoundingly 'reasonable expectation of success' in deriving the claimed invention in light of the teachings of the prior art.>").

203. For an analysis of the Federal Circuit's use of analogous arts after *KSR*, see Samantha Rollins, Note, *Isn't it Obvious? How Klein's Definition of Analogous Prior Art Conflicts with the Supreme Court's Vision for Obviousness*, 98 *IOWA L. REV.* 1377 (2012), available at <http://ssrn.com/abstract=2033993> or <http://dx.doi.org/10.2139/ssrn.2033993>.

204. MPEP §2141 (2012) (citations omitted) ("Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel. Such evidence, sometimes referred to as 'secondary considerations,' may include evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results. The evidence may be included in the specification as filed, accompany the application on filing, or be provided in a timely manner at some other point during the prosecution. The weight to be given any objective evidence is made on a case-by-case basis. The mere fact that an applicant has presented evidence does not mean that the evidence is dispositive of the issue of obviousness.>").

As discussed in Part I, the Federal Circuit's mandate was to improve the uniformity and predictability of patent law. In a sense, it succeeded: it developed a framework for assessing the issue of obviousness that gave some structure to an analysis that many had criticized as marked by substantial inconsistency. That success came at a substantial cost, however. The TSM requirement was not perfect. While it provided a framework for analyzing obviousness, it also provided a legal rule that disappointed patent challengers could point to when they failed to invalidate a patent. The rigidity of TSM made it the perfect scapegoat. Speaking with the benefit of hindsight, the days of the TSM requirement were clearly numbered as criticism mounted against it.

The Federal Circuit's new obviousness jurisprudence may avoid many of these dangers of the TSM approach, but other traps may lay hidden. By adopting a more nebulous central analysis for obviousness that is based on flexible wording, such as a "reason" to combine or modify, the court may be able to avoid presenting a clear target for criticism. The court has matured; it has come to the realization that there is no single, practical, uniform test for obviousness and that a search for it is foolishness. Instead, flexibility is the word of the day, a standards-driven approach as opposed to one based on rules.<sup>205</sup>

To flexibility, the Federal Circuit has added another important component: increased deference to the district courts' findings of obviousness. The observations reported in this study illustrate just how much that deference has grown since *KSR*. Strong signs point to its continued growth.<sup>206</sup> This deference may bring an added shield against criticism, especially if it manifests itself in an increased reliance on factual findings by lower tribunals. Because the Federal Circuit gives deference to factual findings in the obviousness determination, it may effectively wash its hands of any erroneous results by pointing to the standard of review.

Against these two aspects of the Federal Circuit's new obviousness jurisprudence must be weighed the countervailing points. First, the consequences of the court's more flexible and deferential approach has resulted in more patents rendered obvious (perhaps something that *KSR* itself favored). Yet, just as the TSM framework made enemies, the lack of a clear analytical framework may be identified as a convenient target by patent holders whose

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205. Rebecca S. Eisenberg, *Wisdom of the Ages or Dead-Hand Control? Patentable Subject Matter for Diagnostic Methods After In Re Bilski*, 3 CASE W. RES. J. L. TECH. & INTERNET 1, 15 (2012) ("The Supreme Court had repeatedly faulted and reversed the Federal Circuit for applying unduly rigid rules that departed from the flexibility of its own precedents.").

206. As a general observation, the more recent Federal Circuit appointees seem to favor grater deference to district court determinations, as illustrated by the voting blocks and dissents in the denial of a rehearing en banc in the exceptional case context. See Jason Rantanen, *Maintaining Uncertainty in the Standard of Review for Exceptional Cases*, PATENTLYO.COM (Dec. 7, 2012, 3:21 PM), <http://www.patentlyo.com/patent/2012/12/highmark-v-allcare.html>.

patents are invalidated or are subject to refusals by the patent office. Patent challengers, too, may be frustrated by a clear path to rendering a patent obvious. In other words, the sheer under-articulation of a clear framework may be criticized by both patent holders and patent challengers over time.

A second concern is that the directional rules provided by *KSR* may not translate well to non-mechanical and electronic inventions. *KSR*, as with nearly all of the obviousness cases addressed by the Supreme Court, involved a relatively simple, easy to understand technology. It lacked many of the substantial complexities that characterize many of the inventions addressed by the Federal Circuit—complexities that render the obviousness determination extremely challenging. It stands to reason, then, that the rules and legal principles offered by the Court in *KSR* may be a poor fit when applied to these more complex technologies.

Yet, the results of this study suggest that the Federal Circuit has not shied away from applying *KSR* to these more complex technologies. To the contrary, it has embraced *KSR*'s relevance across the board in every area of technology studied, as shown in Table 8.

TABLE 8. CITATIONS TO *KSR* BY TECHNOLOGY IN APPEALS ARISING FROM THE DISTRICT COURTS AND ITC

	Analyses Citing to <i>KSR</i>	Total Analyses	Percentage of analyses
Biological	4	6	67%
Chemical	21	26	81%
Electronic	34	49	69%
Mechanical	25	40	63%

These results raise three possibilities. First, perhaps *KSR* applies well to all areas of technology; perhaps its flexibility translates well from the simple to the complex. Second, in at least some of these opinions, particularly in the chemical arts, the Federal Circuit may be citing *KSR*, but only for the purposes of distinguishing it. If this is the case, then the Federal Circuit is expressing a cautious use of *KSR* consistent with the flexibility characteristic of its new approach to obviousness. As a third possibility, perhaps the court is citing to *KSR* across the board, but doing so even where it is a relatively poor fit. If so, the consequences for the long-term viability of the court's new approach to obviousness may be concerning.

Whether the Federal Circuit's new obviousness jurisprudence possesses long-term viability is ultimately as hard to predict as the effects of *KSR* itself. The short answer is that it is probably viable for the short and intermediate future, especially as long as the Federal Circuit is mostly using its flexibility to give greater deference on obviousness to district courts. Yet, at the same time, a less defined, less structured approach to obviousness carries the potential to create substantial disuniformity in the decisions on obviousness that the appellate body reviews, a fractured approach that may lead in the further-off future to an obviousness doctrine characterized once again by unpredictability and instability.

#### CONCLUSION

So who got it right, Wegner or Eisenberg? In a sense, both did. Wegner predicted that outcomes would change: inventions that were nonobvious the day before *KSR* would suddenly become obvious. The data reported in this study supports Wegner's prediction: the Federal Circuit has indeed found patents and applications to be obvious at a higher rate than it did prior to *KSR*, even in the face of a likely selection bias among parties towards appealing *less* obvious inventions. At the same time, however, that change appears to be due at least in large part to an increase in deference to lower tribunals on findings that patents are obvious, although the possibility that the substantive law of obviousness applied by the court has changed cannot be discounted entirely.

Eisenberg predicted that what the Federal Circuit said about obviousness would change. And indeed it has, with the court abandoning the formal TSM test and adopting a less rigid "reason to combine or modify" approach. At the same time, the court has assimilated language from *KSR* that allows it to give district courts more deference, such as by permitting reliance on the concept that the "predictable use of prior art elements according to their established functions" is obvious. The result is a profound shift in what the court says about obviousness as compared with the era prior to *KSR*.

Whether the Federal Circuit's new obviousness jurisprudence will continue on its present trajectory remains an open question. The jurisprudence is hardly a cohesive monolith. The judges of the Federal Circuit have dissented more often on the issue of obviousness in the five years since *KSR* than in the ten years prior. New judges may have different views on the doctrine than those currently on the bench. Yet, given the signal sent by the Supreme Court in *KSR*, it seems reasonably unlikely that rigid new rules will crystalize in the near future. Instead, the more likely result will be a continued reliance on broad principles coupled with a generous (as long as it is articulated) "reason to combine" requirement.



## APPENDIX A

<i>Number</i>	<i>Field ID</i>	<i>Description</i>	<i>Form</i>	<i>Coding</i>	<i>Cohen's K</i>
1	Serial	Unique record identifier	A[Integer]	Machine	NA
2	Case_Title	Full Case title	[Text]	Machine	NA
3	Case_Serial	Numerical case identifier	C[Integer]	Machine	NA
4	Full_Cite	Reporter citation	[Reporter format]	Machine	NA
5	Docket	CAFC Docket number	[Text]	Machine	NA
6	WESTLAW_Cite	WESTLAW citation	[WESTLAW format]	Machine	NA
7	Date	Date issued	[Day-Month-Year]	Machine	NA
8	Obviousness_Initial	Obviousness at issue - initial	[Yes   No]	Human	NA
9	Obviousness_Final	Obviousness at issue - final	[Yes   No]	Human	NA
10	Precedential	Whether opinion was precedential	[Yes   No]	Human	0.899
11	Rule_36	Whether opinion was summary affirmance	[Yes   No]	Human	1.00
12	En_Banc	Whether opinion was en banc	[Yes   No]	Human	** (100% agreement)
13	Opinion1_Type	Identifies degree of agreement among panel	[Unanimous   Majority   Per curiam   Other]	Human	** (93% agreement)
14	Opinion2_Type	Identifies degree of agreement among panel	[Concurrence   Dissent   [Blank]]	Human	** (97% agreement)
15	Opinion3_Type	Identifies degree of agreement among panel	[Concurrence   Dissent   [Blank]]	Human	1.00
16	Post-KSR	Identifies whether opinion issued before, during, or after <i>KSR</i>	[Before   During   After]	Machine	NA
17	AnalysisN	Identifier for multiple obviousness analyses	A[integer]	Machine	NA (not referenced in article)
18	Patent1	Patent analyzed by court	[Integer]	Human	(not
19	Patent2	Patent analyzed by	[Integer]	Human	(not

		court			referenced in article) (not referenced in article)
20	Patent3	Patent analyzed by court	[Integer]	Human	(not referenced in article)
21	Patent4	Patent analyzed by court	[Integer]	Human	(not referenced in article)
22	Patent5	Patent analyzed by court	[Integer]	Human	(not referenced in article)
23	Technology	Technology of patent	[Biological   Chemical   Electronic   Mechanical]	Human	0.658
24	ProceduralPosture	Procedural posture of lower tribunal decision	[PTO-Application   District-Jury   District-Bench   District-JMOL granted   District-SJ   District-PI   ITC   PTO-Intererence]	Human	0.935
25	PostureOutcome	Lower tribunal determination	[Nonobvious   Obvious]	Human	0.949
26	CAFC_Result	Federal Circuit obviousness determination	[Nonobvious   Obvious   No Final Determination]	Human	0.960
27	Disposition	Federal Circuit's procedural action	[Reversed   Affirmed   Reversed and remanded   Vacated and remanded   Vacated   Other]	Human	0.823
28	DispositionCondensed	Condensed version of Disposition	[Reversed   Affirmed   Vacated]	Human + machine	1.00
29	TSM_Use	Whether court uses "teaching-suggestion-motivation"	[Does not use   Uses]	Human	0.481
30	RtC1	Whether reason to combine must be found in prior art	[Does not require   Requires]	Human	0.290 (71% agreement)

31	RtC2	Whether reason to combine must come from a specific source	[Does not require RTC or [RTC1=yes]   RTC required but not required to come from a specific source]	Human	0.148 (58% agreement)
32	RtC3	Whether reason to combine may come from a PHOSITA, references, or nature of problem to be solved	[Does not require RTC or [RTC1=yes] or [RTC2=yes]   RTC required and may come from a PHOSITA, reference, or nature of problem]	Human	-0.051 (87% agreement)
33	Common_Sense	Whether court permits use of common sense	[Court either does not discuss common sense or does not permit common sense to be used   Court permits use of common sense]	Machine + human	NA
34	Common Sense Used	Whether court actually uses common sense in determining obviousness	[Court does not invoke common sense as a component of obviousness determination   Court invokes common sense as a component of obviousness determination]	Machine + human	NA
35	Predictable_Uses	Whether court references predictable use of prior art elements	[Does not reference predictable use   References predictable use]	Machine + human [coded only for post-KSR opinions]	NA
36	TSM_Formal	Whether court references “teach!” “suggest!” and “motiv!” within the same sentence	[Court does not reference TSM   Court references TSM]	Machine + human	NA

37	Obviousness_Necessary	Obviousness necessary to outcome or expressly decided by court	[Obviousness unnecessary   Obviousness necessary]	Human [coded only for R. 36 opinions]	NA
38	KSR_Cite	Whether opinion cited <i>KSR v. Teleflex</i>	[Yes   No]	Machine	NA
39	Notes	Notes on individual cases	[Text]	Human Machine aggregation	NA
40	RtC4	Any of RTC1, 2, or 3	[Yes   No]	of human coding	0.852

To assess the reliability of the coding, a total of forty opinions and Rule 36 affirmances were coded by a colleague (or, in the case of fields 12-14, a research assistant) and Cohen's kappa (K) (a measure of intercoder agreement) was calculated for the coded variables. Cohen's K was not calculated for variables whose contents were either coded by machine or developed by a combination of machine-based searches coupled with human quality control.

The below explanation of Cohen's K is excerpted from Lee Petherbridge, Jason Rantanen & Ali Mojibi, *The Federal Circuit and Inequitable Conduct: An Empirical Assessment*, 84 S. CAL. L. REV. 1293, 1355 (2011):

Cohen's kappa (K) measures intercoder agreement—reliability of measurement—for categorical observations. Jacob Cohen, *A Coefficient of Agreement for Nominal Scales*, 20 EDUC. & PSYCHOL. MEASUREMENT 37 (1960). It has the merit of taking into account agreement that occurs by chance, but also tends to underestimate agreement when a category is very commonly present. It is thus, generally speaking, considered to be a conservative measure of agreement. The closer the kappa statistic is to 1.0, the greater the level of agreement. While there is no kappa value that signifies good enough agreement, magnitude guidelines have been suggested. Landis and Koch suggest that kappa values of 0.0–0.2 reflect slight agreement; 0.21–0.40 fair agreement; 0.41–0.60 moderate agreement; 0.61–0.80 substantial agreement; and 0.81–1.0 almost perfect agreement. J. Richard Landis & Gary G. Koch, *The Measurement of Observer Agreement for Categorical Data*, 33 BIOMETRICS 159, 165 (1977). See also JOSEPH L. FLEISS, STATISTICAL METHODS FOR RATES AND PROPORTIONS 218 (2d ed. 1981) (discussing 0.40–0.75 as fair to good, and over 0.75 as excellent).

\*\* These variables involved events that were too rare to calculate a meaningful Cohen's K given the sample size used for evaluating intercoder variability. Coder agreement for each of these variables is provided instead.