

THE FEDERAL CIRCUIT AND PATENTABILITY: AN EMPIRICAL ASSESSMENT OF THE LAW OF OBVIOUSNESS

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ABSTRACT

It is by now a cliché to suggest that the United States Court of Appeals for the Federal Circuit has weakened the standards for obtaining patents. In this article, we empirically assess that Court's performance on the ultimate question of patentability – the requirement that a patentable invention must be “nonobvious.” Our findings suggest that the conventional wisdom may not be well-grounded, at least on this measure.

Nowhere is the Federal Circuit's controversial role as the locus of judicial power in the U.S. patent system more evident than in the context of the doctrine of obviousness under 35 U.S.C. § 103. The determination of whether an invention was “obvious” to “a person having ordinary skill in the art” at the time the invention was made is the foundation of patentability – and thus at the very core of the patent bargain. And the issue's status as a question of law, as well as the spare statutory language, means that the law of obviousness is entirely a creation of the courts.

In the study reported here, we systematically examined the Federal Circuit's doctrine of obviousness. Using empirical data collected from a novel dataset spanning more than fifteen years of jurisprudential pronouncements, we suggest that the Federal Circuit has developed a doctrine in this area that is relatively stable and appears reasonably predictable. Indeed, contrary to much recent commentary, these results suggest that the Federal Circuit's doctrinal toolkit – especially the much-discussed (and oft-maligned) “teaching, suggestion, or motivation” test for combinations of references – has not had a significant observable effect on the results of obviousness cases at that Court.

Although this study falls short of painting a complete picture of the Federal Circuit's performance with respect to patentability, the view that emerges is of a modern jurisprudence of obviousness that is more stable, more consistent, and more flexible than has been heretofore understood. These results, then, should give pause to those who argue for a radical reshaping of the Federal Circuit's doctrine under 35 U.S.C. § 103.

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INTRODUCTION

Nearly twenty-five years into the intentional experiment in institutional design that created it, The United States Court of Appeals for the Federal Circuit is unquestionably the most influential player in the United States patent system.¹ And as the economic significance of patents to the national economy continues to increase,² the central role played by the Federal Circuit has become increasingly visible,³ pronounced,⁴ and controversial.⁵

¹ See, e.g., Mark D. Janis, *Patent Law in the Age of the Invisible Supreme Court*, 2001 U. ILL. L. REV. 387, 387 (stating that the “Court of Appeals for the Federal Circuit . . . has become the de facto supreme court of patents.”). Since the creation of the Federal Circuit, the Supreme Court has granted certiorari in only __ patent cases. See

² See generally Federal Trade Commission, *To Promote Innovation: The Proper Balance of Competition and Patent Law Policy* (2003), available at www.ftc.gov/os/2003/10/innovationrpt.pdf, [hereinafter *To Promote Innovation*] (addressing the appropriate balance between competition and patent law and policy); National Research Council of the National Academies, *A Patent System for the 21st Century* 18-19 (Stephen Merrill, Richard C. Levin, & Mark B. Myers, eds., The National Academies Press 2004) [hereinafter *A Patent System for the 21st Century*] (acknowledging the importance of patents) see also generally FRED WARSHOFKY, *THE PATENT WARS: THE BATTLE TO OWN THE WORLD’S TECHNOLOGY* (1994) (noting the critical nature of patents in economic development).

³ See, e.g., *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005) (addressing a patent infringement lawsuit against the makers of the Blackberry wireless email system); *Ex Parte Kretchman*, 2001 Pat. App. LEXIS 80 (B.P.A.I. 2003) (rejecting as obvious the claims of a controversial patent application assigned to Smuckers that was generally directed to sealed peanut butter and jelly sandwiches), *aff’d*, *In re Kretchman*, 2005 U.S. App. LEXIS 6804 (Fed. Cir. 2005) (reporting the case summarily affirmed). See also, e.g., ALAN B. JAFFEE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS: HOW OUR PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT* 34-35

Nowhere is the importance of the Federal Circuit more apparent—and more discussed—than with respect to the standards for patentability, the fundamental requirements for obtaining a patent grant. In this context, the court is cast in two critical roles: as the oversight authority for the administrative body which grants patents (the United States Patent and Trademark Office, the PTO), and as the sole appellate authority for litigated disputes involving already-issued patents. In determining patentability, perhaps more than in any other aspect of the patent system, the centralization of legal power that is the core justification for the Federal Circuit⁶ is brought into sharp relief.

In this study, we use a novel dataset and well-tested techniques to empirically assess the Federal Circuit's performance⁷ in the realm of patentability—specifically with respect to the court's doctrine of "obviousness" under 35 U.S.C. § 103. That section's requirement—

(Princeton Univ. Press 2004) (complaining of patents directed to a "Method of Exercising a Cat" and a "Method of Swinging on a Swing.").

⁴ See, e.g., Ian Austen, *Blackberry Service to Continue*, N.Y. Times, Mar. 4, 2006, at C1 (reporting that the makers of Blackberry settled the suit for \$612.5 million).

⁵ See, e.g., *MercExchange, L.L.C. v. ebay, Inc.*, 401 F.3d 1323, 1339 (Fed. Cir. 2005) (reversing a district court's denial of a permanent injunction against infringement), *vacated*, *ebay, Inc. v. MercExchange, L.L.C.*, 126 S.Ct. 1837 (2006); *Teleflex, Inc. v. KSR Int'l Co.*, 2005 U.S. App. LEXIS 176 (Fed. Cir. 2005), *cert. granted*, *KSR International Co. v. Teleflex, Inc.*, 126 S. Ct. 2965 (2006). See also e.g., Brief for the United States as Amicus Curiae, in *KSR International Co. v. Teleflex, Inc.*, No. 04-1350 on Petition for Writ of Certiorari (May 2006) (stating that the Federal Circuit's obviousness jurisprudence "renders patent examination and litigation more costly, it grants patent applicant's unjustified rewards for disclosing non-innovative subject matter, and it forecloses competitors from using the public storehouse of knowledge that should be freely available to all"); Brief of Twenty-Four Intellectual Property Law Professors as Amicus Curiae, in *KSR International Co. v. Teleflex, Inc.*, No. 04-1350 on Petition for Writ of Certiorari (May 12, 2005) (characterizing the Federal Circuit's obviousness jurisprudence as "at odds with the statutory language, inconsistent with [the Supreme] Court's precedent, and contrary to the goals of the patent system"). For some information concerning practitioner complaints, see, e.g., Paul R. Michel, *The Court of Appeals for the Federal Circuit Must Evolve to Meet the Challenges Ahead*, 48 AM. U. L. REV. 1177, 1186-1200 (1999) (addressing oft-cited practitioner concerns).

⁶ See, e.g., S. REP. NO. 97-275, *reprinted in* 1982 U.S.C.C.A.N. 11, 14-15 (stating that the creating of a centralized court to hear suits related to patents will provide doctrinal stability the expected result of which is to decrease uncertainty and increase innovation). For what is perhaps the seminal theoretical piece considering the formation of the Federal Circuit, see Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1 (1989).

⁷ See *supra* Section II; R. Polk Wagner & Lee Petherbridge, *Is the Federal Circuit Succeeding: An Empirical Assessment of Judicial Performance*, 152 U. OF PA. L. REV. 1105 (2004).

that a patentable invention be nonobvious to a person having ordinary skill in the art at the time the invention was made—is plainly the “ultimate condition for patentability,” and thus lies at the core of the basic *quid pro quo* that is the foundation of patent theory.

Assessing the law of obviousness is not only important to understanding the institutional role of the Federal Circuit; it is also of critical (and timely) importance in its own right. The scholarly and popular literature is replete with the assertion that the standards for patentability (especially obviousness) have been dramatically weakened by the Federal Circuit. Important recent studies of the patent system have also fingered obviousness as a particular area of policymakers’ concern.⁸ And perhaps most importantly, in June 2006, the United States Supreme Court granted certiorari in *KSR International Co. v. Teleflex, Inc.* to review the Federal Circuit’s approach to obviousness, most especially that court’s requirement of a “teaching, motivation or suggestion” to combine prior art references.⁹ A common thread that runs through these contemporary criticisms is that the Federal Circuit’s approach to obviousness is systematically biased in favor of patentability, and thus has dramatically weakened the statutory obviousness requirement.

The results we report here suggest that much of the current commentary may overstate the concerns with the Federal Circuit’s approach to obviousness. Among other results, we find the following:

1. *The Federal Circuit affirms determinations of obviousness a clear majority of the time.* More than 65 percent of the obviousness analyses reviewed by the Federal Circuit are affirmed, and the rate at which the Federal Circuit reverses or vacates obviousness decisions by the PTO has been falling steadily.
2. *The Federal Circuit finds patents obvious a clear majority of the time.* Overall, about 58 percent of all analyses result in a finding of obviousness; this trend has been increasing since 1990. This ratio does not seem to be associated with broad technological areas.
3. *The Federal Circuit’s “teaching, suggestion, or motivation” (“TSM”) analysis does not appear to dominate the law of obviousness.* We find that the TSM analysis is used less than half the time (45%) in obviousness analyses at the Federal Circuit. Whether the TSM analysis is used seems to have no observable effect on whether the

⁸ See *To Promote Innovation*, *supra* note 2, at ch. 4, at 8-15 (reporting the testimony and writings of a number of commentators critical of the Federal Circuit’s obviousness law); *A Patent System for the 21st Century*, *supra* note 2, at 87-94 (identifying the court’s obviousness law as in need of change).

⁹ See *KSR International Co. v. Teleflex, Inc.*, No. 04-1350

reviewed analysis is affirmed, and only a modest impact (about five percent) on whether the patent is declared obvious. Even within TSM-based cases, a majority of Federal Circuit analyses (52.4%) result in a determination of obviousness.

4. *The TSM analysis appears not to be an inflexible tool biased in favor of patentability.* Although we find that the rate at which the TSM analysis is applied has increased substantially during the course of the study, the rate at which TSM analyses result in determinations of obviousness has also increased significantly. Further, we document a significant increase in the number of sources that the Federal Circuit uses to analyze a TSM.
5. *The PTO seems to fare no worse than the courts when having its obviousness analyses reviewed by the Federal Circuit.* The overall affirmance rate for the PTO is 64 percent, virtually the same as the 65 percent average for all cases with obviousness determinations; the affirmance rate for the PTO has risen during the time period of the study.
6. *The Federal Circuit's doctrine in this area seems relatively stable.* During the term of the study, the reversal rate of lower tribunals' obviousness analyses was relatively steady. The overall rate of obviousness analyses increased, though modestly.

These findings, then, while not presenting a comprehensive picture of the Federal Circuit's performance in implementing the standards for patentability, do offer a significant advance in understanding over the existing literature—as well as perhaps calling some recent commentary and legal filings into question. On the whole, the jurisprudence of obviousness, as developed by the Federal Circuit, appears relatively stable and increasingly flexible. At least some data suggests that the Federal Circuit has identified the TSM doctrinal formulation as a way to consistently and coherently frame the otherwise obtuse obviousness analysis. Accordingly, this long-term systematic view may help place the current debate about the law of obviousness in a more appropriate context. Finally, beyond adding objective information concerning the trends and overall developments of the Federal Circuit's obviousness jurisprudence—and some insight in the success of the court in meeting its mandate—this study establishes the need for future work in this area as well as provides suggestions for the future directions of investigation in this area.

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This balance of this Article has four sections. Part I reviews the doctrinal and theoretical background of the Federal Circuit and the

law of obviousness under 35 U.S.C. § 103, and outlines the current controversy surrounding court's development of this area of the law. Part II sets forth the study's design and methodologies. Part III reports the results of the study, and offers some interpretation and discussion. Part IV considers the overall implications of the results, policy prescriptions, and future directions.

I

THE FEDERAL CIRCUIT AND THE LAW OF OBVIOUSNESS

A. *The Federal Circuit: An Exercise in Institutional Design*¹⁰

Even from the distance of twenty-five years, there can be little dispute over what Congress thought it was doing when it created the Court of Appeals for the Federal Circuit. By the enactment of the Federal Courts Improvement Act ("FICA") of 1982,¹¹ Congress unified in the Federal Circuit the appellate jurisdiction for patent cases,¹² whether from the U.S. Patent & Trademark Office, U.S. District Courts, the Court of Federal Claims, or the ITC. It did so at a time when it was widely thought that the legal infrastructure of the patent system was in disarray. Legislators were confronted with information that the interpretation of the patent law differed in different parts of the country.¹³ Studies predating FICA revealed that a patent was more likely to be held valid and infringed in the Fifth Circuit than the Seventh Circuit, and nearly four times more likely to be enforced in the Seventh Circuit than in the Second Circuit.¹⁴ With such a legal

¹⁰ We provide only a review, because this subject has been addressed in more depth in other places. For a more in depth discussion, see Dreyfuss, *supra* note 6; Charles W. Adams, *The Court of Appeals for the Federal Circuit: More than a National Patent Court*, 49 MO. L. REV. 43 (1984); see also Wagner & Petherbridge, *supra* note __, at 1107-24.

¹¹ Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (codified as amended in sections of 28 U.S.C.).

¹² The authors are of course aware of the Supreme Court's decision in *Holmes Group, Inc. v. Vornado Air Circulation Sys., Inc.*, 535 U.S. 826 (2002), which permits appeals of some patent issue to return to the regional circuits.

¹³ See S. REP. NO. 97-275, at 15 (reporting that "patent law [is] an area in which the application of the law to the facts of the case often produces different outcomes in different courtrooms in substantially similar cases").

¹⁴ See Dreyfuss, *supra* note 6, at 7 (citing Cooch, *The Standard of Invention in the Courts*, in *Dynamics of the Patent System* 34, 56-59 (W. Ball ed. 1960)).

landscape, it comes as little surprise that forum shopping in the patent law was rampant,¹⁵ resulting in much collateral litigation.¹⁶ Moreover, because the decisions of the regional circuits were not binding on one another, there was little to be done but wait for the Supreme Court to rectify the situation. This did not happen, and the testimony presented to the legislators suggested that it was very unlikely that the Supreme Court would be able to unify the disparate behaviors of the regional circuits.¹⁷

In light of rare Supreme Court involvement, the Patent Office and its pre-1982 reviewing court, the Court of Customs and Patent Appeals ("CCPA"), operated outside the influence of the regional circuits in developing the law surrounding patentability.¹⁸ But the law the CCPA developed concerning whether a patent should issue could not be imposed by the CCPA on the regional circuits.¹⁹ This left the infrastructure of the patent law in an odd place: one court, the CCPA, developing and applying standards of patentability to whether patents should issue, and other courts, the regional circuits, applying disparate standards²⁰ to whether a given patent should have issued. Naturally, this led to uncertainty. Patents issued from the Patent Office under law developed in its relationship with the CCPA, which

¹⁵ See S. REP. NO. 97-275, at 13-16 (discussing reports that forum shopping was common to patent litigation).

¹⁶ See S. REP. NO. 97-275, at 15 (discussing reports that forum shopping "increases the cost of litigation and 'demeans the entire judicial process and the patent system as well'").

¹⁷ It is generally thought that the most likely reason for this was the size of the Supreme Court's docket and, perhaps, a recalcitrance to take patent cases due to their high level of legal and technical difficulty. See Charles W. Adams, *The Court of Appeals for the Federal Circuit: More than a National Patent Court*, 49 MO. L. REV. 43, 45 (1984) (noting a higher level of cert petitions at the time); see Dreyfuss, *supra* note 6, at 6 ("Perhaps because of its own docket problems and its lack of expertise, the Supreme Court rarely reviewed the patent law decisions of the regional circuits."). This is also consistent with the Senate Report which notes that the Supreme Court "appears to be operating at—or close to—full capacity; Therefore in the future the Court cannot be expected to provide much more guidance in legal issues than it now does." See S. REP. NO. 97-275, at 13.

¹⁸ See Dreyfuss, *supra* note 6, at 6.

¹⁹ *Id.*

²⁰ See Charles W. Adams, *The Court of Appeals for the Federal Circuit: More than a National Patent Court*, 49 MO. L. REV. 43, 55-57 (1984) (noting the heterogeneity of regional circuit standards).

later were invalidated under a regional circuit's alternative interpretation of the same laws.²¹

In the time leading up to the passage of FICA, Congress was also confronted with testimony by representatives of technologically oriented businesses confirming that patent cases were being inconsistently adjudicated.²² Moreover, the representatives of businesses that relied on the patent system contended that the legal infrastructure of the patent law had important implications for the national economy.²³ In particular, it was contended that the uncertainty attending the then current patent law infrastructure was harmful to innovation, and if uncertainty in the patent system could be lessened, innovation would increase.

After hearing the testimony, Congress determined that national uniformity in the patent law was desirable. National uniformity would bring uniformity of doctrinal development,²⁴ doctrinal stability,²⁵ and predictability²⁶ to the law. The solution was FICA, the unification of patent appeals²⁷ under a single appellate jurisdiction.²⁸ In sum, the vesting in the Federal Circuit of exclusive jurisdiction of

²¹ This observation is captured nicely by Professor Dreyfuss, *see supra* note 6, at n.35 (quoting the Supreme Court's observation that "We have observed a notorious difference between the standards [of patentability] applied by the Patent Office and by the courts." *Graham v. John Deere Co.*, 383 U.S. 1, 18 (1966)).

²² S. REP. NO. 97-275, at 16.

²³ *See* S. REP. NO. 97-275, at 16 (reporting the comments of Harry F. Manbeck, Jr., General Patent Counsel of the General Electric Company who testified that doctrinal stability is has an effect on innovation and that decreasing uncertainties is important to business decisionmaking).

²⁴ S. REP. NO. 97-275, at 15 (stating the same).

²⁵ S. REP. NO. 97-275, at 15 ("The Federal Circuit also provides a forum that will increase doctrinal stability in the field of patent law.").

²⁶ S. REP. NO. 97-275, at 16 (stating that stable and predictable law is better for the national economy).

²⁷ It is worth noting that the record is clear that Congress does not intend that the Federal Circuit be a "specialized" court as that term is so often, and pejoratively, used. Rather, Congress was express in the alternative stating: "The Court of Appeals for the Federal Circuit will not be 'specialized court,' as that term is normally used. The court's jurisdiction is not limited to one type of case, or even two or three types of cases . . . it has a varied docket varied docket spanning a borad range of legal issues and types of cases." *See* S. REP. NO. 97-275, at 16.

²⁸ S. REP. NO. 97-275, at 13 (finding that the "courts apply the law unevenly . . . The difficulty here is structural"); *Id.* at 14 ("The Court of Appeals for the Federal Circuit provides such a forum for appeals from throughout the country in areas of the law where Congress determines that there is a special need for national uniformity.")

patent appeals has been based on a consistent and transparent line of reasoning: (1) The Federal Circuit, playing a unitary judicial role, will manage, develop, and police the patent law, (2) the imposition of this institutional design will promote a clearer, more stable, and predictable patent doctrine, which in turn will reduce forum shopping, and improve the economic usefulness of important property rights.²⁹

Few would doubt that Congress's structural goals have been met. The Federal Circuit has moved with alacrity into its role as manager, developer, and enforcer of the patent doctrine. In an inexorable fashion, it has expanded its influence over the jurisprudence in a number of doctrinal areas, including claim interpretation,³⁰ the standard for obviousness,³¹ remedies, procedural issues,³² anticipation, and inequitable conduct. But while the institutional design imagined by Congress has been realized, the question remains whether the court has been successful in achieving the promise that originally motivated congressional action.

B. *The Problem of Nonobviousness*

Under the U.S. patent laws, patents are available for all³³ inventions that are new, useful, and nonobvious. The requirement that an invention be useful is, generally speaking, rather easy to meet. The requirement that an invention be new—that it have not previously been possessed by the public—is, if not also easy to meet, at least relatively easy to determine. The requirement that an invention be nonobvious, however, seeks to determine whether, at the time an alleged invention is made, otherwise patentable subject matter that is new is sufficiently close to subject matter that is not new that it would have been obvious to a person having ordinary skill in the relevant art. Underlying this determination is a concept that has been described by one famous jurist as “as fugitive, impalpable, wayward, and as vague a phantom as exists in the whole paraphernalia of legal

²⁹ S. REP. NO. 97-275, at 16; Dreyfuss *supra* note 6, at 5-7.

³⁰ See Wagner & Petherbridge, *supra* note ____.

³¹ See Section I.B., *infra*.

³² See Dreyfuss, *supra* note 6, at 7-22 (discussing some areas where the court has wielded jurisprudential influence and concluding that the court's success was mixed).

³³ This is a necessarily sweeping statement. It should be noted that there are of course other things a patent applicant needs to do before a patent may be obtained. For example, a patent applicant must file a timely application, *see generally* 35 U.S.C. § 102 (2000), that includes information sufficient to disclose and enable the invention, *see generally* 35 U.S.C. § 112 (2000).

concepts.”³⁴ Patent lawyers have called the nonobviousness requirement the “ultimate condition of patentability.”³⁵ Below we review the doctrinal characteristics of nonobviousness and then describe the contours of the current controversies surrounding it.

1. A Primer on Obviousness³⁶

As noted above, the law of obviousness is directed to ascertaining whether the subject matter claimed to be patentable is a sufficient advance over existing technology to warrant the grant of a patent. Although it had existed as judge made law for many years, a formal requirement of nonobviousness first entered the statutory patent law with the Patent Act of 1952.³⁷ The current formal statement of the requirement of nonobviousness is set forth in 35 U.S.C. § 103(a).³⁸ It states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, 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. Patentability shall not be negatived by the manner in which the invention was made.

The relevant statutory inquiry then is whether “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.”³⁹ In the years following the passage of the Patent Act of 1952, the question turned to how best to determine the answer to that inquiry. In one of its last and most meaningful cases on the issue, its seminal decision of *Graham v. John Deere*,⁴⁰ the Supreme Court addressed that question. There the court

³⁴ This statement is attributed to the jurist Learned Hand, as cited in ROBERT P. MERGES & JOHN F. DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* (3d. Ed. Lexis 2002).

³⁵ JOHN F. WITHERSPOON, *NONOBVIOUSNESS—THE ULTIMATE CONDITION OF PATENTABILITY* (BNA 1980).

³⁶ Those readers familiar with the obviousness requirement of modern patent law may wish to skip this section.

³⁷ Patent Act of 1952.

³⁸ (2000) (“Conditions for Patentability; Non-Obvious Subject Matter”).

³⁹ 35 U.S.C. § 103.

⁴⁰ 383 U.S. 1 (1966).

set out the well-worn considerations relevant for determining obviousness *vel non*. It states:

While the ultimate question of patent validity is one of law, [citation omitted] the § 103 condition . . . lends itself to several basic factual inquiries. 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. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.⁴¹

The Court proceeded to acknowledge the difficulties in determining whether subject matter is obvious and stated that it expected appellate court involvement in the development of the doctrine.⁴² The Court then stressed its view that the factual inquiry set forth in its opinion was of significant importance to establishing congressionally desired uniformity and definiteness⁴³ in the jurisprudence of obviousness.

The *Graham* factor-based analysis was not the only guidance the court provided in setting out its functional approach to determining obviousness. The court also examined the meaning of the language “at the time the invention was made,”⁴⁴ citing prior case law⁴⁵ as well as legislative reports explaining the intended meaning of the language: ‘It refers to the difference between the subject matter sought to be patented and the prior art, meaning what was known before as described in section 102.⁴⁶ If this difference is such that the subject matter as a whole would have been obvious at the time to a person skilled in the art, then the subject matter cannot be patented.’⁴⁷

⁴¹ 383 U.S. at 17-18.

⁴² *Id.* (Graham at 17-18).

⁴³ *Id.* (Graham at 17-18).

⁴⁴ 35 U.S.C. § 103(a).

⁴⁵ 383 U.S. at 14.

⁴⁶ 35 U.S.C. § 102 (describing what constitutes prior art).

⁴⁷ See 383 U.S. at 14 (citing Senate and House Reports, S. REP. NO. 1979, 82d Cong., 2d Sess. (1952); H. R. REP. NO. 1923, 82d Cong., 2d Sess. (1952)).

These sources, according to the Court “place[d] emphasis on the pertinent prior art existing at the time the invention was made.”⁴⁸

This language plainly cautions against looking backwards to determine obviousness, which the court noted later when considering whether (in a consolidated case) the claims of a contested patent should be considered obvious. There the court spoke in favorable terms regarding objective evidence on nonobviousness because not only was it the sort of evidence that was “more susceptible of judicial treatment than are the highly technical facts . . . Such inquiries . . . may also serve to ‘guard against slipping into use of hindsight,’ and to resist the temptation to read into the prior art the teachings of the invention in issue.”⁴⁹

Over the years the Federal Circuit has paid great homage to the decision in *Graham*.⁵⁰ Not only has it consistently relied on the Supreme Court’s factor-based approach to determining the question of obviousness, it has also accepted the Supreme Court’s invitation for appellate court involvement. In that vein, it has focused its attention on developing the jurisprudence surrounding the Supreme Court’s holding that the determination of obviousness *vel non* is to be ascertained “at the time the invention was made.”⁵¹ To ensure that the obviousness inquiry is properly temporally located, the court has engaged perhaps the most straightforward approach. It has, as a conceptual matter, relocated the obviousness inquiry to the “time the invention was made.” It then asks, in light of the contemporaneous topography of relevant prior art, whether the claimed subject matter would be apparent to or easily perceived by a person of ordinary skill in the relevant art.

⁴⁸ 383 U.S. at 14.

⁴⁹ 383 U.S. at 36 (citations omitted).

⁵⁰ A search of Federal Circuit opinions on LEXIS, for the period of the study using the search terms patent /100 obvious and “Graham” revealed 172 cases. A similar search using the terms patent /100 obvious and “383 U.S. 1” (the U.S. Reporter citation for *Graham v. John Deere, Co.*) revealed 156 cases. The difference is most likely due to the court’s common usage of the term “Graham factors” to describe the analysis set forth in the Supreme Court’s opinion. See e.g., *Group One, Ltd. v. Hallmark Cards, Inc.*, 407 F.3d 1297, 1304 (Fed. Cir. 2005) (referring to “Graham factors” without citing to the U.S. Reporter).

⁵¹ See *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1320 (2004) (“We turn first to a comparison between the prior art and the claimed invention. In this inquiry, we are mindful of the repeated warnings of the Supreme Court and this court as to the danger of hindsight bias. See, e.g., *Graham*, 383 U.S. at 36 (consideration of secondary factors ‘serves to guard against slipping into use of hindsight and to resist the temptation to read into the prior art the teachings of the invention in issue[.]’”).

This rather simple logical step has given rise to the kernel of the court's contribution to the obviousness analysis set forth in *Graham*: that somewhere within the full scope of the relevant prior art, the claimed subject matter must be sufficiently taught or suggested that it would have been easily perceived by a person of ordinary skill in the art. As a consequence of some of the linguistic formulations that appear in the Federal Circuit case law, the requirement that prior art make apparent the arrangement of disparate sources and teachings has come to be known as the "suggestion test" or the requirement that the prior art provide a "teaching, suggestion, or motivation" to collect and combine disparate sources of prior art information. For purposes of uniformity, for the remainder of the paper we will refer to the test as either "the teaching, suggestion, or motivation test" or "TSM."

An example of the linguistic formulation of the teaching, suggestion, or motivation test as well as an explanation of its underlying logic is excerpted from a prominent Federal Circuit opinion.⁵² After explaining the controlling nature of the *Graham* factors, the court states:

Measuring a claimed invention against the standard established by section 103 requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. . . .

*Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352, 48 U.S.P.Q.2D (BNA) 1225, 1232 (Fed. Cir. 1998) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding") . . . Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297, 227 U.S.P.Q. (BNA) 657, 667 (Fed. Cir. 1985) (district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination"). See also *Graham*, 383 U.S. at 18, 148 U.S.P.Q. (BNA) at 467 ("strict observance" of factual predicates to obviousness conclusion required). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply*

⁵² See *In re Dembiczak*, 175 F.3d 994 (1999) (considering a Patent Office rejection for obviousness of a patent application directed to an orange yard bag with a jack-lantern depicted on its exterior).

*takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight.*⁵³

The excerpted section shows the court's concern with the problem of hindsight and reveals that the reason for the concern exists at least in part over notions that there is a high risk of unfairness in using an inventor's potential contribution to the storehouse of public knowledge as a roadmap to characterizing that same contribution as obvious.⁵⁴ It also reveals that the court's rationale for the teaching, suggestion, or motivation test is an "essential evidentiary component of an obviousness holding."⁵⁵

Another prescribed aspect of the teaching, suggestion, or motivation test is that it must consider the full scope of the relevant prior art. Thus, as evidenced by the linguistic formulation in *In re Dembiczak*, the "evidence of a suggestion, teaching or motivation may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved."⁵⁶ By casting a wide net, the Federal Circuit's test seeks to provide the public maximum protection against the spurious issue of patents.

However, the jurisprudence suggests that the court has sought to balance the public's interest in preventing the spurious issue of patent with the public's competing interest in receiving disclosure of nonobvious inventions. Thus, the court has cautioned that while the net of prior art evidence is very broad, there must still be evidence. Thus, "[t]he range of sources available . . . does not diminish the requirement for actual evidence. . . . Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'"⁵⁷

⁵³ 175 F.3d at 999-1000.

⁵⁴ It is worth noting that the use of hindsight is not strictly prohibited in an obviousness analyses. See *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276 ("While this court indeed warns against employing *hindsight*, its counsel is just that - a warning. That warning does not provide a rule of law that an express, written motivation to combine must appear in prior art references before a finding of obviousness." (emphasis supplied)).

⁵⁵ 175 F.3d at 999 (citing *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998)).

⁵⁶ 175 F.3d at 999 (emphasis supplied).

⁵⁷ 175 F.3d at 999; see also, e.g., *In re Rouffet*, 149 F.3d 1350, 1357-58 (1998) (requiring that the Patent Office provide evidence for its assertion that a person of ordinary skill in the art would collect and combine disparate sources of prior art); *In re Fritch*, 972 F.2d 1260, 1265 (1992) (holding that the Patent Office must provide a showing [of] some objective teaching in the prior art or that knowledge

At least facially then, the Federal Circuit's teaching, suggestion, or motivation test appears to foster three important values that Congress and the Court hoped would evolve in the jurisprudence of patents. By clarifying the requirement that somewhere in the prior art there must exist a teaching that would make the claimed subject matter apparent to a person of skill in the art, the court has at once improved the objectivity of the obviousness determination, making it more amenable to judicial treatment and review (objectivity and uniformity), made the test more precise in terms of giving patent challengers and the Patent Office clear guidance (a roadmap) on how to establish obviousness, while at the same time serving the public's interest in promoting the likelihood that deserving patentees will obtain patents and continue making valuable disclosures (promoting innovation). In large measure all of this has been achieved by little more than requiring a richer examination of the scope and content of the prior art.

If this seems a little too good to be true, it may be. As discussed below, there is considerable debate on whether the Federal Circuit's development of the obviousness jurisprudence has had an overall positive effect on the patent system.

2. The Controversy of TSM

While litigants have long challenged the requirement that the prior include within its scope a teaching that shows how and why a claimed combination would be obvious to a person of ordinary skill in the art,⁵⁸ it has been only fairly recently that the issue has received the current high level of national attention. The lightning rod is the Federal Circuit's treatment of the obviousness inquiry in *KSR International Co. v. Teleflex Inc.*, No. 04-1350, a non-precedential opinion in which the court vacated and remanded for further fact finding a district court's summary judgment that the relevant claims of the patent in issue were invalid as obvious.

The case itself follows on the heels of two well known reports, both of which were critical of the Federal Circuit's obviousness jurisprudence and both of which concluded that the court had developed the doctrine to a place where it had become too easy to

generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings).

⁵⁸ See *Gillette Co. v. S.C. Johnson and Son, Inc.*, 919 F.2d 720, 723 (1990) ("Appellant urges that the district court . . . committed legal error by requiring that the claimed combination be clearly suggested by the prior art in order to be obvious.").

obtain a patent.⁵⁹ At around the same time the issue was raised in the popular press by, *inter alia*, the book, *Innovation and Its Discontents*,⁶⁰ which asserted that patents regularly issue despite clear evidence of invalidity.⁶¹ Moreover, contemporaneous to these events, a burgeoning body of scholarly literature was vociferously complaining about the Federal Circuit's development of both the patent jurisprudence generally and the jurisprudence of obviousness particularly.⁶²

The *KSR International* case itself involves a patent directed to adjustable pedal assemblies.⁶³ An adjustable pedal assembly is a device that permits a pedal (such as a gas pedal) to be adjusted in position depending on the user's preference.⁶⁴ In the claims at issue, the adjustable pedal assemblies contain an electronic sensor that performs the function of detecting the pivot of the pedal and generating an electronic signal that corresponds to the pivot.⁶⁵ The district court granted summary judgment that the claims were invalid as obvious and the patentee appealed. Finding that a genuine issue of material fact existed on the issue of whether a person of ordinary skill in the art would have been motivated to combine the teachings of the prior art to obtain the claimed subject matter, the Federal Circuit

⁵⁹ See *To Promote Innovation*, *supra* note 2, at Chapt. 5, p.28 (recommending that legal standard developed by the Federal Circuit to prove invalidity is too high and needs to be lowered); *A Patent System for the 21st Century*, *supra* note 2, at 6 (proposing, as part of "Recommendations to Improve the Patent System," the "Reinvigorat[ion of] the nonobviousness standard").

⁶⁰ See *supra*, note 3.

⁶¹ See JAFFE & LERNER, *supra* note 3 at 34-35.

⁶² See, e.g., Rebecca S. Eisenberg, *Obvious to Whom? Evaluating Inventions from the Perspective of PHOSITA*, 19 BERKELEY TECH. L.J. 885, 889 (2004) ("Courts have marginalized the PHOSITA by presuming the PHOSITA is incapable of innovation and by treating determinations of nonobviousness as conclusions of law. They have further marginalized the PHOSITA's role . . . by requiring evidence of 'suggestion' to combine. . . ."); John H. Barton, *Non-obviousness*, 43 IDEA 475 (2003) ("The non-obviousness standard has since been . . . greatly weakened in a very specific and relatively detailed body of law, developed primarily by the [Federal Circuit]. . . ."); Glynn S. Lunney Jr., *E-obviousness*, 7 Mich. Telecomm. Tech. L. Rev. 363, 373-74 (2001) (reporting that since the advent of the Federal Circuit the use of the doctrine of obviousness has decreased as a means of establishing invalidity in comparison to other doctrines and concluding that this means that "obviousness has fallen into such disfavor").

⁶³ See *Teleflex Inc. v. KSR International, Co.*, No. 04 1152, U.S. App. LEXIS 176 (Fed. Cir. 2005) (unpublished opinion).

⁶⁴ *Id.* at n.1.

⁶⁵ *Id.* at 2-3.

vacated and remanded for further fact finding.⁶⁶ The form of analysis is familiar to those who have read a number of Federal Circuit obviousness opinions. Starting with the familiar teachings of *Graham*, it then explains the requirement that the prior art, rather than the inventor's teachings, must provide the analytical framework for determining obviousness. For comparison to *In re Dembiczak*, the KSR *International* court set forth the following analytic framework:

A patent claim is obvious, and thus invalid, when the differences between the claimed invention 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." [citing, inter alia, Graham]. While obviousness is ultimately a legal determination, it is based on several underlying issues of fact, namely: (1) the scope and content of the prior art; (2) the level of skill of a person of ordinary skill in the art; (3) the differences between the claimed invention and the teachings of the prior art; and (4) the extent of any objective indicia of non-obviousness. See Graham, 383 U.S. at 17-18. When obviousness is based on the teachings of multiple prior art references, the movant must also establish some "suggestion, teaching, or motivation" that would have led a person of ordinary skill in the art to combine the relevant prior art teachings in the manner claimed.

Consistent with the jurisprudence, the court explained that the teaching, suggestion, or motivation could be found either explicitly or implicitly, in the prior art references themselves, in the knowledge of those of skill in the art, or the nature of the problems to be solved.⁶⁷ It then examined the trial court's opinion and determined that it had (1) improperly resolved disputed issues of fact, (2) had not made findings on what "understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of [the] invention to make the combination in the manner claimed,"⁶⁸ (3) had erred in concluding that a piece of prior art should be included in the obviousness analysis because it did not pertain to the nature of the problem solved by the patent at issue, (4) had misunderstood the teachings of another prior art document, and (5) had mistakenly relied on the prosecution history in support of its argument for invalidity.⁶⁹

The petition for *certiorari* attracted a surprising amount of attention, given that the *KSR* case involved a relatively

⁶⁶ 2005 U.S. App. LEXIS 176, at *15-*16.

⁶⁷ 2005 U.S. App. LEXIS 176, at *7-*8.

⁶⁸ 2005 U.S. App. LEXIS 176, at *15-*16.

⁶⁹ 2005 U.S. App. LEXIS 176, at *16-*17.

straightforward application of the settled law of the Federal Circuit. Perhaps the two most noteworthy amicus briefs in favor of *certiorari* were the Brief of Twenty-Four Intellectual Property Law Professors⁷⁰ (“the Professors’ Brief”) and the Brief of the United States.⁷¹ The briefs are particularly notable for both the high quality of their authors and the rather sweeping breadth of their arguments about the Federal Circuit’s doctrine.

These briefs make a number of claims concerning the law, facts, and policy surrounding the Federal Circuit’s teaching, suggestion, or motivation test. Both briefs appear to be based on the empirical assumption that either too many patents have issued and/or the rate at which low quality patents issue is accelerating to the point that the patent system is causing greater social harm than the disclosed innovations provide social benefit.⁷² This assumption has not been empirically demonstrated,⁷³ but it does flow fairly easily from property theory.⁷⁴ Regardless, this assumption has enjoyed a measure of popular success and must be regarded as conventional wisdom at

⁷⁰ See *supra*, note 5.

⁷¹ See *supra*, note 5.

⁷² See Brief of the United States, at 16 (stating that the Federal Circuit’s application of the TSM analysis “grants patent applicants unjustified rewards for disclosing non-innovative subject matter, and it forecloses competitors from using the public storehouse of knowledge”); Professors’ Brief, at 10 (stating that the TSM analysis causes the issue of patent rights that have “pernicious social effects”).

⁷³ See *A Patent System for the 21st Century*, *supra* note 2, at 48 (“[T]he claim that quality has deteriorated in a broad and systematic way has not been empirically tested”). Further, even those studies demonstrating a rise in patenting, or a rise in patenting intensity, fail to link such a rise with a loss of social benefits. See, e.g., *A Patent System for the 21st Century*, *supra* note 2, at 29, 46-63. Indeed, empirical demonstration while likely possible, would be very costly.

⁷⁴ See, e.g., Michael A. Heller & Rebecca S. Eisenberg, Can Patents Deter Innovation? The Anticommons in Biomedical Research, 380 *Science* 698 (1998) (explaining how multiple rights to exclude might cause an underuse of resources). It is worth noting that there is also property theory which argues against this assumption, as well as some particularized examples of empirical work which show that it may not be a serious problem. See John P. Walsh, Charlene Cho, & Wesley M. Cohen, View from the Bench: Patents and Material Transfers, 309 *Science* (2005) (concluding that the results of a survey of academic biomedical researchers offered “little empirical basis for the claims that restricted access to IP is currently impeding biomedical research”); John Walsh, Ashish Arora, & Wesley Cohen, The Patenting and Licensing of Research Tools and Biomedical Innovation, in *Patents in the Knowledge-based economy* 285-340 (Nat’l Academies Press 2003) (finding, inter alia that upstream rights do not generally inhibit product development).

present.⁷⁵ (To be clear, we do not deny that patent quality is a serious policy concern; we simply note that the extent of the problem, and its impact, is not well understood.)

The briefs in favor of *certiorari* next make a causal claim: that the Federal Circuit's obviousness jurisprudence can be linked to greater numbers of low-quality patents.⁷⁶ While this has surface appeal—surely a too-low standard of patentability would impact patent quality to at least some degree—neither the briefs nor the sources supporting this view explain the causal link in any level of detail. (For example, there are clearly a great many other plausible reasons for patent quality problems, such as under-funding at the PTO, perverse incentives among prospective patentees and examiners alike, etc.)⁷⁷

The next link in the logical chain among the *KSR* advocates is that *one particular aspect* of the Federal Circuit's obviousness jurisprudence is directly responsible for the low-quality-patent problem. And that is the court's "teaching, suggestion, or motivation" ("TSM") test. In particular, the government and professors assert that this test is an "inflexible rule" that presents "substantial obstacles in establishing obviousness . . . in a way that unnecessarily sustains patents that would otherwise be subject to invalidation as obvious."⁷⁸ It thus, prevents the Patent Office from "weed[ing] out" obvious patents,⁷⁹ and causes patents to issue where the combination of pre-existing technologies would have been obvious to a person of ordinary skill in

⁷⁵ [cite to To Promote Innovation, A Patent System for the 21st Century, recent BusinessWeek and newspaper articles, RIM-related articles]

⁷⁶ [cite to both briefs]

⁷⁷ While there is not a consensus of what constitutes a low quality patent, as a general matter a low quality or questionable patent can be thought of as one that is likely to be invalid. See To Promote Innovation, *supra* note 2, Executive Summary at 5. The number and importance of potential causes of low quality patents is also debated. See *id.*, at 10 (arguing that low quality patents arise because the Patent Office has had difficulty applying the substantive requirement of obviousness). Others view the substantive requirement as only a factor. See A Patent System for the 21st Century, *supra* note 2, at 47 (citing a lowered standard for nonobviousness, fewer prior art search resources at the Patent Office, lower examiner qualifications and experience, and increased workload); Cf. Lee Petherbridge, *Positive Examination*, 46 *IDEA* 173 (2006) (arguing that another cause of questionable patents is poor information concerning the scope of the right sought during examination and that given the difficulty and ambiguity associated in applying the substantive requirement, a more sensible approach to patent quality would include an enhanced focus on defining the meaning of the claims during examination).

⁷⁸ Brief of the United States, at 11-12.

⁷⁹ Professors' Brief at 9.

the art.⁸⁰ It does this, according to the briefs, by requiring a “showing [that] may be difficult or impossible to make.”⁸¹ A showing that emphasizes written prior art references and “all but requires both the patent and trademark office and the courts to base their analyses on the documentary evidence which will often be unavailable.”⁸² The standard ascribed to the Federal Circuit, the briefs argue “strays far” from the statutory standard because it looks “almost entirely to the contents of the prior art references to demonstrate obviousness.”⁸³

Thus, the construct against the Federal Circuit’s obviousness jurisprudence (especially the TSM test) takes the following form:

1. Patent quality (e.g., the lack thereof) is a serious and growing problem that is degrading the innovative output of society;
2. The Federal Circuit’s obviousness jurisprudence is a major component of this problem, by lowering the standard for patentability, making poor quality patents easier to obtain; and
3. The Federal Circuit’s TSM test is the primary culprit with respect to the court’s obviousness jurisprudence, by rendering the basic obviousness inquiry moot in many cases.

... *therefore*, a shift away from the TSM test will improve patent quality, and thus provide general societal benefits—by limiting patentability to truly innovative inventions.

Note that this construct is not only the basic logical chain of the litigants in the *KSR* case; it is also the foundation of the broader controversy surrounding the Federal Circuit’s modern jurisprudence of obviousness.⁸⁴

As we noted above, the components of the argument vary in their empirical basis. Argument 1 is perhaps empirically testable. But as the National Research Council reports, this has not been done.⁸⁵ Argument 2, that the Federal Circuit’s law of obviousness is to blame for a large number of low quality patents, is difficult to test directly: The Federal Circuit has been the only court in the obviousness game

⁸⁰ *Id.*

⁸¹ Brief of the United States, at 14.

⁸² Professors’ Brief at 9.

⁸³ Professors’ Brief at 5-6.

⁸⁴ [cite to the scholarship critiquing the TSM test]

⁸⁵ See A Patent System for the 21st Century, *supra* note 73.

for twenty-five years; there are no similarly situated appellate bodies with which to compare the Federal Circuit's work in a patent system that is generally accepted as being vastly different than the one that existed at the time of *Graham*. Even so, the results of this study may provide at least some indirect evidence regarding how the jurisprudence of the Federal Circuit relates to the patentability of inventions. Similarly, while Argument 3 is probably unverifiable empirically, the systematic nature of this study should provide important insights into the content of the Federal Circuit's obviousness jurisprudence, and how the use of the TSM test affects a number of variables. Thus, we expect that this study will be of substantial interest—not only in the current KSR controversy, but with regard to the larger concern of the Federal Circuit's law of obviousness.

II. STUDY DESIGN AND METHODOLOGY

In view of the importance of the law of obviousness to the question of patentability and rhetoric accompanying current claims about the doctrine, we set out to gain information about the court's performance in this area. To do so we applied an approach with which we already had some experience: the systematic use of judicial opinions as a source of data of the content of the Federal Circuit's jurisprudence.⁸⁶ Since our last effort, Professors Hall and Wright⁸⁷ have surveyed the history and application of this approach to legal scholarship in an article that provides both information and insight into the process and validity of using judicial opinions as a source of data.

A. *A Primer on Content Analysis*

Content analysis refers to the systematic reading and analysis of texts.⁸⁸ While the approach can be applied to most texts, perhaps one of its more interesting applications in the field of law comes from its application to judicial opinions. Content analysis differs from more traditional forms of legal scholarship in that it seeks an objective understanding of a body of law, rather than an interpretation of judicial opinions that are viewed as symbolic or important. According to Hall & Wright, "[s]ystematic content analysis allows

⁸⁶ See, e.g., Wagner & Petherbridge, *supra* note ____.

⁸⁷ See Mark A. Hall & Ronald F. Wright, *Systematic Content Analysis of Judicial Opinions*, SSRN

⁸⁸ *Id.*

scholars to verify, analyze, or refute the empirical claims about caselaw that are implicit or explicit in all branches of legal scholarship.”⁸⁹

While there may be a variety of ways to approach content analysis, it likely includes four general components. These include selecting cases, coding cases, counting case contents, and analyzing case coding.⁹⁰ Selecting cases refers to systematically identifying and collecting those cases likely to provide information concerning the subject of the study. Coding cases refers to the systematic application of a coding scheme designed to record features of each selected case. Once cases are coded, the features observed can be counted and relationships or patterns described and analyzed, using in some cases descriptive and/or inferential statistics. The counts collected from the cases may be analyzed in any way that is reasonable in view of the study as a whole. Among others, these might include examining connections between case outcome and external influences, examining relationships among the factors present in a case that might show order or be predictive of a particular outcome, or as reported in this Article, testing empirical claims concerning the nature and affect of doctrine.⁹¹

There are important caveats to choosing judicial opinions as a dataset, the most important of which affect not only content analysis, but also more traditional interpretive forms of legal scholarship. These include unobserved reasoning, selection bias, and strategic behavior.⁹² Analyzing the content of judicial opinions relies on the assumption that facts and reasoning that appear in an opinion accurately reflect those from the underlying case. A situation that may not always be true given that opinion authors are generally concerned with justifying their conclusion “by showing that it proceeds from accepted sources by legitimate, properly argued steps.”⁹³ Judicial opinions are also subject to selection bias at several levels. Some types of disputes may be less likely to reach trial; others that reach trial may be less likely to generate opinions. Of those that are tried, some will not be appealed, but when appealed may not generate an opinion.⁹⁴ Others may generate only an unpublished

⁸⁹ *Id.* at 10

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² See Wagner & Petherbridge, *supra* note __, at 1128-1130.

⁹³ Edward L. Rubin, *The Concept of Law and the New Public Scholarship*, 89 MICH. L. REV. 792, 801 (1991).

⁹⁴ See, e.g., Fed. Cir. R. 36 (summary affirmance).

opinion, which may affect the scope or depth of analysis that the court will provide. And even when opinions are published, they are subject to strategic behavior. The litigation choices of the parties can impact the facts that make it into a case; litigants, having different expectations for the outcome may contend that the same governing doctrinal principle controls a case, making it more likely that the court will address that principle in any opinion it might author.

There is little question that these potential limitations exist to some degree in the study underlying this Article. But there are some reasons to think that they may be less significant here. In particular, as described below, this study evaluates the content of the jurisprudence itself. In that sense, it concerns itself with the facts and statements of principle and reasoning that have made it into opinions. It does not examine information external to that expressed in the text of the opinions that might impact whether an opinion would be written.⁹⁵ For much the same reason, to the extent there is strategic behavior influencing the content of the opinions, the fact that the study may not detect it is not prohibitive. The information studied is the same information on which institutional and other players in the patent system rely every day. Its validity does not decrease through the use of a systematic and comprehensive approach to the opinions. Indeed, there may be reason to think that such an approach could place outlying opinions in relief by showing a doctrinal order and consistency not otherwise easily discernable.

B. Database Construction & Case Selection

The first step in the study was the construction of the dataset. The selection criteria is defined as *observable analyses of obviousness* under 35 U.S.C. § 103 contained in Federal Circuit opinions between January 1, 1990 and June 1, 2005.⁹⁶ To identify the dataset, several searches of the LEXIS Federal Circuit database⁹⁷ were conducted with search terms calculated to identify all possible opinions falling within the scope of the selection criteria above.⁹⁸ The initial screens identified about 900

⁹⁵ One possible exception to this is if the Federal Circuit has a policy or target of authoring a certain percentage of opinions that affirm, reverse, or vacate. The authors know of no such policy.

⁹⁶ January 1, 1990 was chosen as the starting point for the following reasons: first, to reduce the size of the dataset to manageable proportions; second, to limit the term of the study to the more recent Federal Circuit jurisprudence, and third, to allow at least 15 years of opinions to be included. June 1, 2005 was chosen as the end point because our initial data gathering began in Fall 2005; the time lag is designed to ensure that all relevant opinions are included in the LEXIS database.

⁹⁷ The LEXIS file name is "CAFC."

⁹⁸ For example, the search (patent and obvious).

cases of potential interest. The 900 cases were then screened manually for the presence of a decision on the issue of obviousness. Cases directed to the obviousness *vel non* of design patents were excluded, as were cases directed solely to obviousness-type double patenting.⁹⁹ When the review was completed, 362 identified Federal Circuit opinions remained. Because the core unit of measurement here was the way the Federal Circuit analyzes obviousness, each *observable analysis of obviousness* was a record in the database. Thus, if an opinion analyzed three claims with separate obviousness analyses, each of those analyses was a separate record.¹⁰⁰ Conversely, if the court analyzed several patent claims under the same obviousness analysis, that counted as a single record.¹⁰¹ Because multiple analyses per opinion is not uncommon (though not the norm), the total number of records in the database equaled 480.

C. Selecting Measurement Criteria

For this project, we were interested in gathering information about the Federal Circuit's doctrinal performance in the area of obviousness. Accordingly, a list of measurement criteria (*e.g.*, database fields) were developed, encompassing a list of both the data that was easily obtainable, as well as data that would be useful for future analyses. The total number of fields per record is 43. The table in Appendix A identifies each field in the dataset; what follows is a brief description.

1. Basic Information

One set of fields (numbers 1 through 20 in the field listing in Appendix A) concerns the basic information about a decision of the Federal Circuit, such as the title of the case, the judges assigned, date the opinion was issued, and so forth. The database also includes various citations, an identification of the opinion below, as well as whether the opinion was designated as published or unpublished, whether *certiorari* was requested, as well as the overall disposition of the appeal. All of these fields were collected by computer by parsing the text files of the opinions.¹⁰²

⁹⁹ Both of these cases were excluded because the form of obviousness analysis (if conducted at all) is not sufficiently comparable to the typical § 103 analysis to be of use in the dataset.

¹⁰⁰ [cite an example of multiple analyses]

¹⁰¹ [cite an example of multiple claims under a single analysis]

¹⁰² Custom software was developed for this purpose.

2. Obviousness-Specific Content

The balance of the fields (numbers 21-43 in the field listing in Appendix A) in the database were human-coded.¹⁰³ As described in more detail below, these fields addressed information relating to the *Graham* factors, secondary considerations, teaching, suggestion, or motivation, prior art sources, technological identity of the patents or claims at issue, the depth of analysis, the outcome (*i.e.*, obvious *vel non*), and the patent or patent application numbers associated with the claims at issue.

Information Relating to the Graham Factors (Fields 21-23). In order to track the use of the legal factors outlined in *Graham v. John Deere*—the scope and content of the prior art, the differences between the invention and the prior art, and the level of skill in the art¹⁰⁴—the coding scheme counted the presence of a discussion of each of these three factors.

Information Relating to Secondary Considerations (Fields 24-28). In order to track the use of the secondary considerations that “may have relevancy”¹⁰⁵ to the obviousness determination, the coding scheme noted whether the opinion indicated that the court had applied any of “long felt need”, “copying”, “commercial success”, or “unexpected results”. The analyses were also coded for how the consideration of secondary factors fit within the overall obviousness analysis—*i.e.*, which direction it pointed (obvious/nonobvious) and whether it was dispositive.

Information relating to “Teaching, Suggestion, Motivation” (TSM) test (Fields 29-33). Each record analysis was coded for the application of the TSM analysis (or lack thereof). As with the Secondary Considerations, the coding included an analysis of how the application of TSM applied: dispositive or not, obvious or not. The records were also coded for the sources of TSM used (*i.e.*, the cited references, the knowledge of one of ordinary skill in the art, the nature of the problem to be solved, or other).

Additional Information (Fields 34-43). Each record analysis was also coded for several other factors, including the technological area of the patents or claims at issue (*i.e.*, Biotechnological, Chemical, Mechanical, Electronic) the depth of analysis (*i.e.*, Low, Medium, High), the

¹⁰³ Coding was accomplished by the use of purpose-built Excel spreadsheets, wherein some portions of each record (e.g., the case title and judges) were blinded (as much as practicable) from coders so as to prevent bias. In addition, pull-down menus were utilized to minimize data-entry errors.

¹⁰⁴ [cite *Graham*]

¹⁰⁵ 383 U.S. at 18.

outcome (*i.e.*, obvious or nonobvious), whether the obviousness analysis of the lower tribunal was changed, the procedural posture of the case, and the patent or application numbers associated with the claims at issue.

3. Data Collection and Coding Techniques

The selected cases were coded for the measurement criteria described above. As noted, many of the fields were coded mechanically, via the use of purpose-built software. Where human coding was conducted, it was performed by the investigators of this study, both of whom are attorneys with technical backgrounds, admissions, and significant knowledge of Federal Circuit doctrine.¹⁰⁶

An important note concerning the structure of this study bears repeating: the measurement metric is *analyses*, not opinions. If an opinion analyzed obviousness for claims from two different patents, that counted as two analyses. In addition, where different analyses were used for different claims of the same patent, *i.e.*, claims 1-14 received an analysis distinct from claims 15-21, additional analyses were counted.¹⁰⁷ Dissents or concurrences containing obviousness analyses were treated as distinct analyses.

D. Testing for Reliability

Evaluating the reliability of the data collection process is a crucial component of studies (such as this one) based on content analysis. That is, because the process of content analysis—reading cases and systematically categorizing them according to a defined set of criteria—is inherently subject to some level of subjectivity, rigorous efforts must be taken to determine the reliability of the coding.

In this study, reliability testing of the human coding was conducted during two phases of the study.¹⁰⁸ First, the coding scheme

¹⁰⁶ While we took every step to reduce the subjectivity of the coding, limiting as strictly as possible coding based on “judgment calls” or “impressions,” the nature of content coding makes nearly impossible the assertion that “no” subjectivity remains. And, while we believe that the results of our coding are replicable by at least some others with similar backgrounds and experience, the number of others capable of doing so may be relatively small. Given the technological complexity and highly factual nature of the many Federal Circuit opinions, it is quite likely that this study requires a degree of legal and technical skill that precludes most law students and non-patent lawyers from being effective coders. If so, this is an unfortunate, albeit inherent, aspect of this approach.

¹⁰⁷ In the situation just described, two analyses would have been counted.

¹⁰⁸ The machine coding, given its inherent properties, was evaluated (during the development of the software) for its ability to return the desired results.

described above was “pilot-tested” during the initial development of the measurement criteria. This pilot test consisted of each coder (the investigators) coding 30 to 50 cases in the dataset. The results were compared and evaluated; where applicable, alterations to the coding scheme or the instructions were made.

The second, more formal, test of reliability was conducted concurrently with the coding of the dataset in its entirety. The entire dataset was coded by one co-investigator, over the span of about three weeks. Concurrently and independently, the other co-investigator coded a random sample of 25 percent of the entire dataset (120 records), as a reliability test.¹⁰⁹ At the conclusion of both processes the results were compared and the level inter-coder agreement was tracked and evaluated. Where applicable, corrections were made to the dataset.

The level of inter-coder agreement was calculated using *Cohen's Kappa*, which is a widely-accepted statistical measure of the reliability of content analysis conducted by two coders.¹¹⁰ *Cohen's Kappa* produces a result on a range from 0 to 1, with higher numbers indicating more inter-coder agreement (and thus more confidence in the reliability).¹¹¹ While there is no formal *Kappa* result that corresponds with reliability, in general numbers above .90 are

¹⁰⁹ There is no bright-line standard for the sample size of the reliability coding, though researchers suggests that at least a 10 percent sample be used. See S. Lacy & D. Riffe, *Sampling error and selecting intercoder reliability samples for nominal content categories: Sins of omission and commission in mass communication quantitative research*, 73 JOURNALISM & MASS COMMUNICATION QUARTERLY (1996), at 969-973 (discussing this issue).

Records used in the reliability coding were chosen via computer algorithm based on the generation of random numbers.

¹¹⁰ J. Cohen, *A coefficient of agreement for nominal scales*, 20 EDUCATIONAL AND PSYCHOLOGICAL MEASUREMENT (1960), at 37-46.

There are other statistical tests that can be used, and some debate among methodologists regarding the pros and cons of each. *Cohen's Kappa* was selected for its relative ease of calculation and general acceptance. See Hall & Wright, *supra* note __, at __.

¹¹¹ *Cohen's Kappa* is expressed as $\kappa = \frac{(p_a - p_c)}{(1 - p_c)}$, where p_a is the proportion of agreed-upon judgments, and p_c is the expected proportion of agreed-upon judgments (those caused by chance).

considered to be quite strong, numbers above .80 are reasonably strong, and numbers above .70 are acceptable.¹¹²

For the dataset used in this study, the reliability of each variable was measured separately (using Cohen's Kappa). In general, the inter-coder agreement was very good; the Kappa statistic ranged from a high of 1¹¹³—indicating complete agreement between the coders—to a low of .66¹¹⁴—indicating some, but not especially robust agreement. The results for the major variables discussed in detail in Part III (“Results and Discussion”) are set forth in the table below.

Field	Cohen's κ	Implied Reliability
TSM_Application	0.91	very reliable
Technology	0.98	very reliable
Result	0.94	very reliable
Disposition	0.95	very reliable
Posture	1.00	very reliable

¹¹² See Matthew Lombard, Jennifer Snyder-Duch, Cheryl Campanella Bracken, *Practical Resources for Assessing and Reporting Intercoder Reliability in Content Analysis Research Projects*, <http://www.temple.edu/mmc/reliability>

¹¹³ TSM_Other [Field 33] and Procedural Posture [Field 42].

¹¹⁴ Depth [Field 39]. Note that this variable is not used in this article.

III. RESULTS & DISCUSSION

The overall goal of this study is to contribute to a burgeoning body of literature that addresses the effectiveness of the Federal Circuit at meeting the goals mandated by Congress at the time of the court's creation.¹¹⁵ As we described, *ante*,¹¹⁶ this is a very complex undertaking, which should be undertaken not only with considerable effort and expertise, but also deliberately. Ultimately, it must involve a broad array of issues and topics. Moreover, in the early stages, it should be made as objective as possible. Normative approaches can be enriched when they are based on greater information. It is for this reason that we performed a systematic evaluation of the critical patentability doctrine of obviousness. However, the law of the ultimate determinant of patentability is itself necessarily complicated and the dataset of judicial opinions is a rich source of understanding of the nature of the jurisprudence. So rich, in fact, that it is not the purpose of this article to present and discuss all that this source of information reveals. What is reported here is only a partial picture, addressing some very timely and relevant issues concerning the Federal Circuit's jurisprudence.

The data presented in this section include descriptive statistical information collected from the Federal Circuit database described in Section II. It comprises information pertaining to results, *e.g.*, result tallying, as well as information directed to the content of the Federal Circuit's jurisprudence. By way of overview, this section begins by considering the results from the perspective of what they show concerning the clarity and stability of the doctrine, and later moves to those results describing our findings concerning the teaching, suggestion, or motivation test.

A. *The Stability and Clarity of the Doctrine*

Congress,¹¹⁷ the innovation community, and the Supreme Court¹¹⁸ have all recognized the importance of doctrinal stability in the patent law. The results of this study provide several measures of doctrinal

¹¹⁵ See *supra*, Section I.A.

¹¹⁶ *Id.*

¹¹⁷ See *supra*, Section I.A. and notes therein.

¹¹⁸ See *Graham*, 383 U.S. at __ (discussing desired uniformity).

stability *vel non*, most of which suggest a fairly stable and predictable doctrine.

One measure of stability is the frequency with which an appellate court affirms or reverses the judgments of the tribunals it reviews.¹¹⁹ We examined the frequency with which the Federal Circuit affirmed, reversed, or vacated the decision of the lower tribunal¹²⁰ on the question of obviousness. Table 1 shows the results.

Table 1: Disposition of Analyses in Dataset (n=480)

Result	N	%
Affirm	312	65.0%
Reverse	110	22.9%
Vacate	57	11.9%

The results show that the Federal Circuit authored analyses affirming judgments 65-percent of the time.¹²¹ On the other side of the ledger, the court reversed a judgment only 22.9-percent of the time.¹²² This suggests that for the period of the study reviewed tribunals were correctly adjudicating the question of obviousness *vel non* approximately three times for every one time they got it wrong.¹²³ Moreover, the observed three-to-one ratio is conservative. Because of Federal Circuit Rule 36¹²⁴, there are additional cases in which the court

¹¹⁹ As Circuit Judge Rader noted in dissent from the Federal Circuit's famous *Cybor Corp. v. FAS Techs., Inc.* opinion: "A reversal rate . . . hovering near 50%, is the worst possible. Even a rate that was much higher would provide greater certainty." 138 F.3d 1448, 1476 (Fed. Cir. 1998).

¹²⁰ This includes all obviousness analyses in the database, and thus combines the dispositions of the PTO, District Courts, the Court of Federal Claims, and the ITC.

¹²¹ See Table 1.

¹²² *Id.*

¹²³ It should be noted that this requires an assumption that the authors find reasonable. The measurement metric for the study is analyses, not claims, cases, or patents. Thus, one must assume that the number of analyses/opinion reversing a judgment is on the whole, close to the same as the number of analyses/opinion affirming a judgment.

¹²⁴ Fed. Cir. R. 36.

agreed with the tribunal being reviewed.¹²⁵ Therefore, the actual number of instances where the court affirmed is higher. The true ratio therefore favors affirmances even more strongly.

If the results of analyses that vacated the reviewed tribunal are included, the rate of rejection of lower court judgments increases to 34.8-percent.¹²⁶ Although we often included decisions that were vacated, *e.g.*, when plotting the reversal rate trends, in Figure 1, we did so with an eye towards being conservative. A Federal Circuit holding vacating a decision on obviousness usually indicates that the Federal Circuit cannot have confidence in the judgment of the lower tribunal, not whether the judgment will ultimately prove to be correct. Thus, in some cases where the Federal Circuit vacates a judgment, that judgment will be properly reentered after the Federal Circuit's guidance is observed, while in others a different judgment will be entered. Whether that should constitute a "reverse," when considering the stability of the doctrine, is a matter that can be debated.¹²⁷ It does show some kind of difficulty at the lower tribunal in managing the issue of obviousness. It is reasonable to think that in at least some cases this is a consequence of doctrinal confusion, although there may be nondoctrinal reasons as well. Having presented both sides, we will leave the reader to form their own judgment. Whether the reader prefers the view of 22.9-percent (reverse) or 34.8-percent (reverse or vacate), the number of cases affirmed was still 65-percent, which even standing alone, suggests some success in achieving stability and clarity in the doctrine.

The likelihood of the court to reverse on the question of obviousness compares favorably to the court's likelihood to reverse across all issues. One study places the likelihood of the Federal Circuit to reverse in written opinions across all issues in patent cases at 47.3-percent.¹²⁸ In view of that result, it appears that the Federal

¹²⁵ See, *e.g.*, *In re Kretchman*, (Fed. Cir. 2005) (affirming with rule 36, the BPAI's rejection of the applicant's claims for obviousness).

¹²⁶ See Table 1.

¹²⁷ For example, 35-percent of summary judgments were vacated. See Table 2, *infra*. As the accompanying discussion notes, this number may well reflect gambling in view of the economics of litigation and efforts to modify the law rather than a lack of stability, or even uncertainty in the law.

¹²⁸ Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075, 1097-99 (2001) (reporting the results of a study on the Federal Circuit's claim construction jurisprudence that covered a twenty-eight month period between January, 1998 and April, 2000).

Circuit has provided much greater certainty with respect to the doctrine attending obviousness than on at least some other issues.¹²⁹

Likewise, the court's performance on obviousness is impressive in view of reported reversal rates for other areas of its jurisprudence. Considering the issue of claim interpretation, Chu reports that the Federal Circuit found error in a district court's claim interpretation approaching 50-percent of the time.¹³⁰ Moore reports that over a four-year eight-month period in the mid 1990s, district court "judges decided at least one claim construction issue wrong in 33-percent of all appealed patent cases."¹³¹ And, Circuit Judge Rader calculated that in 1997, the year before the Federal Circuit's *Cybor* decision, the Federal Circuit reversed almost "40% of all claim constructions."¹³² Thus in view of the court's performance in claim interpretation, the Federal

¹²⁹ Like 22.9-percent reversal rate that we find, the 47.3-percent reversal rate reported by Chu does not take into account cases affirmed under rule 36. Chu finds that Rule 36 affirmances accounted for the disposition of one-fifth of the patent cases during the twenty-eight month period. Including this information Chu finds that the overall reversal rate for period studied was 36.6-percent. See Chu, *supra* note __ at 1099-1100. A separate study examining the Federal Circuit's reversal rate over all issues reports 18.8-percent reversal rate for district court patent cases. See Kimberly A. Moore, *Judges, Juries, and Patent Cases – An Empirical Peek Inside the Black Box*, 99 Mich. L. Rev. 365, 396 (2000) (reporting reversal rates from 1993-1998). While this rate seems to align closely with the 22.9-percent rate that we report for the individual issue of obviousness, the 18.8-percent rate reported by Moore is arrived at very differently than the values reported here and those reported by Chu. To begin with, the Moore rate excludes data from appeals from the Patent Office while taking into account summary affirmance. See *id.* at 380 (reporting that the data for the study derived from compilations provided by the Administrative Office of the Courts); see *id.* at 396 (stating that the data represents "district court reversal rates for *all* cases appealed to the Federal Circuit"). Including appeals from the Patent Office provides a more complete picture of the Federal Circuit's treatment of the doctrine, while excluding appeals that were summarily affirmed would increase the rate reported. Thus, perhaps the most that can be said regarding obviousness based on the 18.8-percent reversal rate evident in the Moore study is that (excluding appeals from the PTO), the Federal Circuit's overall reversal rate for obviousness that we report is similar to the rate at which the court reverses district courts in all patent cases. Overall, we think this suggests substantial stability in the doctrine of obviousness—it does not differ substantially from the court's reversal rate across all issues (and the court decides a great number of other issues).

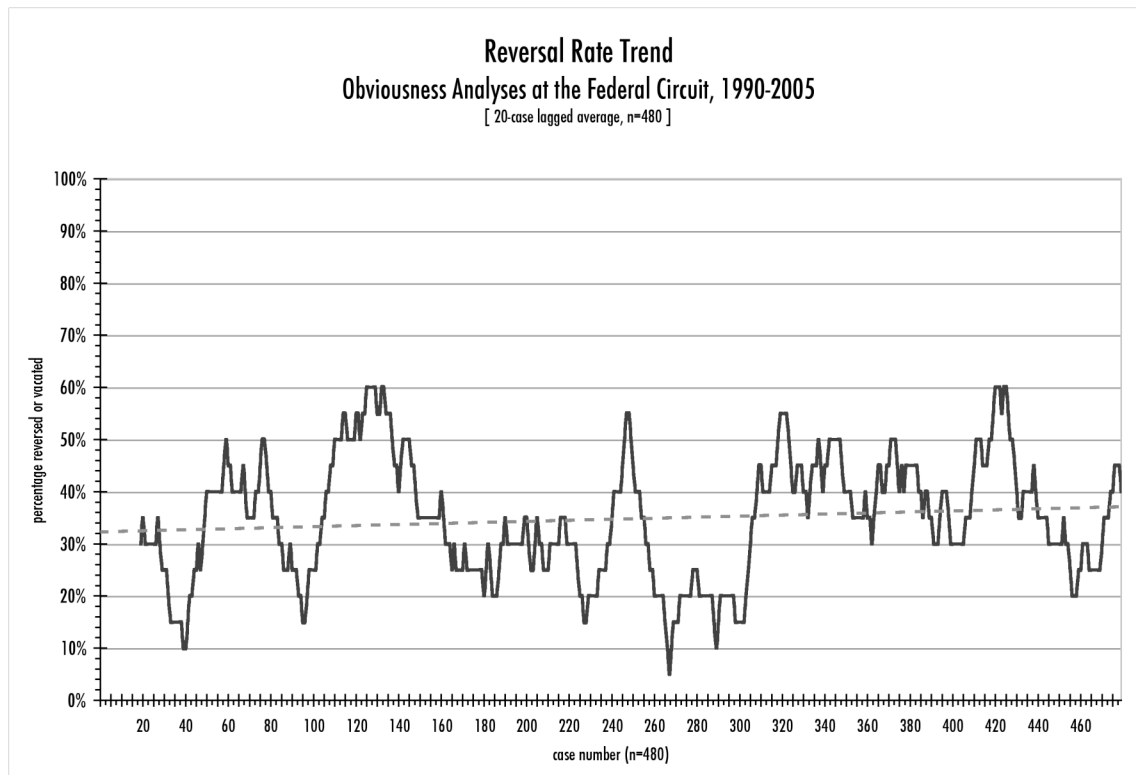
¹³⁰ Although in not all cases was the error outcome determinative. See Chu, *supra* note __ at 1100-03.

¹³¹ See Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 HARV. J. L. TECH. 1 (2001).

¹³² See 138 F.3d at 1476.

Circuit has provided substantially greater certainty in the area of obviousness.

In light of the frequency with which the court reversed or vacated lower tribunals, we examined how these results were distributed over time. To get a perspective of the overall reversal rate over time, we calculated a twenty-analysis lagged average of cases that were either reversed or vacated for the entire dataset. The results are depicted in Figure 1.



*Figure 1: The Overall Reversal Rate Trend in Obviousness Analyses at the Federal Circuit.*¹³³

Figure 1 reveals that the moving rate with which the Federal Circuit was likely to reverse or vacate a trial court held remarkably stable over the last fifteen years. This tends to suggest some level of doctrinal stability, particularly in view of the fact that the overall frequency of the court either reversing or vacating the lower tribunal was 34.8-percent, a value that aligns very well with the lagging rate throughout the course of the study.

¹³³ The ordinate represents a twenty-analysis lagging average of the percentage of analyses reversed or vacated, plotted against the number of analyses. On the abscissa, the analysis number moves from left to right (1990-2005).

The cases presenting the analyses that were the basis of the study came from a variety of procedural backgrounds. Figure 2 shows the distribution of procedural backgrounds of the analyses that formed the dataset for the study.

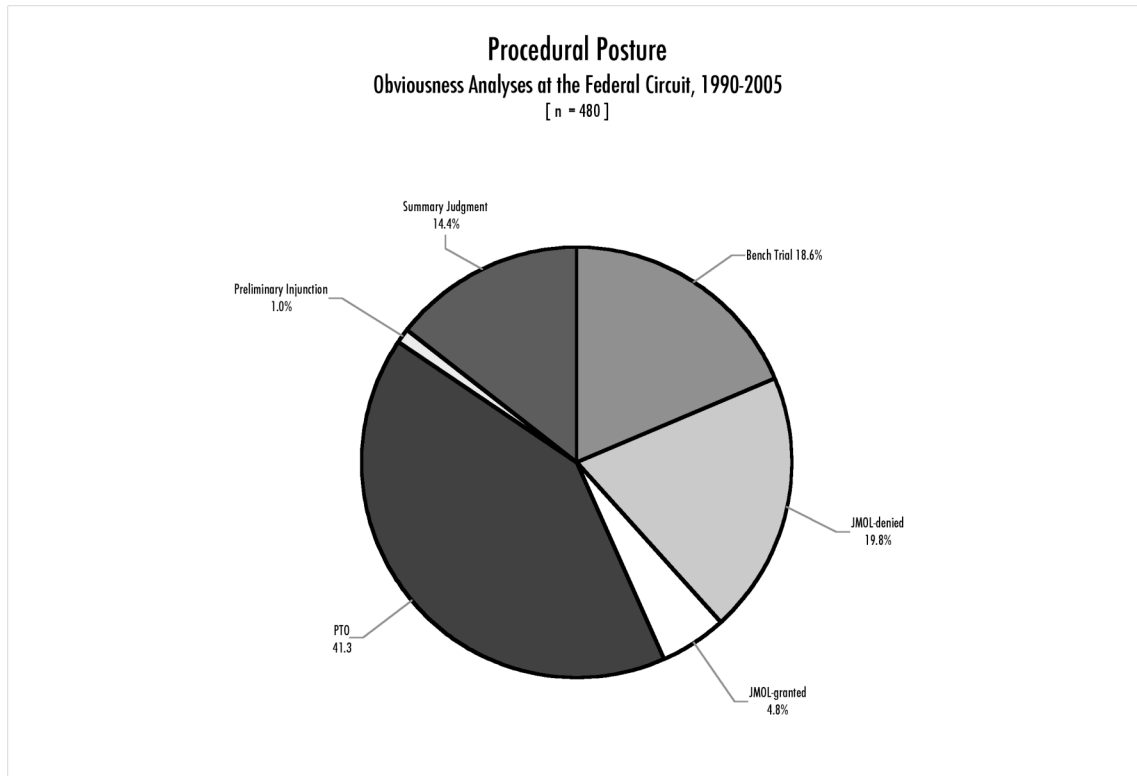


Figure 2: Overall Distribution of Analyses based on Procedural Posture.

Figure 2 shows that the Federal Circuit most frequently authored an obviousness analysis when it was addressing an appeal from the Patent Office (41.8% of the analyses). Analyses from summary judgments, bench trials, and jury trials were all observed with a very similar frequency, 14.4%, 18.6%, and 24.6%,¹³⁴ respectively.

The question of obviousness *vel non* is one of law. However as set forth *ante*,¹³⁵ the doctrine has important factual underpinnings.¹³⁶ One potential measure of the factual influence on a doctrine is an inquiry

¹³⁴ Twenty percent is the sum of JMOL-Denied + JMOL Granted = 19.8% + 4.8% = 24.6%.

¹³⁵ See *supra*, section I.B.1.

¹³⁶ For example, the *Graham* factors are viewed by the Federal Circuit as questions of fact. So too, the question of whether the prior art contains within it a teaching, suggestion or motivation to combine.

into the level of deference a reviewing court gives to the reviewed tribunal. One way to probe the level of deference is to examine the likelihood that the appellate tribunal will affirm or reverse depending on the posture of the case. Table 2 presents the dispositions shown in the court's analyses distributed in accordance with the procedural postures dominant in the study.

Table 2: Procedural Posture vs Dispositions (n = 480)

	Affirm	Reverse	Vacate
Bench Trial	75.3%	15.7%	9.0%
JMOL-denied	81.1%	12.6%	6.3%
JMOL-granted	47.8%	43.5%	8.7%
PTO	64.1%	28.8%	7.1%
Summary Judgment	39.7%	25.0%	35.3%

The results of Table 2 suggest that consistent with the Supreme Court's guidance in *Graham*, the doctrine has deeply factual foundations. The results show that the Federal Circuit was substantially more likely to affirm a lower tribunal's decision on the question of obviousness if it engaged in fact finding. When a bench trial was held, the Federal Circuit was likely to affirm 75.3-percent¹³⁷ of the time. The rate was even higher (81.1-percent)¹³⁸ for cases that

¹³⁷ The Federal Circuit performance when reviewing an obviousness determination following a bench trial is consistent with what others have observed for the court's review of bench trials across all issues. See Moore, *supra* [District Judges], at 17. (reporting an affirmance rate 77-percent for bench trials on the issue of validity). Chu reports affirmance rates for bench trials across all issues for his twenty-eight month study that are somewhat less, 56-percent. See Chu, *supra* note __, at 1152 (Table B-2). The three most probable explanations for the difference between Chu and Moore are the time periods examined, their comparative breadth, and the presence of claim construction data in the rate reported by Chu.

¹³⁸ The numbers of our study are harder to compare to this as prior studies have not distinguished between cases where the district judge enters judgment notwithstanding the verdict, or otherwise as a matter of law, and cases where the trial judge does not. However, the numbers are generally consistent. For jury

had been given to a jury and JMOL had not been granted. Patent Office adjudication fared only slightly worse than trials in courts.¹³⁹ And, as one might expect where an analysis is highly fact-dependent, the court reversed or vacated summary judgments on the question of obviousness over 60-percent of the time. Note that the court reversed or vacated JMOL-granted 52.3-percent of the time, suggesting, by this measure at least, that the court may be wary of judgments where a lower court has taken the fact finding function from the jury.

The examination of the functionality of the Federal Circuit's approach to different dispositions is another measure of the stability and clarity of the doctrine of obviousness. The cases that parties put on presumably reflect their understanding of the relevant legal principles. These understandings in turn influence the trial body's understanding of the law, are reflected in the evidence presented to the jury, jury instructions, the trial body's discretionary case management, and the likelihood that the court will grant JMOL. If the law is well understood and transparent, there should be little to complain about for the losing party other than the contention that the fact-finder took an erroneous view of the facts. Consistent with general principles of appellate review, appellate courts do not retry facts, instead applying some level of deference to the determinations of the fact finder. If the law is stable, but unclear, the lower tribunal should "get it wrong" frequently and reversal rates should be high. So too, where the law is not stable; on review, the appellate court should more frequently find evidentiary decisions improperly made, jury instructions inadequate or erroneous, or cases simply lacking evidence sufficient to support their outcome. Accordingly, one measure of the stability and clarity of the Federal Circuit's jurisprudence on obviousness is the frequency with which the court reverses the judgments of lower tribunals after the issues have been fully aired in the context of the purported governing law. As a general measure, the more likely the court is to affirm, the more likely the doctrine is clear and stable.

trials Moore reports an affirmance rate for validity issues of 78-percent. See Moore, *supra* [District Judges], at 17. Chu reports jury affirmance frequency for "Jury Trial or JMOLs" across all issues for his twenty-eight month study that is somewhat less 45-percent respectively. See Chu, *supra* note __, at 1152 (Table B-2). There are at least four possible explanations for this. One is the different sampling periods. Another is the comparative breadth of the studies. A third is that, as Chu explains, all reviews of a judgments following a jury trials (including JMOL-granted) are in the 45-percent number. And, a fourth is the presence of claim construction data in the rate reported by Chu.

¹³⁹ Chu reports a frequency of affirmance of 56-percent. See Chu, *supra* note __, at 1152 (Table B-2).

Table 2 shows that the Federal Circuit affirmed the judgment entered after a bench trial 75.3-percent of the time, and affirmed the conclusions of a jury 81.1-percent of the time. This is highly suggestive that the doctrinal law of obviousness is both stable and clear. As the Supreme Court made clear in *Graham*, the inquiry into the question of obviousness is deeply factual. The breadth of the factual inquiry, the likelihood that any of a variety of factors can influence the ultimate determination, and the many moving parts of the obviousness inquiry are all good indicators that there will often be genuine issue(s) of material fact that will need to be resolved before a judgment of obvious or nonobvious can be rendered.

The conclusion that the doctrine of obviousness is relatively clear and stable is not inconsistent with the results concerning summary judgment. First of all, as noted above, the doctrine of obviousness is deeply factual and a variety of different facts can affect the ultimate judgment. With a higher likelihood of material facts, and a rule that permits those facts to come from sources as textually unsupported as testimony concerning the knowledge and skill in the art, it is increasingly likely that genuine issues of material fact will exist in a case. Naturally, this makes it less likely for summary judgment to be appropriate on the issue of obviousness.¹⁴⁰

Thus, the result seen in Table 2, that the Federal Circuit affirms only 39.7-percent of summary judgments is consistent with the existence of a highly factual doctrine. Moreover, the low affirmance levels are not strong indicators of instability or lack of clarity. Obviousness requires a complicated and highly technical trial; a situation that is only exaggerated as more patent law issues are presented in a case. The economics of summary judgment often encourage the parties, and perhaps even more enthusiastically the lower courts,¹⁴¹ to attempt summary judgment.¹⁴² The more likely

¹⁴⁰ The critical reader should note that this situation could be expected to be amplified as TSM is used more frequently. See *infra* Section III.B (describing the increased use of TSM). It is a logical result of the Federal Circuit requiring evidence of TSM to establish obviousness. See *supra* Section I.B.1 (A Primer on Obviousness). Assuming that the textual TSM is a relatively rare event, TSM must come from other sources. One common source is expert testimony describing the relevant scope, content, knowledge, and skill in the relevant art. To sustain summary judgment, the non-movant would have to do little more than secure an expert who would contest the movant's expert's interpretation or description of the art.

¹⁴¹ There may be other reasons as well. The first is the presumption of validity. See *supra* note __. If the lower court is going to guess, it might well align its guess with the relevant presumptions. Secondly, those with a high level of knowledge of the doctrine are probably aware that it is sometimes perceived (and usually erroneously) that there may be subrules that prohibit an obvious finding and

explanation of the low affirmance rates for summary judgments is that we are seeing the court in one of its other congressionally envisioned roles—the doctrinal enforcer.

When summary judgment cannot be easily achieved on the facts of a case, another approach is to modify the law. This approach has the promise of attenuating any legally required fact finding by the interposition of layers of dispositive questions that either eliminate certain facts from the realm of materiality, or alternatively, make dispositive those facts which are undisputed. In light of the Federal Circuit's strong tendency to affirm after a trial, and given the economics of summary judgment, it is very likely that what Table 2 shows is the Federal Circuit repelling attempts to modify the functional approach set forth by the Supreme Court in *Graham*.

There are other reasons to think this is likely true. One way to examine the stress on the doctrine as a whole, as well as the Federal Circuit's role in policing it would be to examine the rate at which the court reversed or vacated summary judgment over time. This was done. The result revealed that the Federal Circuit dramatically increased the rate at which it reversed or vacated a summary judgment throughout the period studied.¹⁴³ This suggests that during the course of the study, the doctrine came under increasing pressure. If so, it shows that the Federal Circuit has rigorously and consistently rebuffed efforts to eliminate or reduce the factual quality of the inquiry. This is potentially a prime example of the Federal Circuit playing exactly the role envisioned.¹⁴⁴

The Patent Office reversal rate¹⁴⁵ was lower than expected. However, during the period of the study, the Federal Circuit altered its standard of review of PTO fact-finding in obviousness cases from "clear error" to "substantial evidence",¹⁴⁶ which is perceived as more deferential. In an effort to better understand the temporal nature of the likelihood of reversal at the PTO during the period studied, we examined the moving reversal rate. This is depicted in Figure 3.

perhaps fewer perceived subrules (in light of *Graham*), that direct toward a finding of obvious. It is probably not uncommon for particularly inexperienced lower courts become convinced that such subrules exist. Although, if true, such a phenomenon, suggests a least some lack of clarity in the doctrine.

¹⁴² [Maybe a Cite?]

¹⁴³ Data on file with authors.

¹⁴⁴ Stress placed in the doctrine in this manner may also reflect some degree of lack of clarity and predictably, *see infra*, note ____.

¹⁴⁵ *See* Table 2 (showing 28.8-percent).

¹⁴⁶ *See In re Gartside*, 213 F.3d 1305 (Fed. Cir. 2000).

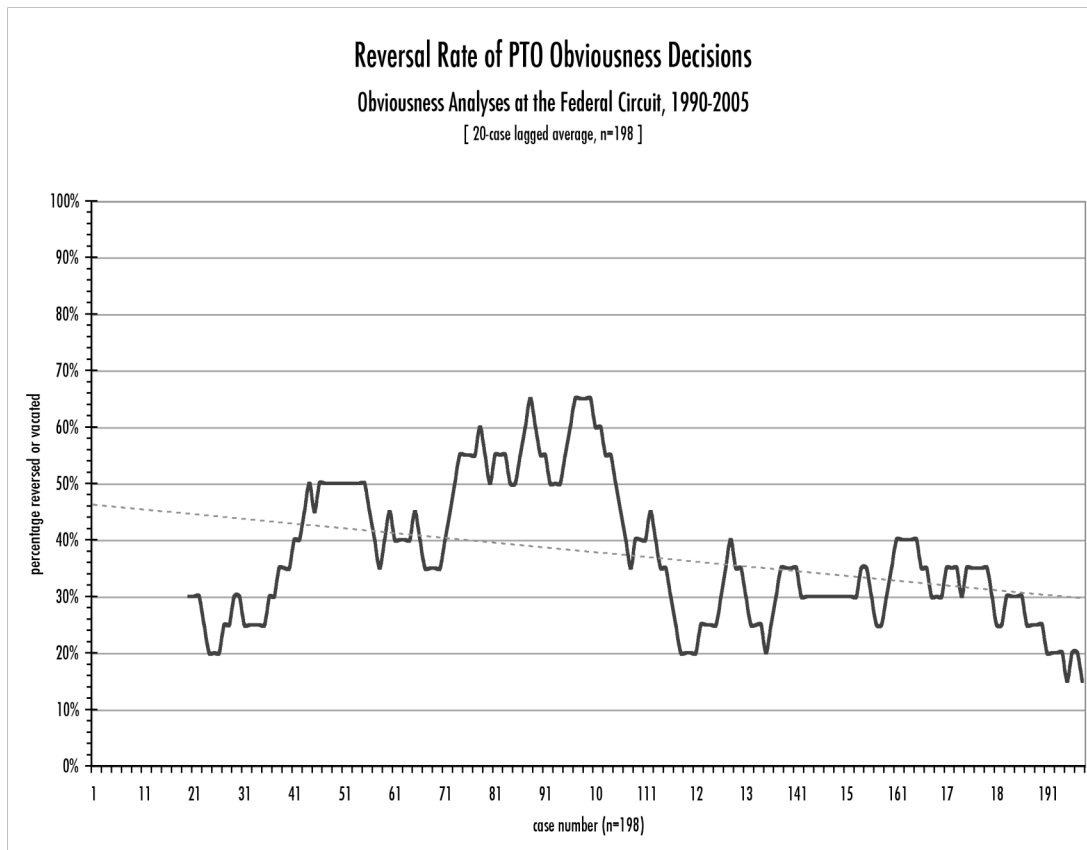


Figure 3: The Reversal Rate of Patent Office Obviousness Analyses¹⁴⁷

Figure 3 reveals that the rate at which the Federal Circuit was likely to reverse or vacate the Patent Office decreased over the course of the study. As the informed reader is aware, nearly every obviousness decision of the PTO that is reviewed by the Federal Circuit is a decision by the Board of Patent Appeals and Interferences that the disputed claims are obvious. Because of the obvious *vel non* posture of the appeals, the clear inference from this is that the PTO is more accurately determining that claims are obvious.

The fact that the PTO has fared better at establishing obviousness suggests that the law of obviousness is getting clearer. The likely reasons for this are that the Board now: (1) has a better understanding of when claims are obvious *vel non* and (2) has a better understanding

¹⁴⁷ As in Figure 1, the ordinate represents a twenty-analysis lagging average of the percentage of analyses reversed or vacated, plotted against the number of analyses. On the abscissa, the analysis number moves from left to right (1990-2005). The trend line superimposed on the graph has an $r^2=0.13$, $t\text{-obs}=5.14$, which is statistically significant to a level of $p=0.01$.

of how to articulate that knowledge in its opinions in a manner that is less likely to cause the court to think that the Board has erred. Because the source of the Board's guidance on how to identify and define obvious claims comes from the Federal Circuit, the clear inference is that the court has communicated to the Board how to establish obviousness.

Given that the Federal Circuit has been roundly criticized for weakening the standards of patentability,¹⁴⁸ we thought it would be interesting to examine the frequency with which the court reached either an obvious or a nonobvious outcome. Table 3 shows the frequency with which the court held claims either obvious or nonobvious.

Table 3: The Results of Obviousness Decisions
(*excludes Vacated dispositions, n=422*)

Result	N	%
Obvious	244	57.8%
nonobvious	178	42.2%

Here we found that Federal Circuit review resulted in an outcome of obvious 57.8-percent¹⁴⁹ of the time. This is a clear majority of the analyses. Note that to accommodate the fact that a result was still pending in 57 decisions where the court vacated a judgment on obviousness, we excluded those results from the calculations underlying Table 3. We did not follow the ultimate disposition of the vacated cases. At least one did return for Federal Circuit review,¹⁵⁰ and the disposition therefore eventually captured, but the quantity of cases returning appears to be quite low. In any event, given the nature of the coding there is little reason to think the return of a case from remand could have any significant distortive impact on the study results.

¹⁴⁸ See, e.g., *supra*, notes 3 and 62 (asserting this position).

¹⁴⁹ The 57.8-percent obvious outcome number is surprising in that it is achieved in the face of the law's presumption of validity, which can only be overcome by clear and convincing evidence. See [Cite a case which states the standard—tons in the dataset].

¹⁵⁰ Compare *Ruiz v. A.B. Chance Co.*, 234 F.3d 654 (2000), with *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276 (2004).

At least one reported study has concluded that obviousness has “fallen into . . . disfavor.”¹⁵¹ In view of that study, the high frequency of obvious outcomes observed here was a bit of a surprise. Having reached an outcome of obvious nearly sixty-percent of the time it tested the issue, the Federal Circuit seems to have little problem finding claims obvious.

There are several differences between the two studies that make comparing them difficult. For example, the study reported here looked at Federal Circuit opinions from 1990-2005, while the prior study looked at Federal Circuit decisions for two, two-year periods, one occurring before the period addressed by the study reported here.¹⁵² In addition, this study compares neither the ratio of obviousness to overall invalidity nor the Federal Circuit’s obvious outcomes to the obvious outcomes reached by the regional circuits. However, that the Federal Circuit reaches an obvious outcome nearly sixty-percent of the time it addresses the issue seems inconsistent with the notion that the importance of obviousness is on the wane.

There are several ways that the results from these two studies can comfortably coexist. Perhaps the most straightforward is (consistent with the results of this study): the law of obviousness has gotten clearer. It may be just as important, but parties are better able to judge whether to litigate or appeal the question. This would reduce the likelihood that it appears as a decided issue in a Federal Circuit opinion. It would also explain the comparatively low rate of reversal on the issue at the Federal Circuit described *ante*.¹⁵³ If so, the ratio relative to other doctrines with which obviousness appears in Federal Circuit opinions may not be decisive on the importance of the doctrine or whether it is disfavored.¹⁵⁴ To the contrary, it is at least equally

¹⁵¹ See Lunney, *supra* note __, at 374 (reporting the same).

¹⁵² It also is at least possible that the 1994-1995 information could be correct for that period, but because of the size of the sample, a relatively poor reflection of the overall activity of obviousness at the Federal Circuit.

¹⁵³ A rate that is even lower when the issue is tried. See *supra* Table 2.

¹⁵⁴ Another possible explanation is that parties prefer to use other doctrines to invalidate patents where they can. Anticipation is conceptually simpler, making it easier to explain to a judge or jury. As fields get crowded and patenting becomes heavy, it may be more likely that there is anticipatory art. If as is generally thought, the Patent Office does a poor job at locating prior art, “real” prior art searching may await litigation. Then it may be learned that there is anticipatory art and the case is litigated on that issue. Also, other doctrines may have ascended over time.

likely evidence of the Federal Circuit's success¹⁵⁵ in cleaning up the doctrine.

Yet another way to measure stability is across the varying technologies that are reflected in the cases for which the court authors analyses. The structure of the study permits the examination of the Federal Circuit's performance based on the technology involved in the analyses. The overall distribution of analyses based on technology is shown in Figure 4.

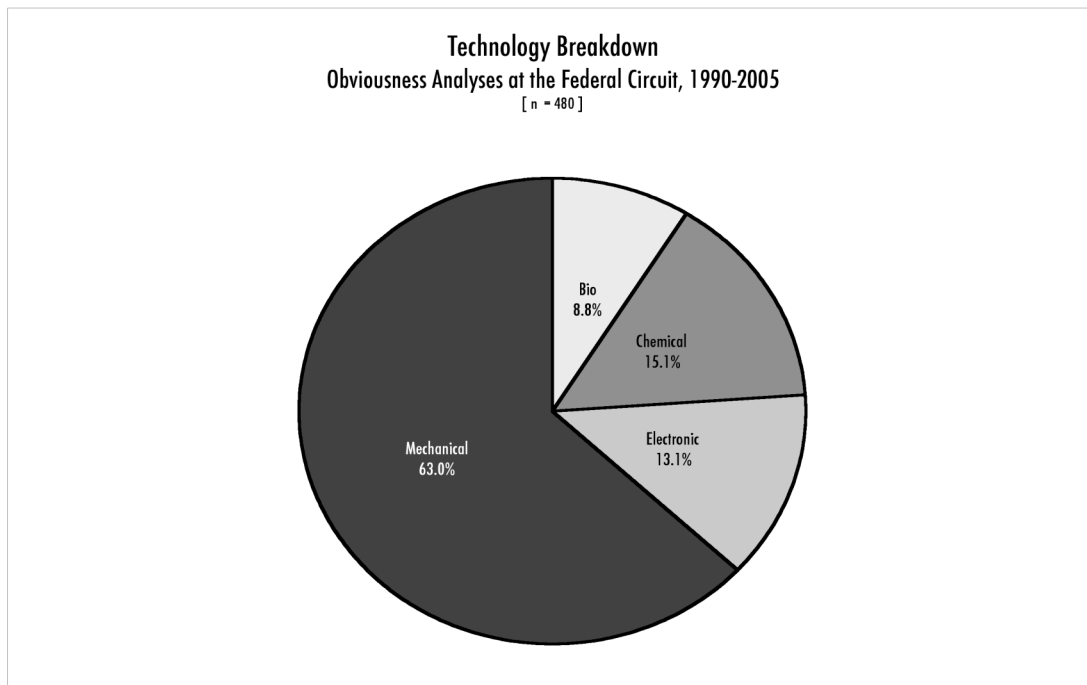


Figure 4: The Frequency of Analyses Involving Particular Technologies

Figure 4 captures the entire dataset and shows the distribution of analyses authored by the Federal Circuit based on technology. As is apparent, a majority of the cases involved the mechanical arts (63-

¹⁵⁵ One of the reasons it was thought that the Federal Circuit was needed was the high rate of regional circuit invalidity that Professor Lunney documents. See generally *supra* Section I.A. For other studies addressing the rate of invalidity before the creation of the Federal Circuit, see GLORIA KOENIG, PATENT INVALIDITY: A STATISTICAL AND SUBSTANTIVE ANALYSIS 4-41 (rev. ed. 1980) (reporting a likelihood of noninvalidity before the creation of the Federal Circuit of around 35-percent); P.J. Frederico, *Adjudicated Patents*, 38 J. Pat. Off. Soc'y 233, 236 (1956) (reporting that the percent of patents found valid and infringed in the Circuit courts of appeals to be between 18-19-percent), see also Justice Jackson's remarks in dissent in *Jungerson v. Ostby & Barton Co.*, 335 U.S. 560, 572 ("[T]he only valid patent is one that this court has not been able to get its hands on.")

percent), while the chemical and electronic arts were relatively similarly represented (15.1-percent and 13.1-percent respectively). The biotechnological arts were the least prevalent in Federal Circuit obviousness analyses, comprising only 8.8-percent of the analyses present in the dataset.

To investigate whether the Federal Circuit disproportionately finds claims pertaining to certain arts nonobvious, we examined the frequency distribution of results based on the identity of the art involved in the analysis. Table 4 shows the distribution.

Table 4: Technology vs. Results
(excludes Vacated dispositions, n=422)

	obvious	Nonobvious
Bio	58.3%	41.7%
Chem	58.7%	41.3%
Electronic	46.9%	53.1%
Mechanical	57.1%	42.9%

As noted above, in the study as a whole the mechanical, chemical, electronic, and biotechnological arts were distributed at frequencies of 63%, 15.1%, 13.1% and 8.8%, respectively.¹⁵⁶ When we asked whether the disposition of these analyses were obvious or nonobvious we discovered a nearly uniform distribution of obvious and nonobvious outcomes between the mechanical (57.1% obvious/42.9% nonobvious), chemical (58.7% obvious/41.3% nonobvious), and biotechnological arts (58.3% obvious/41.7% nonobvious).¹⁵⁷ The electronic arts differed somewhat, showing 46.9% obvious outcomes and 53.1% nonobvious outcomes).¹⁵⁸ With the possible exception of the electronic arts, these results are pretty self-explanatory. Federal Circuit analyses of different technologies lead to the same frequency of obvious dispositions. This is consistent with the overall frequency of an obvious disposition, which is 57.8%.¹⁵⁹ Thus, these results indicate a stability and consistency in the manner in which the Federal Circuit has applied the doctrine across technological identities.

¹⁵⁶ See Figure 4.

¹⁵⁷ See Table 4.

¹⁵⁸ *Id.*

¹⁵⁹ See Table 3.

["A Brief Summary" of the subsection]

With respect to the doctrine of obviousness, it appears that the Federal Circuit has been fulfilling Congress's promise to develop a patent law that reduces uncertainty. The Federal Circuit's frequency of reversal is not the "worst possible" 50-percent and compares favorably to its activity in other areas of the doctrine.¹⁶⁰

Moreover, the court's reversal rate on the issue of obviousness has remained stable throughout the course of the study.¹⁶¹ As might be expected for a highly factually complex doctrine, summary judgment is rarely affirmed, but jury trials and bench trials are affirmed over three-quarters of the time.¹⁶² In addition, the rate at which the federal circuit reverses the Patent Office has declined. Suggesting that one of the patent system's most important institutional players is better at identifying and rejecting obvious claims.

When one adds in that the court affirms obvious outcomes 68.6-percent of the time¹⁶³ and that the court is more likely to reach an outcome of obvious as opposed to an outcome of nonobvious, it suggests both that the court does not have "pro-patentee" bias on the question of obviousness and that lower tribunals are capable of establishing the obviousness of disputed claims.

B. *The Relationship Between TSM and Obviousness*

As noted *ante*,¹⁶⁴ a considerable controversy has arisen concerning the Federal Circuit's interpretation of the statutory requirement that the obviousness inquiry be temporally located "at the time the invention was made."¹⁶⁵ In particular, the interpretation that requires evidence showing more likely than not that somewhere within the prior art there is a teaching, suggestion, or motivation to collect and arrange disparate pieces of prior art to meet the claimed subject matter.

Given this controversy, we examined the application of TSM throughout the course of the study. The results were revealing, showing that TSM has no apparent affect on the likelihood of the Federal Circuit to affirm, and little to no apparent affect on the likelihood of the court to reach an obvious disposition. Moreover, as

¹⁶⁰ See Table 1 and accompanying discussion.

¹⁶¹ See Figure 1.

¹⁶² See Table 2.

¹⁶³ Data not shown.

¹⁶⁴ See *supra*, Section I.B.

¹⁶⁵ 35 U.S.C. § 103.

we describe below, the results show that while the application of TSM has increased over the course of the study, the rate of a nonobvious outcome for cases involving the application of TSM declined.

To investigate the nature of the Federal Circuit's TSM test on its overall obviousness jurisprudence, we first examined the frequency with which the application of TSM corresponded to a reversal of the lower tribunal.

Table 5: Disposition vs. Application of TSM Analysis (n=480)

	<i>TSM Applies</i>	<i>TSM Does NA</i>
Affirm	65.3%	65.0%
Reverse	21.3%	24.3%
Vacate	13.4%	10.6%

Table 5 shows that the Federal Circuit reversed the lower tribunal only 21.3-percent of the time when TSM applied. This rate of reversal was very similar to the rate of reversal observed when TSM was not a feature of the Federal Circuit's analysis (24.3-percent). In addition, TSM was not observed to substantially alter the frequency with which the court was likely to vacate a judgment during the period studied.¹⁶⁶ One of the most interesting features of this observation is that the court affirms quite frequently (65.3-percent) when TSM applies, a frequency of affirmance that is not appreciably different from analyses that did not feature TSM (65.0-percent).

**Table 6: TSM Analysis vs. Results
(excludes Vacated dispositions, n=187)**

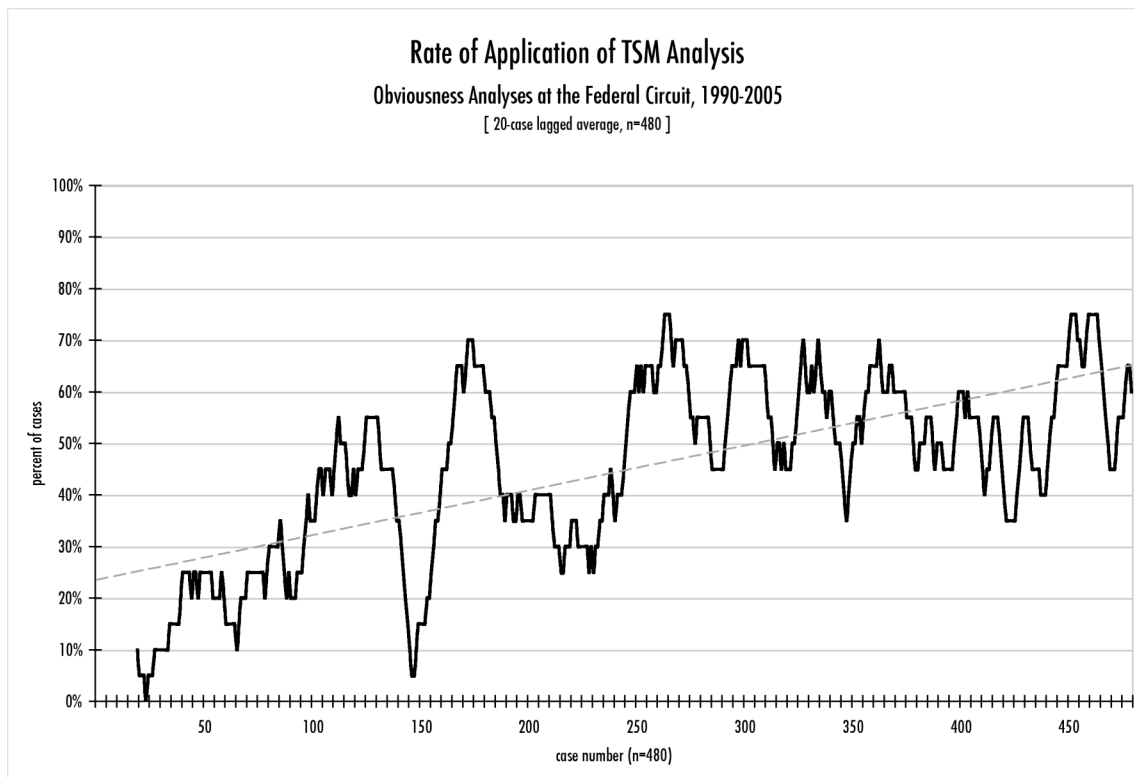
	Obvious	nonobvious
TSM Applies	52.4%	47.6%

Table 6 shows the distribution of an obvious or nonobvious outcome in analyses that showed a TSM analysis.

¹⁶⁶ Compare 13.4-percent, with 10.6-percent.

By comparing Tables 2 and 7 it appears that the presence of TSM in an analysis only slightly decreased the frequency with which the court reached an obvious disposition. The Federal Circuit reached an obvious disposition for the entire dataset 57.8-percent of the time,¹⁶⁷ while reaching an obvious disposition a slightly lower 52.4-percent¹⁶⁸ of the time in cases that showed a TSM analysis. The similarity of these two results suggests that overall the rate of obvious outcomes has not been strongly affected by the presence of TSM in the doctrine.

This was true even though the rate of application of TSM steadily rose throughout the period studied. Figure 5 shows the rate at which TSM was featured in Federal Circuit opinions during the period studied.



*Figure 5: The Rate of Application of TSM.*¹⁶⁹

¹⁶⁷ See Table 3.

¹⁶⁸ See Table 6.

¹⁶⁹ Here, the ordinate represents a twenty-analysis lagging average of the percentage of analyses showing a TSM analysis. The abscissa contains the number of cases in the study as a whole. The analysis number moves from left to right (1990-2005). The trend line superimposed on the graph has an $r^2=[. . .]$, $t\text{-obs}=[\dots]$, which is statistically significant to a level of $p=[. . .]$

Figure 5 clearly shows that as measured by Federal Circuit obviousness analyses, TSM is gaining in prominence as a part of the doctrine. The results presented here do not definitively show why this is true and there may be a number of reasons, none of which need be independent. For example, the TSM test may be an objective standard on which district courts, the Patent Office, and litigants feel they can hang their hat. If TSM can be proved, obviousness is established. If it can be refuted, a nonobvious result is more likely to be obtained. Moreover, in regard to the Patent Office, these results provide support for this proposition. Figure 3 shows that the reversal rate for appeals originating at the PTO declined over the same period during which the application of TSM was increasing. One reason for this may be that TSM provides a linguistic formulation that examiners and the Board can use to state their arguments for obviousness. If so, such improved clarity may be a very useful roadmap for establishing obviousness.

Another reason that TSM could be gaining prominence is disposition of and force with which the Federal Circuit has authored a few of its TSM opinions.¹⁷⁰ Another reason still may be the academic outcry, which has to some degree characterized the TSM test as an easy means to avoid an obvious outcome.¹⁷¹ Whatever the reason(s), however, the results show that the frequency of obvious outcomes remained stable even in the face of a significantly increasing use of TSM.¹⁷²

Although the results discussed above suggests that TSM has little impact on the overall frequency of obvious outcomes, we questioned whether the increase in the rate of TSM shown in Figure 5 corresponded to an increase in nonobvious outcomes. If TSM is a “green-light” to nonobviousness, perhaps some of the vacated outcomes were converted to nonobvious outcomes by the increasing application of TSM. Figure 6 shows the rate of a nonobvious result when TSM applies.

¹⁷⁰ See, e.g., *Dembiczak* and 1-2 others that really go after the board for not explaining why teachings related to one another.

¹⁷¹ See, e.g.,

¹⁷² Compare Table 3 with Table 6.

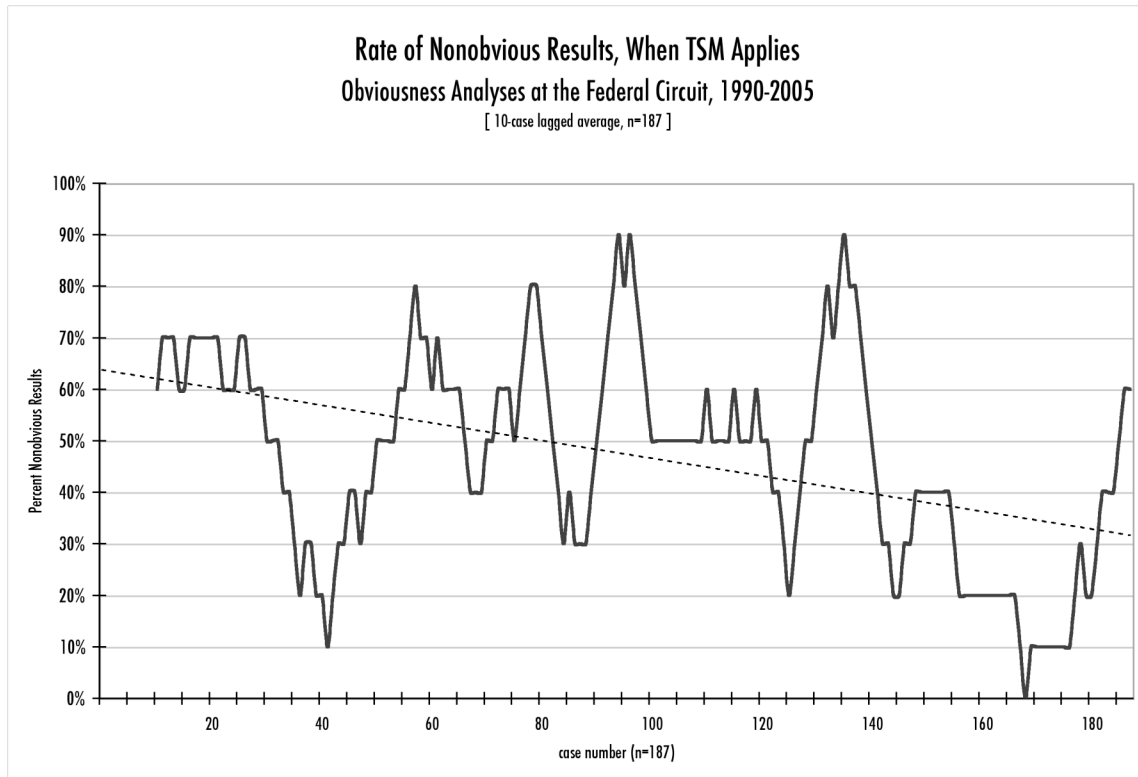


Figure 6: Rate of Nonobviousness Result in Analyses Applying TSM¹⁷³

What we found was quite surprising. The more TSM was used, the lower the rate of nonobvious results.¹⁷⁴ This finding suggests that TSM is not a great impediment to establishing obviousness. To the contrary, the more TSM appeared in Federal Circuit analyses, the less likely it was that the outcome of the analysis was nonobvious. This lends weight to the notion that TSM might be bringing a clarity to the law of obviousness that is helping rather than hindering the demonstration of obviousness. It also indicates that TSM is not a lever or tool that the Federal Circuit reaches to, simply to be pro-patentee, or to reach a nonobvious finding.

The TSM results also suggest that the Federal Circuit is playing the role of the enforcer. The increase in the frequency of TSM analysis may reflect that litigants have been applying pressure to the doctrine,

¹⁷³ Here, the ordinate represents a twenty-analysis lagging average of the percentage of analyses showing a TSM analysis that produced a nonobvious result. The abscissa contains the number of cases in the study that applied TSM. The analysis number moves from left to right (1990-2005). The trend line superimposed on the graph has an $r^2=[0.19]$, and is statistically significant to a level of $p=0.01$.

¹⁷⁴ See Figure 6.

by raising it frequently.¹⁷⁵ As noted *ante*,¹⁷⁶ this may reflect some uncertainty about the doctrine. The observed increase in writing on the part of the Federal Circuit suggests that the court has moved to address the stress that a perceived or real lack of clarity may have placed on the doctrine. It may also be confirming evidence of the elevation of the doctrine to the position of a core consideration in the obviousness determination. The fact that as TSM increased, fewer cases had a nonobvious outcome suggests that what the Federal Circuit has been teaching is that TSM is not a “green light” to a nonobvious outcome. In fact, as discussed above, it may show exactly the opposite.

Consistent with this, the results of this study appear to suggest that TSM has not brought great inflexibility or rigidity. As seen below in Figure 7, the court appears to have broadened the use of sources valuable for establishing teaching, suggestion, or motivation. This, in view of the fact that as the application of TSM increased the frequency of nonobvious outcomes decreased suggest that the court’s writing has been directed to explaining how to use the doctrine. Figure 7 suggests that what the court is teaching is the broad use of prior art to establish a teaching, suggestion, or motivation that makes apparent the claimed subject matter to a person having ordinary skill in the art. Thus, these data reveal an evolving and dynamic doctrine that appears responsive and functionally concerned with the concept underlying the inquiry of obvious *vel non*.

¹⁷⁵ It is less likely that it reflects Federal Circuit freelancing, as appellate court’s do not generally involve themselves with issues and arguments not raised by the parties.

¹⁷⁶ See *supra*, note ____.

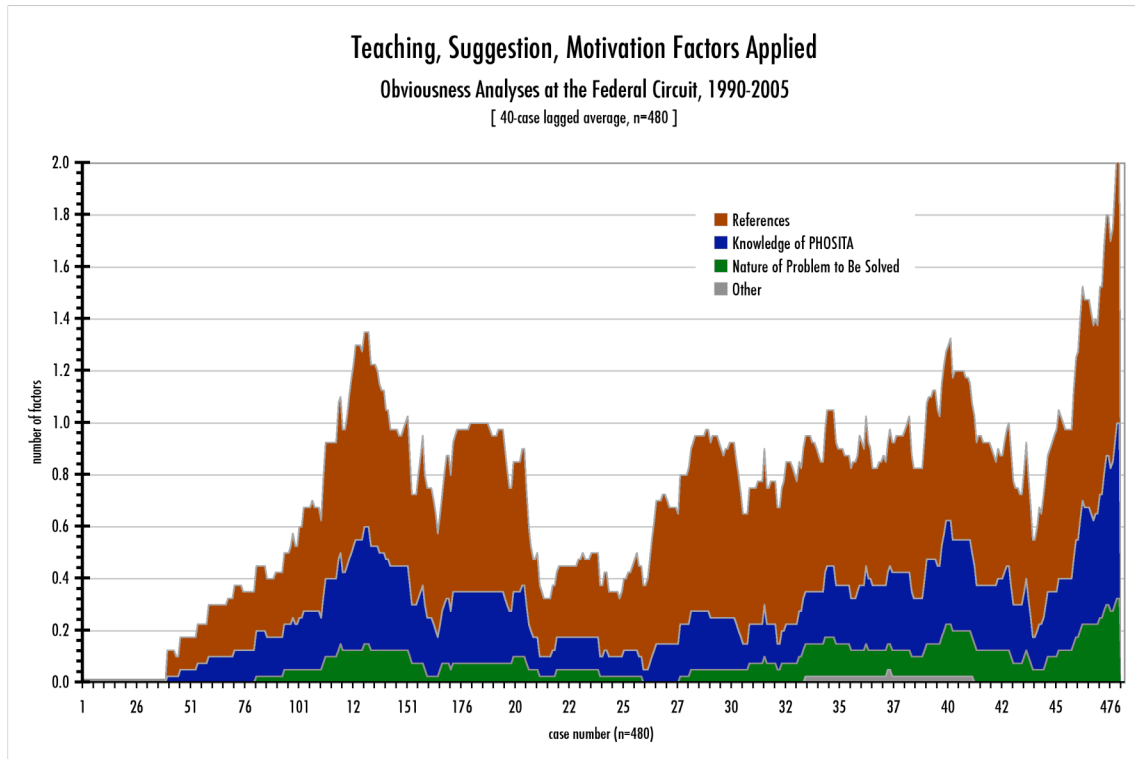


Figure 7: The Number of TSM Sources Shown in Federal Circuit Opinions

IV. IMPLICATIONS AND CONCLUSIONS

While this study reveals a still incomplete picture of the law of obviousness, the results permit several significant observations about how the court has developed the doctrine. Collectively, the results suggest that the court's approach to patentability is not systematically biased against obviousness. They further suggest that much of the contemporary criticism of the evolution of the doctrine under the guidance of the Federal Circuit may be exaggerated. As we discuss below, the evidence from this study undermines both the assumption that TSM is negatively affecting the patent jurisprudence, and the assumption that removing TSM from the jurisprudence would provide relief from any perceived increase in the grant of noninnovative patents. Moreover, the results suggest that TSM may be playing a positive role by showing litigants and lower tribunals how to establish obviousness.

Among the results that stand out in this study are:

1. *The Federal Circuit affirmed the outcome of obviousness determinations a clear majority of the time.*

2. *The Federal Circuit found claims obvious a clear majority of the time.*
3. *The overall rate at which the Federal Circuit affirmed the PTO is nearly identical to the overall affirmance rate and is increasing.*
4. *There has been a substantial increase in the appearance of TSM analysis in Federal Circuit opinions.*
5. *As TSM analysis has become more prominent in Federal Circuit opinions, the rate at which the Federal Circuit affirmed or reversed the reviewed tribunal has not substantially changed.*
6. *The frequency of an obvious or nonobvious outcome is not substantially different in cases that include a TSM analysis and those that do not.*
7. *As TSM analysis has become more prominent in Federal Circuit opinions, the rate at which the Federal Circuit reached a nonobvious outcome decreased.*
8. *As TSM analysis has become more prominent in Federal Circuit opinions, the rate at which the court reversed the PTO decreased.*
9. *As TSM analysis has become more prominent in Federal Circuit opinions, the court has shown an increase in the number of sources on which it relies to analyze TSM.*

A. *The Implications of this Study for the General Doctrinal and Normative Policy-Shaping Contentions Surrounding KSR International*

The results of this study provide important information concerning the general doctrinal and political contentions involved in the *KSR International* case. Before proceeding further however, it is important to realize that this study does not, and was not designed, to be highly probative of all of them. In particular, these results do not reveal whether there are too many noninnovative patents. Indeed, to know the answer to that question requires knowing where the line between innovative and noninnovative should be. Once that is determined, so is the answer to the question of whether there are too many noninnovative patents. Congress defined the line as “obvious at the time the invention was made to a person having ordinary skill in the art.” The Supreme Court defined the line with the *Graham* factors and the guidance that the statutory language “at the time the invention was made” should be assiduously observed. If the language the Federal Circuit uses is any guide to what it actually does, the Federal Circuit has stayed true to this framework, adding in this context, if indeed it is an addition, the requirement that somewhere within the full scope of the prior art, in the prior art references

themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved,¹⁷⁷ the prior art must teach or suggest the claimed subject matter to a person having ordinary skill in the art. Assuming, *arguendo*, that these standards differ, this study was not qualitatively designed to answer the question of which most closely approximates what it means to be nonobvious.

The results of this study do, however, reveal much concerning the general issues of obviousness-related patentability that surround the *KSR International* case.

TSM does not appear to present a “substantial obstacle” to establishing obviousness. Rather, it appears to have the flexibility to sustain obvious outcomes. If TSM is an “inflexible rule” that presents “substantial obstacles in establishing obviousness . . . in a way that unnecessarily sustains patents that would otherwise be subject to invalidation as obvious,”¹⁷⁸ the “inflexibility” of the rule should be apparent at the Federal Circuit. For the same reasons the lower tribunal would be forced by the “rule” to enter a judgment of nonobvious, so too would the Federal Circuit. The results from this study show that such is not the case. This conclusion is shown by several results. Overall the Federal Circuit reached an obvious outcome 57.8-percent¹⁷⁹ of the time.¹⁸⁰ In cases involving TSM, the court reached an obvious outcome 52.4-percent¹⁸¹ of the time. This difference is quantitatively small, suggesting that there is no substantial difference in obvious outcomes when the court applies TSM. This further suggests that litigants can make the showing necessary to establish obviousness. Moreover, the court affirmed obvious outcomes 68.6-percent¹⁸² of the time. If TSM were inflexibly biased toward nonobviousness, it seems unlikely the court could sustain such high levels of obvious outcomes, combined with such a high level of affirmance.

¹⁷⁷ 175 F.3d at 999.

¹⁷⁸ Brief of the United States, at 11-12.

¹⁷⁹ See Table 3.

¹⁸⁰ [Is this number high too in terms of case selection theory?—Kimberly Moore (relying on Priest & Klein and talking about trials), contends that patentees have more to lose and should be expected to win on issues of patentability more often. Whether to settle after judgment or appeal would seem to be based on a similar calculus—if it is, then the losses for patentees on appeal may be a very high number].

¹⁸¹ See Table 6. [Figure needs to be fixed n=187.]

¹⁸² Data not shown.

If TSM is a pro-patentee doctrine that makes establishing nonobviousness easy, one would expect to see more of it in the case law as patentees and patent applicants try to protect or obtain patents. This study does report an increase in the rate of TSM¹⁸³ over the last fifteen years, but it reveals a startling additional result: As the court's use of TSM has increased, the likelihood of an analysis concluding that claims were nonobvious has decreased.¹⁸⁴ This means that the increase in the use of TSM has coincided with a reduced likelihood that patentees and patent applicants will leave the Federal Circuit with nonobvious patents or claims. The fact that the more frequently the court applies TSM, the less likely it is to reach a nonobvious outcome further suggests that TSM does not present a substantial obstacle to establishing obviousness.

The results suggest that TSM does not appear to present a "substantial obstacle" to the Patent Office when it comes to establishing that claimed subject matter obvious. During the course of this study, we examined the court's review of the Patent Office, the body thought by many to be the most handicapped by the Federal Circuit's TSM jurisprudence. As the informed reader is aware, nearly every obviousness decision of the PTO that is reviewed by the Federal Circuit is a decision by the Board of Patent Appeals and Interferences that the disputed claims are obvious. Here, the results show¹⁸⁵ that the reversal rate for appeals originating at the PTO declined over the same period during which the application of TSM was increasing. Because of the obvious *vel non* posture of the appeals, the clear inference from this is that the PTO is more accurately determining that claims are obvious. The fact that the PTO has gotten better at establishing obviousness as the use of TSM in the review of their decisions has increased, at least suggests that the Patent Office is capable of working in the framework of TSM.¹⁸⁶ In fact, one possible implication of the

¹⁸³ See Figure 5.

¹⁸⁴ See Figure 6.

¹⁸⁵ See Figure 3.

¹⁸⁶ A critical reader should query whether the increase in the application of TSM and the corresponding decrease in nonobvious results at the Federal Circuit is a good measure of how well the Patent Office and lower courts are using TSM. For example, one might reasonably argue that the Federal Circuit's doctrinal pronouncements influence the selection of cases that are appealed. If so, cases where a patent challenger cannot establish TSM might be less likely to be appealed on the issue of obviousness, and would not show up in the results of this study. While such a situation could exist, however, it relies on some not too well founded assumptions. One is that the missing cases contain "obvious" subject matter than cannot be characterized as being taught or suggested by the prior art. It is at least equally likely that subject matter that cannot be characterized as taught or suggested by the prior art is nonobvious. A second

results is that the TSM formulation has been helping rather than handcuffing the Patent Office. As a question of framework dynamics, such a conclusion makes sense. Because TSM somewhat objectifies the test for obviousness, it creates a target at which the Patent Office can aim. It further provides a flexible and sweeping linguistic formulation that the Office can use to characterize its findings on the question. The finding of TSM *vel non* has been held by the court to be of a factual quality, and therefore relatively immune from reversal. Thus, one interpretation of the results of this study is that the Federal Circuit has provided the Patent Office the roadmap to establishing obviousness. A situation that in cooperation with the highly deferential review¹⁸⁷ the Office receives, has given the Patent Office the upper hand over undeserving patent applicants.

If so, the same dynamic should be present in all cases where the court reviews lower courts that have similarly characterized factual findings on the question of obviousness. Thus, if the court has in fact explained to the lower courts how to establish obviousness, one would expect to see deference to the lower courts when they decide claims are obvious after making findings *and* use or provide for a TSM characterization as the explanation for the outcome. The first of these conjunctives was observed.¹⁸⁸ The second was not directly tested, but enjoys some indirect support from the observation that the rate of use of TSM increased throughout the study.

Although the Federal Circuit's TSM prescription appears more than flexible enough to sustain obviousness judgments, it is still worth considering the argument that the court virtually requires that teaching, suggestion, or motivation be written in a prior art document. It should be noted that this is, of course, incorrect as a matter of law.¹⁸⁹ However, we think there is a good faith argument behind the assertion. That is: *practically* when fact finders must use TSM, they are

assumption is that the Patent Office and litigants are not interested enough in establishing as obvious claims that they firmly believe are obvious to litigate and appeal the question even where it might be difficult to put in terms of being taught or suggested by the prior art.

If the Patent Office and litigants are pulling cases with obvious claims because they cannot characterize disputed claims as either taught or suggested by the prior art, the temporal aspect of this study might have revealed a tumble in either the frequency or rate of obviousness analyses. This was not seen. In fact, the frequency of Federal Circuit obviousness analyses increased, albeit slightly, during the period of the study and reversal rates remained stable for the entire fifteen-year period of the study.

¹⁸⁷ See *In re Gartside*, 213 F.3d 1305 (Fed. Cir. 2000)

¹⁸⁸ See Table 2.

¹⁸⁹ See, e.g., *In re Dembiczak* (or any of a number of others).

unable to use it without a written prior art document containing the teaching.

This is difficult to observe from the appellate level, but at least two things suggest that the argument may be overemphasized. The first is discussed above: lots of obvious outcomes are being reached at the Federal Circuit when the court applies TSM. The second is both more subtle and more indirect. During the course of the study, the frequency with which the Federal Circuit used different sources to establish TSM increased.¹⁹⁰ This indicates that the panoply of prescribed sources are being used, and since at least two of them do not require a writing, *e.g.*, knowledge and skill of a person having ordinary skill in the art and the nature of the problem to be solved, it is suggestive of fairly far reaching test, one capable of exploring the full scope of the relevant prior art.

The results of this study do not support a normative argument that excising TSM from the doctrine without a more substantive change to the *Graham* approach or the governing statutory law will result in an increased number of obvious outcomes.¹⁹¹ Many of the results supporting this finding have been described above: for the last fifteen-years the Federal Circuit has reached an obvious outcome at a fairly high rate; over the last fifteen years there has been only the slightest difference in obvious outcomes between cases that show the application of TSM and those that do not show the application of TSM; as the Federal Circuit uses TSM more frequently, the less likely it is to achieve an outcome of nonobvious; and as the Federal Circuit uses TSM more frequently, the less likely it is to reverse the PTO. Together these results suggest that TSM may not be the “green light” to nonobviousness that has previously been supposed. If so, this finding implies that if there is a deleterious difference in substance between the framework the Supreme Court provided in *Graham* and the current doctrinal approach utilized by the federal circuit, we will have to look elsewhere to find it. Finally, it suggests that those who take issue with the current level of innovation required to obtain a patent have a quarrel not with the Federal Circuit, but rather with the Congress.

¹⁹⁰ See Figure 7.

¹⁹¹ Given the nearly total scholarly focus on the TSM, we have not in this Article made an effort to describe and rule out other features of the law of obviousness that may differ between the *Graham* approach laid out so long ago, and the contemporary doctrine.

B. *Is the Federal Circuit Succeeding?*

Here, as before,¹⁹² we consider that question through the lens of the court's mandate, establishing uniformity and predictability from the inconsistency and confusion that existed prior to FICA. While there is more to learn of the law of obviousness than can be reported in this Article, what it does reveal are several signs that the court is, if not succeeding, moving toward meeting its mandate. Those signs are found separately in observations concerning doctrinal stability, doctrinal evolution, and doctrinal affect.

The indicators of doctrinal stability are several. The Federal Circuit has a relatively low reversal rate on the question of obviousness that has remained stable for the last fifteen years. The court affirms the decision of lower tribunals at a ratio greater than 3:1. Moreover, this rate of affirmance seems independent of whether TSM is used by the court when analyzing obviousness. The court seems to have remained loyal to the factual nature of the doctrine. Following a trial of any sort, the court is very likely to affirm, and very unlikely to reverse. As one would expect from the warden of a highly factual functional determination, the Federal Circuit frequently rejects summary judgment. Finally, the court has been surprisingly consistent across technological identities, which may indicate an ability to evenly apply the doctrine to a variety of different technofactual situations.

Whether the doctrine is evolving to a place that is closer to or farther from stability and predictability is harder to tell. Presently, there is at least room for optimism. Based on the increasing rate at which it appears in Federal Circuit obvious analyses there can be little question that TSM is ascending in importance. However, counter to the common wisdom TSM does not appear to be a green light to a nonobvious outcome. There are signals in the results of this study, including decreasing nonobvious outcomes, and decreasing reversal rates at the Patent Office that may indicate that TSM is playing a different function. One possible function may be to take the guesswork out of obviousness decisionmaking, both at the reviewed tribunal and on appellate review. If TSM has reduced the ambiguity in deciding obviousness and somewhat objectified the analysis, that might be a welcome improvement. Perhaps now the Patent Office and the lower courts have a linguistic formulation with which to present their findings that the prior art makes obvious claimed subject matter; one that can be communicated to a jury or a reviewing court while

¹⁹² See Wagner & Petherbridge, *supra* note ____.

simultaneously enjoying the protection of a high level of deference.¹⁹³ In addition, the increase in the rate of TSM analyses suggests that the Federal Circuit is teaching more about the doctrine. In light of the outcomes, reversal rates, and observations concerning the number of sources used, what the court appears to be teaching is how to use the different sources to establish TSM. Perhaps, then, the court has done what Congress, and later the Supreme Court could not, take a very ambiguous and subjective doctrinal concept and made it more objective in a manner that shows some degree of sensitivity and fealty to its functional nature. If so, this would be a triumph not only for the Federal Circuit, but also for the concept of institutional design it reflects.

What can the Federal Circuit do better? If it intends for TSM to be a roadmap to obviousness, it could be more open in saying so. Thus far it looks like the court is showing the breadth and power of the approach, and is increasingly doing so, but it has not as far as we know talked openly about its true potential.

V. FUTURE DIRECTIONS

Although the question cannot be completely answered in this paper, it appears that the Federal Circuit has developed a robust jurisprudence surrounding obviousness. Given the ambiguity of the obviousness concept, the law developed appears fairly stable, predictable, and procedurally certain. The results of this study further suggest that the court is staying atop this issue, writing more analyses containing TSM, and in its application teaching that the test can be used to reject the assertion that claims are nonobvious. The results of this study also cast doubt on the validity of the assertion that the TSM test has paralyzed the obviousness inquiry to the point of uselessness. Indeed, some of the results reported in this article suggest that opposite is true. Nor does their appear to be a strong basis to excise the TSM test from the law of obviousness, and even if it were to be done, little basis for the expectation that more claims would be adjudicated obvious—at any tribunal.

The results presented here suggest numerous avenues for further study. For example, it would be interesting to examine district court conduct in the context of TSM. Are district courts using it as the study suggests—as the bulls-eye of obviousness? How frequently does it

¹⁹³ While the thought of TSM playing this role is appealing, it may also be troublesome because the Federal Circuit may have handed over a significant amount of power to the Patent Office and lower courts. If it becomes too easy to establish obviousness, doctrinal clarity may begin to fade into a battle of the experts as the obviousness determinations are subsumed into (relatively) review immune TSM determinations.

appear in the opinions and judgments of lower tribunals? What outcomes are reached? What, if any, are the historical patterns? Are litigants and lower courts diligent when trying the issue, do they attempt to present nondocumentary evidence of the knowledge of the PHOSITA or the nature of the problem to be solved. How frequently is the question appealed?

Does the Patent Office complain that its examiners cannot apply the TSM? While the results reported here would appear to suggest that the Office is capable of explaining how a person of skill in the art would find claimed subject matter taught or suggested by the prior art, is the task too difficult? If so, how might the standard be better tailored to assist the Office?

Other avenues of investigation could be directed to obtaining a comprehensive measure of the number of “low quality patents”? How is a low quality patent to be identified? What method(s) can be used to systematically identify actual or potential low quality patents? Are the social harms that are argued to attend the large number of issued patents are less than, greater than, or equal to the benefits *vel non* of having a patent system?

Under the assumption that there is indeed a problem with obviousness law—and that the problem is that it is too easy to get a patent—another avenue of investigation could be some creative thinking on how to modify the statutory or case law to better reflect the concept, while at the same time not damaging innovation in this country and preserving the justiciability of the determination.

APPENDIX A

DATABASE FIELDS

Field#	Field ID	Description	Form	Coding	<i>Cohen's κ</i>	Notes
1	Serial	serial number	[integer]	machine	NA	unique record identifier
2	Title	case title	text	machine	NA	
3	Docket	case docket numbers	[xx-xxxx]	machine	NA	may have multiple dockets
4	Citation	full citations	text, citation format	machine	NA	
5	Lexis_Cite	LEXIS Citation	[xxxx U.S. App. LEXIS xxxxxx]	machine	NA	
6	Date	date issued	[date]	machine	NA	
7	Published	publication status	[yes no]	machine	NA	
8	Cert_Denied	was certiorari denied	[yes no]	machine	NA	
9	Case_Below	title & court below	text	machine	NA	incomplete, especially before 1995
10	Lexis_Cite_Below	LEXIS Citation Below	[xxxx U.S. Dist. LEXIS xxxxxx]	machine	NA	incomplete, especially before 1996
11	Disposition	case outcome	[affirmed reversed vacated mixed]	machine	NA	
12	Judge1	Judge assigned	text	machine	NA	
13	Judge2	Judge assigned	text	machine	NA	
14	Judge3	Judge assigned	text	machine	NA	
15	Author	author of court's opinion	text	machine	NA	
16	Opinion_Type	type of opinion	[sole majority]	machine	NA	
17	Author	author of alternative opinion	text	machine	NA	may not be present
18	Opinion_Type	type of opinion	[concur dissent]	machine	NA	may not be present
19	Author	author of alternative opinion	text	machine	NA	may not be present
20	Opinion_Type	type of opinion	[concur dissent]	machine	NA	may not be present

Field#	Field ID	Description	Form	Coding	Cohen's κ	Notes
21	GF_Prior_Art	whether Graham Factor - scope and content of the prior art - was discussed	[yes no]	human	0.81	
22	GF_Differences	whether Graham Factor - differences between invention and prior art - was discussed	[yes no]	human	0.87	
23	GF_Skill	whether Graham Factor - level of ordinary skill in the art - was discussed	[yes no]	human	0.97	
24	2nd_Application	how "secondary factors" applied	[dispositive-obvious dispositive-nonobvious leans-obvious leans-nonobvious NA]	human	0.84	
25	2nd_Long_need	whether "long felt need" was discussed	[yes no]	human	0.99	
26	2nd_Copying	whether "copying" was discussed	[yes no]	human	0.98	
27	2nd_Success	whether "commercial success" was discussed	[yes no]	human	0.98	
28	2nd_Unexpected	whether "unexpected results" was discussed	[yes no]	human	0.99	
29	TSM_Application	how the "Teaching, Suggestion, or Motivation" test applied	[dispositive-obvious dispositive-nonobvious leans-obvious leans-nonobvious NA]	human	0.91	
30	TSM_References	whether "references" was discussed as a source for TSM	[yes no]	human	0.91	
31	TSM_Knowledge	whether "knowledge of skill in the art" was discussed as a source for TSM	[yes no]	human	0.97	
32	TSM_Problem	whether "the nature of the problem to be solved" was discussed as a source for TSM	[yes no]	human	0.98	
33	TSM_Other	whether another source was discussed as a source for TSM	[yes no]	human	1.00	

Field#	Field ID	Description	Form	Coding	Cohen's κ	Notes
34	Art_Patents	whether prior art references included patents	[yes no]	human	0.93	
35	Art_Articles	whether prior art references included articles or non-patent publications	[yes no]	human	0.95	
36	Art_Testimony	whether prior art references included testimony	[yes no]	human	0.94	
37	Art_Products	whether prior art references included existing products or services	[yes no]	human	0.94	
38	Technology	broad technological area of the patent-at-issue	[bio chem electronic mechanical]	human	0.98	
39	Depth	depth of obviousness analysis	[hi med lo]	human	0.66	
40	Result	the Federal Circuit's conclusion on obviousness	[obvious nonobvious]	human	0.94	
41	Disposition	the Federal Circuit's action/result on obviousness	[affirm reverse vacate]	human	0.95	
42	Posture	the procedural posture of the case	[bench SJ JMOL-granted JMOL-denied PI PTO]	human	1.00	
43	Patent #	the patent# involved	[#####]	human	NA	