EMPIRICAL ANALYSIS OF THE FEDERAL CIRCUIT'S CLAIM CONSTRUCTION TRENDS

By Christian A. Chu[†]

ABSTRACT

As a result of *Markman v. Westview Instruments, Inc.* and *Cybor Corp. v. FAS Technologies, Inc.*, claim construction is an issue of law reviewed de novo by the Federal Circuit. That approach promised greater certainty and predictability in patent litigation. Yet, criticisms have mounted that patent litigation remains unpredictable, partly because there is no certainty as to claim scope until the Federal Circuit ultimately rules. Unfortunately, these criticisms frequently rely on old statistics or isolated anecdotes.

To examine the effects of the de novo review standard, the author conducted an empirical study that systematically examined recent Federal Circuit decisions and applied statistical methods to analyze trends in the court of appeals' claim construction jurisprudence. This study reveals an increasing trend in claim construction modifications and claim interpretation-based reversals since *Cybor Corp.*'s reaffirmation of the de novo review standard. Underscoring the effects of the de novo standard, this study further indicates a strong correlation between the type of judgment reviewed by the Federal Circuit and the likelihood of reversal and claim construction modification. This increase in claim construction modification and reversal cannot be solely blamed on the standard of review, since a case's precedential status or the inclusion of a means-plus-function claim statistically affects its rate of reversal. By contrast, other factors like the particular panel hearing the case or the district from which a case is appealed do not appear to influence the outcome of the

---

[†] J.D., 2001, University of California at Berkeley, School of Law (Boalt Hall); B.A., 1997, Harvard University. Mr. Chu is clerking during the 2001-2002 term for the Hon. Marilyn Huff, Chief Judge of the U.S. District Court for the Southern District of California. He plans to clerk during the 2002-2003 term for the Hon. Raymond Clevenger III, U.S. Court of Appeals for the Federal Circuit. He is deeply grateful to Professor Mark Lemley for insightful comments on earlier drafts and thoughtful advice during the preparation of this study. He also thanks Kurtis MacFerrin, Timothy Pham, Jennifer Polse, Timothy A. Porter, Frank Porcelli, and Jason Schultz for their editorial suggestions and thoughtful comments on earlier drafts of this article. Mr. Chu emphasizes that the opinions and mistakes in this article are his alone, and do not reflect the views of the judges for whom—or the courts for which—he will be clerking.

appeal. Even on appeal and with the de novo standard at its disposition, the Federal Circuit tends to expressly review claim construction less often for invalidity challenges than for infringement appeals. Given these results, the hopes for greater predictability and certainty remain a tantalizing dream.

TABLE OF CONTENTS

I. INTRODUCTION

> The object of our study, then, is prediction, the prediction of the incidence of the public force through the instrumentality of the courts . . . . The primary rights and duties with which jurisprudence busies itself again are nothing but prophecies.[1]

Patents have become staples of modern commercial endeavors. Yet, asserting patent rights involves significant risk and uncertainty. Despite the substantial cost of patent litigation,[2] the parties and their attorneys often choose litigation rather than settlement because they cannot accurately assess their rights and obligations under the patent-in-suit.[3]

In *Markman v. Westview Instruments, Inc.*,[4] the Court of Appeals for the Federal Circuit ("Federal Circuit") tackled a portion of this unpredictability problem by transferring responsibility for claim construction from the jury to the trial judge.[5] The *Markman* approach promised greater reliability, certainty, and predictability.[6]

In the views of some judges and commentators, the Federal Circuit subsequently weakened *Markman*'s promises when it reaffirmed its power to review claim construction de novo.[7] Since then, criticisms have mounted that patent litigation remains as unpredictable as before *Mark-*

---

1. THE HONORABLE OLIVER WENDELL HOLMES, THE PATH OF THE LAW (1897), *reprinted in* 78 B.U. L. REV. 699, 699 (1998).

2. *See* Josh Lerner, *Patenting in the Shadow of Competitors*, 38 J.L. & ECON. 463, 470-71 (1995) (discussing the costs of patent litigations).

3. *See* Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1475 n.15 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting) ("Three variables affect the settlement calculus of each party to litigation: *p*, the probability of the plaintiff obtaining damages; *J*, the expected value of a judgment for the plaintiff; and *c*, the cost of litigation. *See* RICHARD A. POSNER, THE FEDERAL COURTS: CHALLENGE AND REFORM 89-94 (1996). If *p* x *J* (*pJ)* exceeds *c*, then plaintiff will sue. The plaintiff values the case at *pJ* - *c*. If the defendant agrees on the values assigned to the variables, the suit will cost him *pJ* - *c*. This rough model poses an interesting question. Because the costs of litigation invariably exceed the costs of settlement, why do not all cases settle? Chief Judge Posner answers: "Uncertainty as to outcome is the key to the settlement rate . . . ." *Id.* at 90. This uncertainty leads each party to overestimate its chance of prevailing. Accordingly, each party will assign different values to the variables, most notably *p*, thereby diminishing the likelihood of settlement."

4. 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

5. *Id.* at 979.

6. *See infra* note 39 and accompanying text.

7. *See Cybor Corp*., 138 F.3d at 1476 (Rader, J., dissenting); Luke L. Dauchot, *The Federal Circuit's De Novo Review of Patent Claim Construction: A Need for a More Balanced Approach*, 18 INTELL. PROP. L. NEWSL. 1 (1999).

man, partly because there is no certainty as to the scope of the claims until the Federal Circuit ultimately rules.[8]

These criticisms of *Markman* often stand on a shaky foundation of old statistics or isolated anecdotes. To provide more tangible evidence on this issue, the present empirical study systematically examined recent Federal Circuit decisions as they relate to claim constructions, and applied statistical methods to analyze trends in the court of appeals' claim construction jurisprudence. Part II discusses the issues and cases leading to the Federal Circuit's decision in *Cybor Corp. v. FAS Technologies, Inc.* Part III describes the methodology used in this study's analysis. Part IV provides the results from such analysis, and discusses the implications of these results.

Specifically, Part IV.A shows an increasing trend in claim construction modifications and claim interpretation-based reversals since *Cybor Corp.* Part IV.B indicates a strong correlation between the type of judgment reviewed by the Federal Circuit and the likelihood of reversal and claim construction modification. Part IV.C examines the panel-dependency hypothesis and shows that the identity of the Federal Circuit judge who authors the majority decision does not appear to influence the outcome of the appeal. Part IV.D demonstrates that, although the Federal Circuit tended to reverse fewer cases appealed from districts with larger patent dockets during the time covered by this study, there is no conclusive link between the particular tribunal from which a case originates and the likelihood of reversal or claim construction modification. Part IV.E demonstrates that the precedential status of a case correlates with the probability of reversal and claim construction modification. Part IV.F suggests that cases requiring a review of means-plus-function claims have a higher probability of reversal and claim modification. Finally, Part IV.G indicates that, contrary to its precedent, the Federal Circuit tends to expressly review claim construction less often for invalidity challenges than for infringement appeals.

---

8. *See* Ted D. Lee & Michelle Evans, *The Charade: Trying a Patent Case to All "Three" Juries*, 8 TEX. INTELL. PROP. L.J. 1, 11-20 (1999) (arguing that, while trying his case to the traditional jury and the judge, a patent litigator must also prepare the record for appeal because the Federal Circuit "became a second jury by substituting its opinion for the jury verdict."); Douglas D. Salyers, *The Paper Side of Jury Litigation in Patent Cases—Don't Become Just Another Statistic in The Federal Circuit*, 572 PLI/PAT 557, 566-88 (1999) (discussing the possible errors in trying patent cases, including the uncertainty of claim construction).

II. BACKGROUND

> [I]n societies like ours the command of the public force is intrusted to the judges in certain cases, and the whole power of the state will be put forth, if necessary, to carry out their judgments and decrees. People want to know under what circumstances and how far they will run the risk of coming against what is so much stronger than themselves, and hence it becomes a business to find out when this danger is to be feared.[9]

A. Patent Litigation before *Markman*

Before 1982, the federal judiciary's inability to adjudicate patent law issues in a consistent manner begat uncertainty and led parties to expensive forum-shopping among the regional circuits.[10] To remedy this problem, Congress created the Federal Circuit and transferred exclusive appellate jurisdiction over patent cases to the new court.[11] Since its inception, the Federal Circuit has worked to fulfill its mandate to unify and clarify patent law.[12]

Yet, by the early 1990's, the Federal Circuit continued to struggle with the unpredictability that often characterized patent litigation.[13] The commentators and Federal Circuit judges alike often attributed the uncertainty problem to the trial courts' failure to properly define the scope of the patent claims in jury trials. As Judge Michel explained:

> In the jury verdict appeals I have reviewed, I cannot recall even one in which the trial judge defined the literal scope of the claim for the jury in clear, comprehensive, and mandatory instructions, despite the fact that this seems to be the duty strongly implied in our precedent. Instead, judges routinely delegate the tasks of

---

9. HOLMES, *supra* note 1, at 699.

10. COMMISION ON REVISION OF THE FEDERAL COURT APPELLATE SYSTEM, STRUCTURE AND INTERNAL PROCEDURES: RECOMMENDATIONS FOR CHANGE at 5-8, 15 (1975), *reprinted in* 67 F.R.D. 195, 209-12, 220 (1975).

11. *See* Federal Courts Improvement Act of 1982, Pub. L. 97-164, 96 Stat. 25 (1982) (codified at 28 U.S.C. § 1295(a)(1)(1994)); *see also* H. R. REP. No. 97-312, at 22-23 (1981) ("A single court of appeals for patent cases will promote certainty where it is lacking to a significant degree and will reduce, if not eliminate, the forum-shopping that now occurs.").

12. *See* Martin J. Adelman, *The New World of Patents Created by the Court of Appeals for the Federal Circuit*, 20 U. MICH. J.L. REFORM. 979, 987-88 (1987).

13. The Honorable Paul R. Michel, *The Challenge Ahead: Increasing Predictability in Federal Circuit Jurisprudence for the New Century*, 43 AM. U. L. REV. 1231, 1232-45 (1994).

> claim construction, as well as infringement findings, to the jury. . . . When the court delegates both construction and infringement to the jury's discretion, the jury is free to do almost anything it wishes.[14]

This uncertainty led to predictions of dire consequences. Uncertain litigation outcomes could inhibit the disclosure of inventions in public patent documents or the filing of patent applications in the first instance.[15] Similarly, competitors uncertain about their potential liability may opt not to market new products.[16] In both cases, the public ultimately would be harmed by the lack of predictability.[17] The uncertainty problem had to be addressed.

B. *Markman v. Westview Instruments, Inc.*

In *Markman v. Westview Instruments, Inc*. ("*Markman I*"),[18] the Federal Circuit seized the opportunity to resolve inconsistency in its precedent and foster predictability in patent law by making the construction of patent claims a question of law to be decided by a judge.[19] In the majority opinion, the Federal Circuit provided three reasons for that holding. First, because the construction of written instruments lies within the exclusive province of the court, a patent's scope and meaning is uniquely suited for determination by a judge rather than a jury.[20] Second, because a patent's scope can have serious consequences in infringement suits, the judge stands as the superior actor to determine the scope of the rights granted by the government in the form of a patent.[21] Third, a patentee's competitors should be able to ascertain the scope of the patent claims with a reasonable degree of certainty.[22]

With the aid of established rules of construction, competitors should be able to understand the scope of a patent claim by analyzing the patent and its prosecution history.[23] Judges trained in the law should reach simi-

---

14. *Id.* at 1238-39 (footnotes omitted).
15. *Id.* at 1241.
16. *Id.*
17. *Id.* at 1242.
18. 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).
19. *Id.* at 979 ("We therefore settle inconsistencies in our precedent and hold that in a case tried to a jury, the court has the power and obligation to construe as a matter of law the meaning of language used in the patent claim.").
20. *Id.* at 978.
21. *Id.*
22. *Id.*
23. *Id.* at 978-79.

lar results when applying the same established rules of construction.[24] More importantly, because the courts would construe the claims as a matter of law, those interpretations would be reviewable de novo by the Federal Circuit.[25] Therefore, the Federal Circuit held that "the court has the power and obligation to construe as a matter of law the meaning of language used in the patent claim."[26]

The accompanying concurring and dissenting opinions sharply criticized the *Markman I* majority. Judge Mayer warned that the decision was tantamount to ejecting juries from infringement cases, since deciding the scope of the patent claims often disposed of the litigation.[27] From his perspective, the majority opinion directly violated the Seventh Amendment.[28] Echoing Judge Mayer's argument, Judge Newman argued that jury trial was crucial in patent infringement cases because of their intensive factual basis.[29] By eliminating juries from infringement cases, the majority had imposed new and uncertain procedures on trial judges.[30] Sounding a dire warning for the judicial system, the dissent thus cautioned appellate courts against the temptation to redefine questions of fact into questions of law as a means to impose the court's policy view.[31]

On appeal in *Markman II*,[32] the Supreme Court unanimously held that the construction of a patent, including terms of art within a claim, resided exclusively within the province of the court.[33] After employing its traditional Seventh Amendment test with no clear result,[34] the Supreme Court relied on policy arguments of uniformity and predictability to support the view that claim construction was a matter of law.[35] Although not expressly adopting the arguments advanced by the Federal Circuit majority, the Court concluded that a judge was the superior judicial actor because of his

---

24. *Id*.

25. *Id.* ("Because claim construction is a matter of law, the construction given the claims is reviewed de novo on appeal.").

26. *Id*.

27. *Id.* at 991-992 (Mayer, J., concurring).

28. *Id.* at 992-996 (Mayer, J., concurring).

29. *Id.* at 999 (Newman, J., dissenting).

30. *Id.*

31. *Id.* at 1008.

32. Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996) [hereinafter "*Markman II*"].

33. *Id.* at 391. The issue on appeal was "whether the interpretation of a so-called patent claim . . . is a matter of law reserved entirely for the court, or subject to a Seventh Amendment guarantee that a jury will determine the meaning of any disputed term of art about which expert testimony is offered." *Id.* at 372.

34. *Id.* at 376-78.

35. *Id.* at 384-91.

training in the exegesis of written instruments and because such trained ability took priority over the need for community standards and factual findings provided by juries.[36] More importantly, the Court emphasized the need for uniformity and predictability in patent cases, indicating that juries would inject too much uncertainty in the patent infringement process.[37] Although it found that claim construction was an issue of law reserved for judges, the Supreme Court did not decide which standard of review would apply in appeals of patent infringement cases.[38]

In the wake of *Markman II*, some commentators have extolled the policies underlying the decision. In the words of one commentator:

> The Supreme Court and Federal Circuit majority opinions in Markman indicate that uniformity of interpretation and the need for competitors [sic] to understand the scope of a patent are valid policy reasons for allocating claim construction to judges. The Markman decision, which is based in part on those policies, is likely to make the scope of patent claims more predictable.
>
> As a result of Markman, when patent attorneys and their clients consider the patents of other parties, they will be able to rely upon the patent and its prosecution file history to construe patent claims with greater assurance that, if litigation occurs, the claims will not be interpreted in a different way because of expert testimony or confusion of a jury.[39]

Thus, *Markman II* promised a more uniform and predictable patent world. In that world, competitors could properly assess the scope of a patent and adjust their business plans accordingly, district courts would act predictably according to strict guidelines, and a single court of appeals would ensure consistency in claim interpretations. But, that world was not yet meant to be.

C. Uncertainties in the Wake of *Markman*

In the wake of *Markman II*, the Federal Circuit quickly asserted its authority to review claim interpretations de novo.[40] As the court stated, its

---

36. *Id.* at 388-90.

37. *Id.* at 390-91.

38. *See generally Markman II*, 517 U.S. at 376-91.

39. John B. Pegram, Markman *and its Implications*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 560, 565 (1996).

40. *See, e.g.*,Tanabe Seiyaku Co. v. Int'l Trade Comm'n, 109 F.3d 726, 731 (Fed. Cir. 1997) ("The proper construction of a claim . . . is solely a matter of law, over which on appeal we exercise complete and independent review."); Minco, Inc. v. Combustion Eng'g, Inc., 95 F.3d 1109, 1115 (Fed. Cir. 1996) (stating that "[t]his court reviews with-

law required "independent determination of the construction of the claims, as a matter of law, unencumbered by the trial process."[41] Thus, the Federal Circuit generally reviewed claim constructions appeals under the de novo standard, doing so independently and without deference to the trial judge's determination.[42]

Beneath that veneer of authority grew the seeds of discontent, as some judges interpreted *Markman II* differently.[43] The first disagreement appeared in *Metaullics Systems Co. v. Cooper*, where a Federal Circuit panel dismissed an appeal based on a district court's denial of a preliminary injunction because the record relevant to claim interpretation was not fully developed.[44] Ignoring the de novo review standard espoused in *Markman I*, the majority, composed of Judges Mayer and Rader, deferred to the trial court's claim interpretation by applying the "clearly erroneous" review standard.[45] In his dissent, Judge Lourie reminded the majority that the en banc ruling in *Markman I* subjected claim interpretation to a de novo standard of review and that Federal Circuit law precluded a merits panel from modifying the settled law.[46]

The internal disagreement over the standard of review authorized in *Markman II* intensified in subsequent cases. Advocating appellate restraint, Judge Rader's dissent in *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*[47] strongly objected to the court's de novo approach:

> This decision stands as a monument at the troubled intersection between legal and factual analyses in this court's post-*Markman* jurisprudence. That claims must be construed by the court does

---

out deference the district court's conclusion that the reexamined claims remained identical in scope.").

41. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 72 F.3d 857, 863 (Fed. Cir. 1995), *vacated and remanded on other grounds*, 520 U.S. 1111 (1997).

42. *E.g.*, Alpex Computer Corp. v. Nintendo Co., 102 F.3d 1214, 1218 (Fed. Cir. 1996); Insituform Techs., Inc. v. Cat Contracting, Inc., 99 F.3d 1098, 1105 (Fed. Cir. 1996); Gen. Am. Transp.Corp. v. Cyro-Trans, Inc., 93 F.3d 766, 769 (Fed. Cir. 1996).

43. *See* Donald R. Dunner & Howard A. Kwon, Cybor Corp. v. FAS Technologies*: The Final Say on Appellate Review of Claim Construction?*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 481, 484 (1998).

44. 100 F.3d 938, 939 (Fed. Cir. 1996).

45. *Id.* ("[W]e may be required to defer to a trial court's factual findings. Where a district court makes findings of fact as a part of claim construction, we may not set them aside absent clear error.").

46. *Id.* at 940 (Lourie, J., dissenting in part) (arguing that "the analyses and holdings of our in banc court might preclude a subsequent panel before which the issue properly is raised from holding that fact questions exist in claim construction that require deference to the district court").

47. 106 F.3d 1563 (Fed. Cir. 1997).

> not divorce the interpretive process from a host of inherently factual subsidiary matters, such as how one skilled in the art would understand claim terms and prosecution history statements. . . . This court's role in reviewing claim meanings discerned by the district courts calls for modesty and restraint—born not of timidity, but of recognition of the limits inherent in appellate review. When an appellate court arrives at a novel claim interpretation after nearly twenty years of prosecution and litigation, it is inadequately equipped to test its new and unprecedented reading against the views of those skilled in the art. I believe the court today has overstepped the boundaries of effective appellate review.[48]

Putting this vision of appellate restraint to practice, Judge Rader—joined by Judge Mayer—deferred to the trial court's consideration of extrinsic evidence in construing the patent claims at issue in *Eastman Kodak Co. v. Goodyear Tire & Rubber Co.*[49] The *Eastman Kodak* dissent accused the majority of quoting *Markman II* out of context and deplored the majority's misapplication of the law.[50] Echoing Judge Rader in *Eastman Kodak*, Judge Mayer's concurrence in *Serrano v. Telular Corp.*[51] stressed that the court of appeal should give due deference to the trial court's factual findings in claim interpretation.[52]

---

48. *Id.* at 1577 (Rader, J., dissenting) (citations omitted).
49. 114 F.3d 1547 (Fed. Cir. 1997). The court found that:
> Upon review of the entire record, and recognizing both the trial court's "trained ability to evaluate [expert] testimony in relation to the overall structure of the patent" and the trial court's "better position to ascertain whether an expert's proposed definition fully comports with the specification and claims," this court sustains the trial court's claim interpretation.

Id. at 1555-56 (quoting *Markman II*, 517 U.S. at 390) (brackets in original).
50. *Id.* at 1563. In his partial dissent, Judge Lourie noted:
> As the majority opinion states, quoting from the Supreme Court's *Markman* opinion, this interpretation is based upon "the trial court's 'trained ability to evaluate [expert] testimony' . . . and . . . 'better position to ascertain whether an expert's proposed definition fully comports with the specification and claims.'" This language, while directed to the differences between judge and jury in *Markman*, is inapplicable here because the trial court's "trained ability" and "better position" to evaluate witnesses are irrelevant when reading the specification is what counts. The appellate court is equally well situated to read the specification.

Id. (Lourie, J., dissenting in part) (quoting *Markman II*, 517 U.S. at 390) (brackets in original).
51. 111 F.3d 1578 (Fed. Cir. 1997).
52. *Id.* at 1586. Judge Mayer noted:

The situation escalated soon afterward. Dissenting from a denial of a petition for en banc rehearing in *CVI/Beta Ventures, Inc. v. Tura LP*,[53] Judge Mayer emphasized that by not adopting the opinion in *Markman I*[54] the Supreme Court did not indicate that the Federal Circuit could review a district court's claim construction factual findings de novo.[55] In other words, he argued that factual findings underlying a question of law should receive their proper measure of deference.[56] According to him, "[s]ave to

---

> According to the Supreme Court, claim construction is a matter for the judge, and not the jury. . . . As such, if the claim construction does not require the resolution of disputed material facts, it may be treated as a matter of law and so reviewed by this court. However, where material facts are disputed, claim construction requires resolution of both questions of fact and questions of law, . . . and this court may be required to give due deference to the trial court's factual findings.

Id. (Mayer, J., concurring) (citations omitted).

53. 112 F.3d 1146 (Fed. Cir. 1997), *reh'g denied*, 120 F.3d 1260, 1261 (Fed. Cir. 1997).

54. Although the Supreme Court affirmed the Federal Circuit's judgment, it did not adopt the Federal Circuit's reasoning or opinion. *See Markman II*, 517 U.S. at 370.

55. *CVI/Beta Ventures*, 120 F.3d at 1261. In his dissent, Judge Mayer noted:

> In affirming the judgment of infringement in *Markman v. Westview Instruments, Inc.*, the Supreme Court chose not to reaffirm this court's majority opinion. Instead, it divided the responsibilities for claim construction between actors according to well-established principles. The Court gave the trial judge the task of interpreting the scope of the patent by examining the claims, the specification, the prosecution history, and extrinsic evidence. To the trial level fact finder, the Supreme Court left the task of evaluating extrinsic evidence to determine the scope and content of prior art and what a claim term would mean to one of ordinary skill in that art. To the appellate court, the Court allocated a much narrower task, reviewing the district court's claim construction. The Supreme Court in no way suggested that, where the district court found facts about the prior art or the skill and understanding of an artisan, the appellate panel could disregard these findings upon de novo review. Instead it called for the trial court and the appellate court each to work within its own field of expertise and with its own procedures.

Id. (Mayer, J., dissenting) (citations omitted).

56. *Id.* at 1262. Judge Mayer also noted:

> Between the two, where we must review determinations of law that are informed by the resolution of factual disputes, we must separate the two and give each its proper measure of respect. When we do otherwise, we deviate from the proper, normal and accepted order of our judicial duties, we are not consonant with logic, circumstance, known fact and other standards, our actions are improper, and if these were but guidelines instead of binding rules, we would be breaching etiquette and decorum.

Id. (footnotes omitted).

augment the power of our court, no rational basis exists to deviate from every other area of appellate review, in which we examine the factual findings of a district court only for clear error."[57] Judge Mayer's subsequent concurrence in *Fromson v. Anitec Printing Plates, Inc.*[58] went a step further by asserting that the panel had affirmed the district court's claim interpretation under the clear error standard of review.[59] As he clarified:

> This case could readily and probably would have come out differently if we were free, as some of our cases suggest, to decide the issue anew as a matter purely of law. The court's opinion, which I fully join, demonstrates that the surest way to maintain consistency and certainty in patent cases is for us to rely on the trial court's fact finding expertise and the record it makes and considers. We do a disservice if we go off on a definitional inquest of our own.[60]

The seeds of discontent had indeed bloomed.

D. *Cybor Corp. v. FAS Technologies, Inc.*

To resolve the conflict in its precedent regarding the standard of appellate review applicable to claim construction,[61] the Federal Circuit, acting sua sponte, ordered an en banc rehearing in *Cybor Corp. v. FAS Techs., Inc.*[62] Writing for the majority, Judge Archer reaffirmed that the Federal Circuit would review claim construction de novo.[63] The majority supported its decision by explaining that the Supreme Court in *Markman II*

---

57. *Id.*

58. 132 F.3d 1437, 1447 (Fed. Cir. 1997).

59. *Id.* at 1448 (affirming "as a matter of law based on the facts he found from conflicting evidence, which are not clearly erroneous").

60. *Id.*

61. As discussed in Part II.C *supra*, the conflict focused on the use of the clearly erroneous standard by some panels of the Federal Circuit, despite the adoption of the "de novo" standard in *Markman I*. *See supra* notes 45-46 and accompanying text.

62. 138 F.3d 1448, 1451 (Fed. Cir. 1998) (en banc). Commentators have speculated that this extraordinary action was "likely prompted by an opinion circulated internally by the original *Cybor* panel that supported, and possibly expanded on, the views previously set forth by Judges Mayer and Rader on the deference due in reviewing a trial court's claim construction." Dunner & Kwon, *supra* note 43 at 490.

63. *Cybor Corp.*, 138 F.3d at 1451. The majority found:

> We affirm the district court's judgment in its entirety. In so doing, we conclude that the Supreme Court's unanimous affirmance in *Markman v. Westview Instruments, Inc*., of our in banc judgment in that case fully supports our conclusion that claim construction, as a purely legal issue, is subject to *de novo* review on appeal.

Id. (citations omitted).

left undisturbed the *Markman I* holding that claim construction would be reviewed de novo on appeal.[64] As it explained, "the Supreme Court endorsed this court's role in providing national uniformity to the construction of a patent claim, a role that would be impeded if we were bound to give deference to a trial judge's asserted factual determinations incident to claim construction."[65] Therefore, the majority explicitly overruled post-*Markman II* opinions that granted deference to the lower court's claim interpretation.[66]

This decision prompted a plethora of concurring and dissenting opinions. In his concurrence, Judge Plager claimed that the en banc decision merely put to rest any remaining doubts about the proper standard of review for claim construction.[67] Optimistically, he explained that *Cybor Corp.* would bring further simplicity, clarity, and predictability to the patent litigation process:

> The decision today should help institute a simplified and clarified method by which both trial and appellate courts address claim construction issues, pursuant to the rules established in this court's *Markman I* opinion. Our purpose is to improve the process of patent infringement litigation for the benefit of patentees and their competitors, and ultimately the public. Whether this approach to patent litigation will in the long run prove beneficial remains to be seen. There is every reason to believe it will, and certainly to believe it is better than what we had.[68]

---

64. *Id.* at 1455-56.

65. *Id.* at 1455.

66. *Id.* at 1456. The majority held:

> Thus, we conclude that the standard of review in *Markman I*, as discussed above, was not changed by the Supreme Court's decision in *Markman II*, and we therefore reaffirm that, as a purely legal question, we review claim construction de novo on appeal including any allegedly fact-based questions relating to claim construction. Accordingly, we today disavow any language in previous opinions of this court that holds, purports to hold, states, or suggests anything to the contrary.

Id. (citations omitted).

67. *Id.* at 1462. Judge Plager noted:

> This otherwise unremarkable case was taken in banc for the sole purpose of laying to rest any residual doubts about how, in claim construction, the verbalizations surrounding the familiar "fact-law" dichotomy should be understood. I join the court's opinion and judgment, eliminating the unnecessary obfuscation that seems to have emerged since our decision in *Markman v. Westview Instruments, Inc*.

Id. (Plager, J., concurring) (citations omitted).

68. *Id.* at 1463.

Also concurring, Judge Bryson tried to reassure litigants that the Federal Circuit would not disregard the work of the lower court.[69] Although Judge Mayer filed an opinion concurring in the judgment, he sharply dissented with the majority's reasoning and accused it of profoundly misapprehending *Markman II*.[70] He joined Judge Newman's dissent in blaming the de novo standard for the failure of *Markman I* to bring uniformity and stability to the application of patent law.[71]

Echoing Judges Newman and Mayer, Judge Rader filed a dissenting opinion in which he expressed practical concerns regarding the adverse impact of the majority's opinion on patent litigation.[72] In particular, he argued that *Cybor Corp*. would defeat the policy underlying *Markman I* and diminish the role of the trial judge in construing claims because no certainty would exist until the Federal Circuit had spoken on a particular patent.[73] Judge Rader supported his views with specific statistics:

---

69. *Id.* Judge Bryson noted:

> I think it important to note that our adoption of the rule that claim construction is an issue of law does not mean that we intend to disregard the work done by district courts in claim construction or that we will give no weight to a district court's conclusion as to claim construction, no matter how the court may have reached that conclusion.

Id. (Bryson, J., concurring).

70. *Id.* (Mayer, J., concurring in the judgment) ("I respectfully disagree with the opinion because it profoundly misapprehends *Markman v. Westview Instruments, Inc*.").

71. Judge Newman noted:

> As this case illustrates, perfection is elusive in the aftermath of the Federal Circuit's decision in *Markman v. Westview Instruments, Inc.* The expectation of greater stability in the application of patent law—thus enhancing consistency in result, reducing the cost of litigation, and indeed reducing litigation by diminishing the uncertainties of jury trials—has not been well achieved. Most of the shortfalls between expectation and reality arise from the manner of implementation of our de novo authority for claim interpretation.

Id. at 1478-79 (Newman, J., dissenting) (citations omitted). Judge Newman's dissent went on to state:

> The second area of disappointed expectations has flowed from the unexpectedly creative de novo claim interpretations that the Federal Circuit has issued in a few cases. This unpredictability in administration of the law of patent claiming has added a sporting element to our bench. It has not only released appellants' imaginations on appeal, but it will surely add complexity to future trials, as lawyers attempt to guard against the judicial imagination.

Id. at 1479.

72. *Id.* at 1473-78 (Rader, J., dissenting).

73. *Id.* at 1476. Judge Rader remarked:

> The problem with this plan was in its implementation because as a question of law, claim interpretation is subject to free review by the appellate court. The Federal Circuit, according to its own official 1997 statistics, reversed in whole or in part 53% of the cases from district courts (27% fully reversed; 26% reversed-in-part). Granted this figure deals with all issues in cases with many issues. Nonetheless, one study shows that the plenary standard of review has produced reversal, in whole or in part, of almost 40% of all claim constructions since *Markman I*.[74]

He explained the nature of the "study" in a related footnote:

> This figure is based on a survey of every patent decision rendered by the Court of Appeals for the Federal Circuit between 5 April 1995 (the date *Markman I* was decided) and 24 November 1997. A total of 246 patent cases, originating in the Board of Patent Appeals and Interferences (BPAI), the district courts, and the Court of Federal Claims, were evaluated. Of the 246 cases, 141 cases expressly reviewed claim construction issues. Among these 141 decisions, this court reversed, in whole or in part, 54 or 38.3% of all claim constructions. With respect to the district court and Court of Federal Claims cases, the rate of reversal of claim constructions is 47 out of 126 or 37.3%.[75]

> [T]he current *Markman I* regime means that the trial court's early claim interpretation provides no early certainty at all, but only opens the bidding. The meaning of a claim is not certain (and the parties are not prepared to settle) until nearly the last step in the process—decision by the Court of Appeals for the Federal Circuit. To get a certain claim interpretation, parties must go past the district court's *Markman I* proceeding, past the entirety of discovery, past the entire trial on the merits, past post trial motions, past briefing and argument to the Federal Circuit—indeed past every step in the entire course of federal litigation, except Supreme Court review. In implementation, a *de novo* review of claim interpretations has postponed the point of certainty to the end of the litigation process, at which point, of course, every outcome is certain anyway.

Id.

74. *Id.*

75. *Id.* at 1476 n.16. It is important to note that the 141 cases involving an express review of claim construction issues did not include summary affirmances under FED. CIR. R. 36. Because the exclusion of those summary affirmances influences the final outcome of many analyses as shown in Part IV *infra*, this study has done its best to analyze data—whenever possible—with and without summary affirmances.

As these figures suggest, *Markman I* replaced the uncertainties of jury trials with greater judicial ambiguity as patent cases failed to reach resolution until the Federal Circuit finally ruled on the matter.

Given the contrary predictions advanced by Judges Plager and Rader, it is unclear what effect, if any, *Cybor Corp.* has had on the patent litigation process. To ascertain the aftermath of this momentous decision, Part IV of the present study independently assesses the Federal Circuit's claim construction trends in the approximate two years following *Cybor Corp*.

III. METHODOLOGY

> For the rational study of the law the black-letter man may be the man of the present, but the man of the future is the man of statistics and the master of economics.[76]

A. Population

Because of the inherent constraints in using a grouping of cases in a sample study,[77] this study adopted the methodology of a previous empirical analysis conducted by John Allison and Mark Lemley.[78] Thus, this is a population study rather than a sampling study.[79]

---

76. HOLMES, *supra* note 1, at 708.

77. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185 (1998). Allison and Lemley note:

> [W]hen using reported cases as data sources, there are intractable problems with treating the grouping of cases as a representative random sample, regardless of how carefully one has defined the grouping. Although it is self-evident that any grouping of cases represents a subset of something larger, i.e., a population of something, it is practically impossible to assure that the grouping is a representative sample, much less a random one.

Id. At 194 n.20.

78. *See id.* at 194-97.

79. In a sampling study, one attempts to extrapolate the characteristics of a very large population by taking representative samples of the population and applying statistical analyses to that sample. For instance, if a population were 10,000 cases, one may take a random sample of 500 cases and analyze that sample to determine the trends in the population. In contrast, a population study avoids the uncertainty and margin of error inherent in any attempt to extrapolate the characteristics of a population through sampling. A population study selects the general parameters of a well-defined and circumspect population, and includes every case within that definition. *See id.* at 194 n.20 (explaining the advantages of a population study over a sampling study in analyzing legal cases).

The defined population includes *all patent* decisions that the Federal Circuit filed between January 1, 1998, and April 30, 2000, and that were available in the "US Court of Appeals Cases - Federal Circuit" LEXIS database.[80] The defined population thus contains 502 *patent* decisions and includes both written opinions and Federal Circuit Rule 36 summary affirmances.[81] Differently from the more selective process adopted by Allison and Lemley,[82] this study includes all cases that fall within the above parameters. Hence, the decisions included in the studied population cover all patent issues, including infringement, validity and inequitable conduct.[83] In addition to district court appeals, the population contains appeals from the Board of Patent Appeals & Interferences ("BPAI") and the International Trade Commission ("ITC").[84] Finally, the population is defined in terms of individual decisions, not cases or patents.[85] Therefore, the study population included all decisions relating to a particular case—even when there was more than one decision in a particular case[86]—as long as those decisions fell within the parameters described above.

---

80. This study assumes that the "US Court of Appeals Cases - Federal Circuit" database on the online LEXIS service contains all decisions filed within that time period (including written opinions and summary affirmance orders). The database description states that it covers and includes *all* Federal Circuit cases since October 1982.

81. A search in the LEXIS database within these given dates resulted in *all* Federal Circuit opinions filed within that time period, including patent cases, merit protection board reviews, veteran affairs issues, and government contract disputes. This author reviewed each of these cases to screen patent cases from non-patent cases for inclusion in this study's population.

82. For comparison purposes, Allison and Lemley excluded from their population decisions on issues such as unenforceability due to misuse, inequitable conduct, estoppel, or the like.

83. This inclusive approach is particularly important for the analysis and discussion presented in Part IV.G *infra*.

84. It is true that the proceedings in these agencies are procedurally different from litigations in district courts. Allison and Lemley, *supra* note 77, at 195 n.23-24. Their inclusion in the analysis is, however, essential to obtain a complete perspective of the Federal Circuit's practices. In any event, the number of these decisions in the studied population is relatively small.

85. This definition differs from Allison and Lemley's definition of their population in terms of individual patents, rather than cases or decisions. *See id.* at 196. The choice of definition necessarily reflects the focus of an empirical study. Allison & Lemley focused on the ultimate validity of a particular patent, while the current study attempts to understand the Federal Circuit's practices and trends in the court's decisions.

86. Although Allison and Lemley chose only to report final decisions because they were focusing on the ultimate validity of a particular patent, this study attempted to understand the Federal Circuit's practices and trends. In any event, the inclusion of these multiple decisions did not affect the analysis for two reasons. First, the Federal Circuit addresses different issues in each of these decisions. *Compare* SunTiger Inc. v. Scientific

B. Data Collected

This study collected the following data, to the extent that the information was relevant and discernable from the court's opinion:[87]

> **Case Data**. Case name, docket number, filing date of decision, tribunal or agency appealed from, judgment/order being appealed,[88] case disposition,[89] precedential status.[90]
>
> **Judge Data**. Judges on panel, author of the opinion, author of concurring or dissenting opinions.
>
> **Claim Construction**. Number of claims addressed and/or construed, all claims issues addressed,[91] other issues addressed by the Federal Circuit in that decision,[92] whether the Federal Circuit made *any* change to the lower tribunal's claim construction,[93] whether such changes were outcome determinative, whether claims reviewed involved an issue related to means-plus-function claims.[94]

Research Funding Group, 189 F.3d 1327 (Fed. Cir. 1999) (deciding issues of priority, collateral estoppel and infringement), *with* SunTiger Inc. v. Scientific Research Funding Group, No. 98-1418, 1999 U.S. App. LEXIS 8584 (Fed. Cir. May 6, 1999) (addressing issues of invalidity under § 102(b) and inequitable conduct). Second, the number of multiple decisions in the same case is very small, and is thus unlikely to affect the validity of the analysis.

87. In a very small number of cases, some data were unavailable from the Federal Circuit opinion. Whenever possible, the missing data was collected from the lower tribunal's opinion.

88. E.g., summary judgment, jury/judgment as a matter of law, other ruling, procedural ruling, bench judgment, preliminary injunction, or appeal from the Board of Patent Appeals and Interferences.

89. E.g., affirmed, reversed/remanded, affirmed in part and reversed in part, dismissed, mandamus/order/certified question petition granted, mandamus/order/certified question petition denied.

90. E.g., precedential, nonprecedential, or summary affirmance.

91. E.g., infringement, invalidity, procedural, infringement and invalidity, and not applicable.

92. E.g., infringement, invalidity, inequitable conduct, and other issues. The "other issues" category includes issues such as antitrust, damages, willfulness, and procedural issues.

93. This was accomplished by comparing the Federal Circuit's interpretation of the claim element with the construction adopted by the lower tribunal. Thus, even a minor change in wording would be tabulated as a "change."

94. All issues related to means-plus-function claims were noted, regardless of whether the Federal Circuit concluded that the claim(s) at issue was/were subject to 35

One important caveat is pertinent here. Because this study purported to expand on Judge Rader's study in *Cybor Corp.*, it adopted Judge Rader's approach to collecting claim construction information. This study thus defined claim construction review as any instance in which the Federal Circuit *expressly* reviewed the lower tribunal's claim interpretation.[95] Although arbitrary, this definition was necessary to maintain consistency for comparison purposes. This specific definition necessarily impacted all categories relating to claim construction and constricted the number of cases in which the Federal Circuit has "reviewed" claim construction. In other words, because this methodological definition requires that claim constructions explicitly appear in the court's opinions, cases implicitly construing claims and summary affirmances would be excluded from the subset of cases where the court has "reviewed" claim constructions. Part IV *infra* will discuss these results in more depth.

C. Use of the Population for Statistical Testing

As Allison and Lemley effectively showed in their study, a population can be used both to generate descriptive data statistics and perform statistical testing.[96] As they explain, "one can perform hypothesis testing and prediction from a population by treating the population as a subset of a 'superpopulation'—in this case the hypothetical population of all past and future . . . decisions—without pretense that the data set is a representative sample of that superpopulation."[97] This study relied on this approach for many of its key conclusions.[98]

Although the scope of a population study could be arbitrarily determined,[99] it was important to ascertain methodically how many decisions should be included in this study. To do so, this study relied on a formula that was developed for statistical sampling and that aimed to include, at a

---

U.S.C. § 112(6). The reader should refer to Part IV.F, *infra*, for an explanation of the reasons this study collected data on means-plus-function claims.

95. Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1476 n.16 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting) ("This figure is based on a survey of every patent decision rendered by the Court of Appeals for the Federal Circuit between 5 April 1995 (the date *Markman I* was decided) and 24 November 1997. . . . Of the 246 cases, 141 cases *expressly* reviewed claim construction issues.") (emphasis added).

96. Allison & Lemley, *supra* note 77, at 201-02.

97. *Id.* at 194 n.20 (citing M.E. Thompson, *Superpopulation Models*, 9 ENCYCLOPEDIA OF STATISTICAL SCIENCE 93 (1988)).

98. *See* Part IV *infra*.

99. Within the population, all the numbers analyzed are by definition "statistically significant." *See* Allison & Lemley, *supra* note 77, at 201.

95% confidence level, the population means.[100] Taking the claim construction issue as a binomial proportion (i.e., whether or not the Federal Circuit expressly construed claims in the decision), this study applied the formula for determining N, the requisite population size of binomial proportions.[101] To get the largest possible N,[102] the probability of success was set at 0.5. Plugging in numbers for a 95% confidence level and setting the margin of error at 5%, N is equal to 384. In other words, the study had to include at least 384 cases where the Federal Circuit could have construed claims, and thus the 384 cases must be written opinions and necessarily exclude summary affirmance decisions. To reach a number that exceeds the value of N being 384, this study analyzed all cases decided by the Federal Circuit from January 1998 until the end of April 2000. Of the 502 cases collected, 396 were written opinions. Although this exercise is unnecessary for a population study, it provides a useful guideline in determining the scope of the studied population.

D. Limitations of the Study

Regardless of how carefully an empirical study is conducted, inherent limitations exist. In brief, even when controlled by objective criteria,[103] this study involved a small degree of personal judgment in collecting the data.[104] However, it is doubtful that such a factor systematically biased the results reported.[105] Second, the nature of the litigation and appeal process

---

100. In this case, it would be the "superpopulation" means. Although the superpopulation is theoretical, the formula used here does not depend on the size or any attribute of the superpopulation.

101. $N=[(Z_a)^2(PQ)]/B^2$, where Z_a is the z-score for the confidence interval, P is the sample proportion, Q is (1-P), and B stands for the margin of error. *See* SUSAN F. WAGNER, INTRODUCTION TO STATISTICS 201-02 (1992).

102. By calculating the largest value of N, it was unnecessary to include any attribute of the sampling population—the superpopulation.

103. For instance, in tabulating data on claim construction changes, this study attempted to control such events by comparing the Federal Circuit's interpretation with the lower tribunal's.

104. This author acknowledges that others might disagree with his judgment in any given case, but he does not believe that his evaluation of the cases in this study is biased in any systematic way. He has retained the complete dataset and MS Excel calculation worksheets, and will make them available upon request.

105. Some practitioners have mistakenly assumed that this study contains methodological biases because it does not include summary affirmances in some instances. The author emphasizes that he included summary affirmances under FEDERAL CIRCUIT RULE 36 in the analysis whenever possible. In some instances, the inclusion of those cases was not statistically proper, and this study addressed such problem in Appendix A below by extrapolating the effects of those cases. Therefore, the author believes that no systematic bias affects this study's data.

inherently limits the scope of this study. It is impossible to control for lawyering skills; personalities and biases of juries; experiences and interests of judges; the issues that the parties choose to raise on appeal; the prosecution history of the patent claims; and the financial resources of the parties.[106] Because no data was available on those issues—and because they often defy numerical categorization—they were not collected. For a comprehensive and careful discussion of the pitfalls and constraints in this type of empirical study, the reader should refer to Allison and Lemley's meticulous article.[107]

IV. RESULTS

> I wish, if I can, to lay down some first principles for the study of this body of dogma or systematized prediction which we call the law, for men who want to use it as the instrument of their business to enable them to prophesy in their turn, and, as bearing upon the study, I wish to point out an ideal which as yet our law has not attained.[108]

The analysis contained in this section will describe the results and discuss the implications of the following criteria: (A) reversal and claim construction changes over time, (B) effects of the type of judgment being appealed, (C) panel-dependency problem, (D) influence of the tribunal from which the case is being appealed, (E) correlation with the precedential nature of decision, (F) impact of including a means-plus-function claim in an appeal, and (G) issues for which the Federal Circuit expressly reviewed claim construction.

A. Although the Federal Circuit has in the Aggregate Reversed Fewer Cases Based on Claim Construction than before 1998, there is a Trend Showing an Increase in Claim Construction Modification and Claim Interpretation-Based Reversal Since *Cybor Corp*.

In *Markman I*, the Federal Circuit stated that the construction of patent claims starts with the claim language, as interpreted in light of the specifi-

106. Allison and Lemley have suggested that most of the variables that determine invalidity were factors not easily amenable to measurements. *See* Allison & Lemley, *supra* note 77, at 250-51. It is likely that the same principle applies here.

107. *See* Allison & Lemley, *supra* note 77, at 202-05.

108. HOLMES, *supra* note 1, at 700.

cation and the prosecution history.[109] Since 1995, it has invoked and applied that approach consistently and reliably.[110] As lower tribunals adopted this approach, the Federal Circuit believed that they would "arrive at the true and consistent scope of the patent owner's rights to be given legal effect."[111] Over time, claim construction should thus become more predictable and consistent, thereby reducing reversible errors in claim construction.

1. Appellate Reversal: All Issues

To ascertain whether *Markman I* has achieved its goals, this study first examined the Federal Circuit's reversal rate of lower court judgments by analyzing the court's written opinions[112] issued over a period of twenty-eight months. This initial reversal rate analysis encompasses *all* issues in patent cases reviewed by the Federal Circuit; it is *not* limited to just claim construction reviews. Once normalized,[113] the result of this analysis appears in Table A-1 in Appendix B and graphically in Figure A-1 below.

---

109. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979-80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

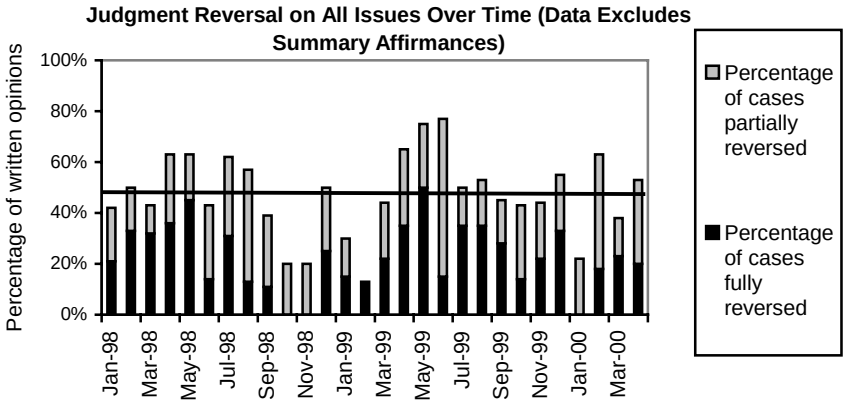
110. *See, e.g.*, Optical Disc Corp. v. Del Mar Avionics, 208 F.3d 1324, 1333-35 (Fed. Cir. 2000); Hill-Rom Co. v. Kinetic Concepts, Inc., 209 F.3d 1337, 1340 (Fed. Cir. 2000); K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1362-63 (Fed. Cir. 1999); Suntiger, Inc. v. Scientific Research Funding Group, 189 F.3d 1327, 1334-36 (Fed. Cir. 1999); EMI Group N. Am. v. Intel Corp., 157 F.3d 887, 891-92 (Fed. Cir. 1998); Bai v. L & L Wings, 160 F.3d 1350, 1353-54 (Fed. Cir. 1998); Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1302 (Fed. Cir. 1997); Lockwood v. Am. Airlines, 107 F.3d 1565, 1572-73 (Fed. Cir. 1997); Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1581-82 (Fed. Cir 1996); Cole v. Kimberly-Clark Corp., 102 F.3d 524, 528 (Fed. Cir. 1996).

111. *Markman I*, 52 F.3d at 979.

112. By limiting this initial reversal rate analysis to the Federal Circuit's written opinions, this study did not include Rule 36 summary affirmances in the dataset of Figure A-1. One of this study's goals was to scrutinize the rate of change in claim construction in light of the rate of reversal on all issues. *See infra* note 120 and accompanying text. To accurately do so, it is imperative to compare data from the same dataset. The dataset used in analyzing the rate of change in claim construction must necessarily exclude Rule 36 summary affirmances because, by definition, the Federal Circuit did not "expressly" review the claim constructions in those cases. That is why this study chose to limit this initial reversal rate analysis to the 396 written opinions in this population. However, for the sake of completeness, this study has also analyzed the rate of reversal using the entire population dataset, including Rule 36 summary affirmances. *See infra* Figure A-2 and accompanying text.

113. Because the court may issue a large number of patent cases in a particular month and very few in another month, the data was normalized, for comparison purposes, by dividing the number of cases the Federal Circuit reversed in full or in part (or the number of cases they affirmed) by the total number of cases the court decided in that month. The denominator necessarily excluded dispositions involving petitions to appeal, for manda-

Figure A-1



To determine whether there is any trend in the Federal Circuit's reversal rate over time, a trend line based on the least-squares line method is superimposed over Figure A-1 and shown as a black solid line. Although regression analysis is inapplicable here,[114] the line of best fit can suggest whether a correlation relationship should be studied and can also indicate where the average reversal rate lies.[115] Although the trend line fails to indicate any correlation between the passage of time and the reversal rate, it nonetheless suggests that the Federal Circuit has remained surprisingly consistent in its reversal rate over time. In fact, the reversal rate hovers around 50%—to be exact, 47.3%—echoing the 53% reversal rate cited by Judge Rader in *Cybor Corp*.[116] In other words, regardless of the issues appealed, a litigant has virtually as much chance of having his case reversed as having it affirmed. As Judge Rader warned:

> A reversal rate in this range reverses more than the work of numerous trial courts; it also reverses the benefits of *Markman I*. In fact, this reversal rate, hovering near 50%, is the worst possible. Even a rate that was much higher would provide greater certainty. Instead, the current *Markman I* regime means that the trial

---

mus, or certified questions since these decisions do not review any judgments, but rather lie within the procedural requirements of the court's rules or within the discretion of the Federal Circuit.

114. Linear regression analyzes the relationship between two sets of purely numerical data. *See* WAGNER, *supra* note 101, at 293. Hypothesis testing using linear regression is problematic where one set of data is non-numerical (such as months and years, or types of judgment). *See id.* at 308-10.

115. *See id.* at 307.

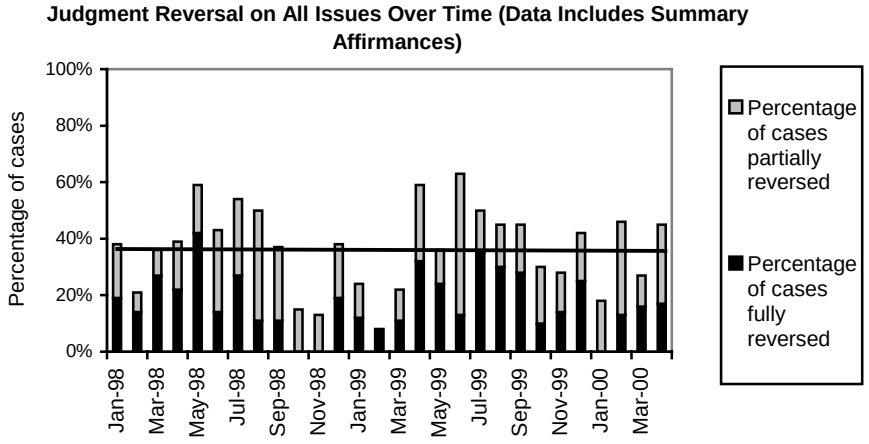
116. Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1476 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting).

> court's early claim interpretation provides no early certainty at all, but only opens the bidding. The meaning of a claim is not certain (and the parties are not prepared to settle) until nearly the last step in the process—decision by the Court of Appeals for the Federal Circuit.

At first blush, this seems like the worst of both worlds. Knowing such statistics, the losing party is unlikely to settle without appeal, especially when it has one chance in two of winning.

However, the data depicted in Figure A-1 only focuses on written opinions and excludes summary affirmance decisions. In this study's dataset, one-fifth of all patent decisions (106 of 502 decisions) were summary affirmances. After analyzing all 502 cases—written opinions and summary affirmances—the picture changes substantially, as shown in Table A-1 in Appendix B and Figure A-2 below.

Figure A-2



Although adding summary affirmance decisions did not affect the slope of the trend line, it decreased the average reversal rate over this time period. This result is logical since Federal Circuit Rule 36 allows the merit panel to affirm without opinion,[117] and the inclusion of those decisions

117. Federal Circuit Rule 36 provides that:
> The court may enter a judgment of affirmance without opinion, citing this rule, when it determines that any of the following conditions exist and an opinion would have no precedential value: (a) the judgment, decision or order of the trial court appealed from is based on findings that are not clearly erroneous; (b) the evidence supporting the jury's verdict is sufficient; (c) the record supports summary judgment, di-

necessarily reduces the overall reversal rate. Once all patent decisions are taken into account, the average reversal rate drops to 36.6% of all cases. Thus, there was only slightly more than one chance in three that the Federal Circuit would reverse the lower court's judgment. However, this rate remains higher than recently released statistics showing a 20-30% reversal rate in patent cases.[118] Although the source of this difference is unclear, it is possible that the official statistics include all cases reviewed by the Federal Circuit—including appeals from the Merit Protection System Board—while this study focuses on patent cases. Regardless of which statistic is correct, the probability of settlement remains remote. As Judge Michel explained:

> even in cases where the chance of reversal might fall within the range of twenty-five percent to fifty percent, the large stakes typically attending cases in areas such as patents, public contracts, takings, and international trade will seem to justify the expense of time and money in seeing the appellate process through to its conclusion. The odds are supported by the fact that parties have already spent ninety percent or more of the total cost of the litigation and, therefore, to spend another five percent to ten percent to conclude the appeal process seems justified.[119]

In other words, the promises of pre-trial predictability and expedient patent litigation seem to remain a tantalizing dream.

2. Appellate Reversal: Claim Construction Issues

The reversal trend does not tell the whole story of claim construction because the Federal Circuit often reversed cases for reasons independent of claim construction.[120] To fully understand the effects of *Markman*, one must focus on the trend in claim construction changes. Using the 396 cases with available written opinions,[121] this study ascertained the number

---

> rected verdict, or judgment on the pleadings; . . . (e) a judgment or decision has been entered without an error of law.

FED. CIR. R. 36.

118. The Honorable Paul R. Michel, *The Court of Appeals for the Federal Circuit Must Evolve to Meet the Challenges Ahead*, 48 AM. U. L. REV. 1177, 1192 (1999) ("In actuality only twenty percent to thirty percent of appeals result in reversals."). Unfortunately, Judge Michel did not specify whether those statistics focus exclusively on patents or whether they encompass all cases heard by the court.

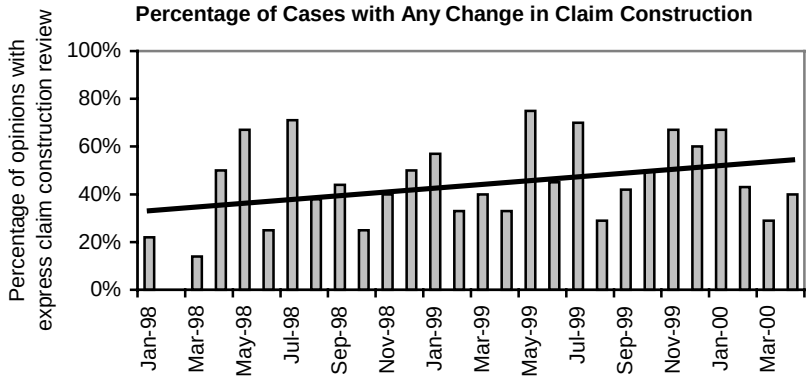
119. *Id.* (footnotes omitted).

120. *See, e.g.*, Genentech, Inc. v. Regents of the Univ. of Cal., 143 F.3d 1446 (Fed. Cir. 1998) (deciding case based on analysis of the 11th Amendment to the Constitution).

121. This approach excludes all 106 summary affirmances because the methodology's focus on express claim construction requires the availability of a written opinion.

of cases per month in which the court changed at least one claim interpretation, and normalized that number for easier comparison over time.[122] In addition, this study further determined whether a change in claim construction by the Federal Circuit led to a change in the disposition of that particular decision. Table A-2 in Appendix B summarizes this data and Figure A-3 below provides a visual depiction of the rate of change in claim construction.

Figure A-3



As with the reversal rate, the percentage of cases in which the Federal Circuit changed at least one claim construction fluctuated from month to month. To determine whether a trend is evident over time, a line generated based on a least-square analysis was superimposed on Figure A-3. The trend line's ascending slope suggests a gradual increase in the number of cases in which the Federal Circuit modified the appealed claim interpretations. To determine the strength of the possible correlation, this study re-

---

However, to address some practitioners' interests in a more inclusive perspective, this study attempted to estimate the effect of summary affirmances on the rate of claim construction changes and claim interpretation-based reversals. This estimation is presented in Appendix A *infra*.

122. This normalization is necessary since the court may issue a large number of patent cases in a particular month and very few in another month. As part of the normalization, this study ascertained the percentage of cases for any given month where the court changed any claim construction. To do so, this study divided the number of such cases by the total number of cases in that month where the court expressly reviewed claim construction. The denominator, the total number of cases where a written opinion was available, was not used because many of those cases deal with issues (such as inequitable conduct or procedures) that do not call for claim construction.

lied on the Pearson's product moment coefficient of correlation.[123] The calculated value of the correlation coefficient was +0.344421, indicating a small but possibly significant correlation between the passage of time and the rate of claim construction change by the Federal Circuit. Of course, the trend line's suggestion may have occurred by mere statistical chance. To determine whether this trend is statistically significant or merely an artifice, the following hypothesis was tested: [124]

> *Hypothesis A-1:* There is no correlation between the passage of time and the rate of change in claim construction by the Federal Circuit.

The significance *t* of this correlation coefficient was +1.87067.[125] The critical value of *t* with 28 independent variables, at a 95% level of significance in a one-tail test, is +1.706.[126] Because the significance *t* of the correlation coefficient is greater than the critical value (+1.87067 > +1.706),[127] the null hypothesis above can be rejected. In sum, in the twenty-eight month period since the beginning of 1998, the number of cases per month in which the Federal Circuit has modified some claim construction has tended to increase.

Because of the definition of "a change in claim construction" adopted by this study, Figure A-3 contains some cases where the Federal Circuit changed the lower court's claim construction without changing the out-

---

123. The Pearson's product moment coefficient (*r*)—also known as the coefficient of correlation—is a quantitative measure of the strength of correlation between two interval-level variables. It is thus well-suited to correlate the independent variables representing the percentage of claim construction cases with the independent variable representing the passage of time. The coefficient *r* can take values from -1.0 and +1.0, where the sign of *r* indicates whether the correlation is inverse or direct. The absolute value of *r* indicates the strength of the correlation, or how close the array of data points is to a straight line. In other words, the closer the correlation is to 1, the stronger the linear trend and the association between the data points. Where *r* is equal to 0, there is no linear relationship. *See* JEFFREY JARRETT & ARTHUR KRAFT, STATISTICAL ANALYSIS FOR DECISION MAKING 385-86 (1989).

124. *See id*. at 386-87 (discussing hypothesis-testing procedure to determine whether the null hypothesis that $r=0$ can be safely rejected, thereby indicating a linear relationship between the variables tested).

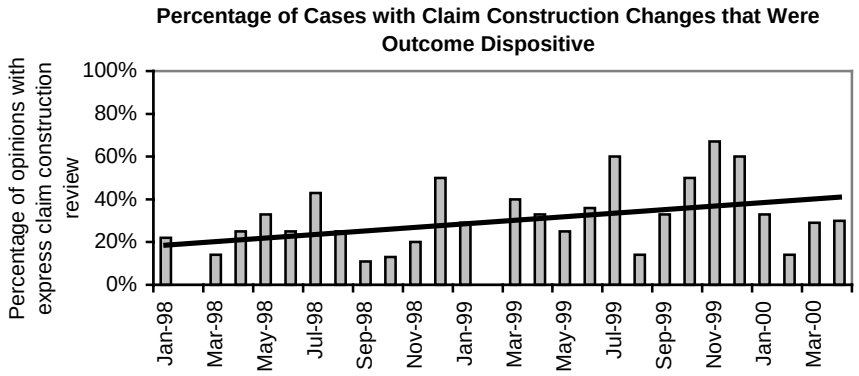
125. The formula used to determine the significance *t* of *r* is: $t = [r (n-2)^{½}] / [(1-r^2)^{½}]$. In that formula, *n is* the number of variables, (*n*-2) is the degree of freedom, and *r* is the correlation coefficient. *Id.* at 387.

126. *Id*. at 682-83 (indicating, in Table E, the critical value of *t* given a predetermined degree of freedom and a desired significance level).

127. In other words, the significance *t* value falls within the region of rejection of the statistical distribution. *Id.* at 387.

come of the case.[128] To better understand the effect of a change in claim construction on the outcome of a case, this study examined the absolute percentage of cases where claim construction changes were outcome dispositive and provided that result in Table A-2 in Appendix B. Figure A-4 below provides a visual depiction of that result.

Figure A-4



The superimposed trend line, generated from a least-square analysis, suggests an upward trend in the rate of outcome dispositive changes in claim construction as time passes. The slope of the trend line in Figure A-4 is similar to the line in Figure A-3, partly because the average claim construction-based reversal rate hovered around 70% of the cases in which the court has changed any claim interpretation. Again, it was necessary to assess the possibility that this trend lies within the margin of error. Thus, this null hypothesis was tested:

> *Hypothesis A-2:* There is no correlation between the passage of time and the rate of outcome dispositive claim construction changes.

The Pearson's correlation coefficient for this dataset is +0.33428, and the significance *t* is +1.8705067.[129] When compared to the critical value of

---

128. *E.g.*, NFA Corp. v. Asheboro Elastics Corp., No. 98-1579, 2000 U.S. App. LEXIS 68, at *9 (Fed. Cir. Jan. 5, 2000); Zelinski v. Brunswick Corp., 185 F.3d 1311, 1316 (Fed. Cir. 1999); Mas-Hamilton Group v. Lagard, Inc., 156 F.3d 1206, 1215 (Fed. Cir. 1998).

129. One practitioner who reviewed this data expressed concerns that the significance *t* for the outcome dispositive subset is very similar to the one for claim construction changes. This is just a coincidental result of the formula used to calculate the value of *t*. It

t for a 95% confidence level in a one-tail test ($t_c = +1.706$), it is possible to reject the null hypothesis because $t > t_c$ (i.e., $+1.8705067 > +1.706$). Within the studied period, the passage of time was correlated to an increase in the number of cases in which a change in claim construction was outcome dispositive.

Despite the continued trend, a look at the aggregate data reveals a counter-intuitive result. Of the 179 cases that involved an express review of claim construction, the Federal Circuit modified claim interpretations in 78 cases, or 44% of the total, during the twenty-eight months covered by this study. Further, 53 out of these 78 cases (68%) were reversed on the basis of claim construction. In sum, the Federal Circuit reversed 29.6% of cases involving an express review of claim construction. This 29.6% figure is lower than the 37.3% rate of claim construction reversal cited by Judge Rader in *Cybor Corp.*[130] This is a small but significant decrease. It suggests that in the aggregate, the Federal Circuit has reversed fewer cases based on claim construction in the period after *Cybor Corp.* than before. Judge Rader's higher rate of reversal figure may arise from the confusion that occurred in the aftermath of *Markman I*, as the Federal Circuit progressively imposed its new claim interpretation framework. Many of the cases that the court of appeals reviewed from 1995 to 1997 necessarily included cases decided before *Markman I* or before the lower courts fully understood and espoused the new regime. By the time this study examined the Federal Circuit's practices, most of the appealed cases were decided at the trial court level well after *Markman I* and *II*. This theory could perhaps explain the small decrease relative to the pre-*Cybor Corp.* period. It cannot, however, fully explain the increase over time in the rate of claim construction changes.[131]

To obtain a complete picture of how the Federal Circuit deals with claim construction, this study addressed one remaining problem: in any given case involving an express claim construction examination, the Federal Circuit seldom reviewed a single element of a patent.[132] Rather, its

---

is clear that both datasets are quite different given the different values of the Pearson's correlation coefficient for each set.

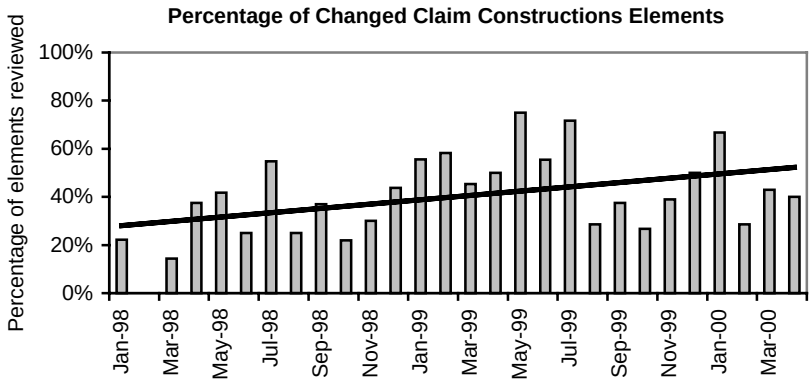
130. Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1476 n.16 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting).

131. An alternative explanation may rest in the fact that, as the Federal Circuit feels freer to change appealed claim constructions, it may pay more attention to harmless error in order to avoid an unduly high reversal rate. Although attractive, this explanation remains a mere speculation without knowing the inner workings of the court and its judges' thought processes.

132. The term "element" refers to a claim construction term in dispute before the court.

review often involved more than one claim element, claim, or patent. Hence, Figures A-3 and A-4 could present a distorted picture, especially where the court only changed one claim element but affirmed the construction of the remaining claims or claim elements in dispute. To control for this possible bias, this study also tabulated and analyzed the normalized number of claim elements whose construction was changed by the Federal Circuit.[133] Table A-3 contains this result and Figure A-5 graphs that dataset over time.

Figure A-5



The superimposed trend line in Figure A-5 shows that Figures A-3 and A-4 were not statistical aberrations: the Federal Circuit tended to change more claim construction elements over time. To ensure the statistical significance of this trend, this study tested the following hypothesis.

> *Hypothesis A-3:* There is no correlation between the passage of time and the number of claim construction elements modified by the Federal Circuit.

The Pearson's correlation coefficient for this dataset is +0.42526, and the significance *t* is +2.3958. Compared to the critical value of *t* for a 95% confidence level in a one-tail test ($t_c = +1.706$), the null hypothesis can be rejected because 2.3958 is greater than 1.706. In sum, the average number of claim elements modified by the Federal Circuit during the twenty-eight months covered by this study increases over time. Therefore, the trends in

133. This study calculated the normalized number of claim elements by dividing, for each case, the number of changed claim elements by the total number of claim elements in dispute before the court. Then, for each month, the resulting percentages were averaged and presented in Table A-3 in Appendix B.

Figure A-3 and A-4 are not abnormalities, but reflect a consistent inclination over time.

3. Significance

There are at least three possible explanations for this interesting result. First, the lower tribunals have not yet fully adopted the *Markman* regime. This explanation is unlikely because over two years elapsed between the *Markman* decisions and the beginning of the period covered by this study. In those two years, lower tribunals and the patent bar should have accepted and implemented the *Markman* rules. By the year 2000, there should have been few cases in which the trial judge failed to apply *Markman*'s dictates.[134] Second, the lower tribunals may have continued to erroneously construe patent claims. Perhaps the difficulty generally associated with technology and the arcane rules of claim construction may have dampened *Markman*'s promised uniform application by trial judges. If this explanation were truly the reason for the observed trends, trial counsels need to better explain the technology to generalist judges. The Federal Circuit must also endeavor to simplify and harmonize patent law so that lower courts can easily understand and apply the law to the facts of their cases.

The last possible explanation for this trend is more ominous*:* the Federal Circuit's de novo standard may have led to an activist court that is more willing to disregard the lower tribunals' constructions in favor of its own interpretation of the disputed claims. As appealing as this theory may be, it necessarily stands on shaky ground because it assumes that correlation equals causation. One must consider that the Federal Circuit carefully reviewed and explained its approach to claim construction in virtually all the written opinions analyzed in this study. This is particularly important, given that each case comes before the court with its own merits and record. In addition, this explanation ignores other intangible factors, such as the skills of the litigants' counsels or the quality of each litigated patent. All that this study can safely say is that it is impossible to ascertain definitively which of these explanations, if any,[135] can substantiate the ascend-

134. In fact, only one case in this study echoed the pre-*Markman* practice. *See* Rivera-Davila v. Asset Conservation, Inc., No. 98-1075, 2000 U.S. App. LEXIS 479, at *11 (Fed. Cir. Jan. 12, 2000) ("The district court did not construe the disputed claim language before sending the infringement and damages issues to the jury.").

135. A practitioner suggested that there are simpler possible answers, including the possibility that: (1) the Federal Circuit misinterpreted the claims, (2) the district court misinterpreted the claims, or (3) there were two or more reasonable claim interpretations and the Federal Circuit adopted a reasonable claim interpretation different from the dis-

ing trends depicted in this section. Only time will tell whether this trend continues.[136]

B. The De novo Standard Could Explain the Relationship between the Type of Judgment Appealed and the Likelihood of Reversal and Claim Construction Modifications by the Federal Circuit

"[T]o decide what the claims mean is nearly always to decide the case."[137] In the wake of the *Markman* decisions, claim construction and all factual determinations relating to claim construction involve solely questions of law and lie within the court's exclusive province.[138] Thus, lower tribunals can resolve infringement and invalidity disputes without full trials by simply resorting to summary judgments. In other words, "the trial arena loses some of its luster as the center stage of the dispute resolution drama."[139] This shift away from the trial as the centerpiece of patent litigation seems to have already occurred. As Judge Michel recently explained:

> Theoretically, the only cases in need of trial would be those in which either the structure and operation of the accused device are unclear based on the summary judgment affidavits or depositions, or where there is a close question about whether the terms of the claim are met by the features of the accused device or steps in the accused process, literally or equivalently.
>
> I predict that an increasing portion of patent infringement cases will be resolved on summary judgment. It is conceivable, for example, that in as many as one-quarter of the cases, literal infringement could be decided as a matter of law. In another quarter, perhaps, equivalent infringement could be decided as a matter of law. In yet another quarter, both forms of infringement could be eliminated as legally incorrect. As a result, only one-fourth of infringement cases would require trial on both types of

---

trict court's. The author acknowledges the validity of these possibilities, but lacks the necessary analytic tools to determine the influence of these possible explanations.

136. Recent personnel change may also affect the slope of this trend. First, Judge Rich passed away in mid-1999. Second, the Senate confirmed Judges Linn and Dyk. Finally, Judge Plager took senior status in December 2000. Although no one judge is likely to affect the trend, this substantial change in court personnel might have a nontrivial effect.

137. Markman v. Westview Instruments, Inc., 52 F.3d 967, 989 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996) (Mayer, J., concurring).

138. *See id.* at 989.

139. Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1477 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting).

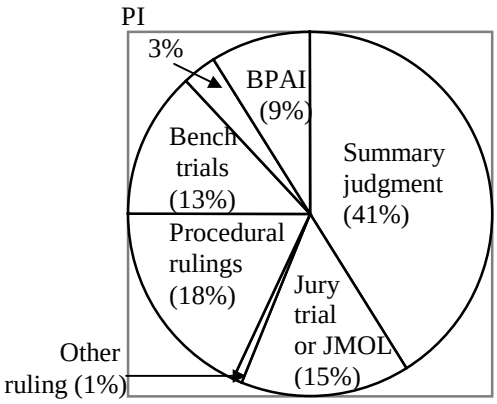
> infringement, while another fourth would require no trial at all.[140]

Based on the data collected and analyzed in this section, it appears that Judge Michel's prediction has already become true.

1. Appealed Judgments: All Issues

To examine this prediction, this study analyzed all types of judgments and orders reviewed by the Federal Circuit from the beginning of 1998 to April 2000. The analysis in this sub-section covers all issues reviewed by the Federal Circuit, and is not limited to claim construction reviews. For practical reasons, this section grouped together judgments as a matter of law ("JMOLs") and jury findings. In analyzing the court's written opinions, it was often difficult to determine whether the Federal Circuit was reviewing a jury's verdict or a post-verdict motion for a judgment as a matter of law to reverse that verdict. For this reason, and to avoid introducing any bias, this study grouped together jury verdicts and JMOLs. The results are presented in Table B-1 and illustrated in Figure B-1 below.[141]

Figure B-1



Types of Judgment Appealed to the Federal Circuit (on All Issues)

140. Michel, *supra* note 118, at 1188-89.

141. The data considered here excludes summary affirmances because those cases are decided without a written opinion and thus without a means to determine the type of judgment being appealed. Hence, the universe of cases for Table B-1 and Figure B-1 consists of cases with a written opinion. In addition, because six cases involved both summary judgments and judgment as a matter of law, those cases were credited to each of the two categories. This approach expanded the universe of written opinions to 402 rather than 396 cases. Because of the small number, this minor double-counting should not have affected the significance of the final results.

As Figure B-1 illustrates, a substantial number of cases—166 cases or 41% of available written opinions—came to the Federal Circuit from summary judgment, while close to a third of the cases (109 cases or 28%) were fully tried either by a jury or a judge. Close to one-fifth of cases (71 cases or 18%) reached the court as a result of lower court procedural rulings. Appeals from the Board of Patent Appeals and Interferences only composed 9% (36 decisions) of the written opinions issued by the court, while preliminary injunction appeals constituted 3% (14 opinions) of the Federal Circuit patent decisions.

Interestingly, as shown in Table B-2 in Appendix B, the Federal Circuit's affirmance rate of these types of judgments did not differ substantially.[142] The court affirmed 52% of summary judgments (84 of 161 cases), while affirming jury and bench trials 45% (25 of 56 cases) and 56% (28 of 50 cases) respectively. It affirmed 57% of preliminary injunctions (8 of 14 cases) and agreed with the BPAI in 56% of cases (19 out of 34 cases). To determine the significance of these results and to decide whether any predictive value exists in this data, this study tested the following hypothesis:

> *Hypothesis B-1:* There is no difference in the likelihood that the Federal Circuit will affirm or reverse the lower court if the judgment being appealed is a summary judgment, jury finding or JMOL, bench trial, preliminary injunction, or a decision from the BPAI.

The *chi-square* test[143] p-value was 0.00082.[144] This null hypothesis can thus be rejected with 99% confidence. In other words, the type of

142. The results in Table B-2 do not take into account dispositions involving petitions to appeal, for mandamus, or certified questions since these decisions do not review any judgments, but rather rest within the procedural requirements of the court's rules or within the discretion of the Federal Circuit. These petitions do not readily fall within our existing categories (e.g., affirmed or reversed). Table B-1 and Figure B-1 included these discretionary decisions in order to provide a complete picture of this study's population. This is why the denominators in Figures B-1 and B-2 differ slightly. Even if they were included in the analysis of Table B-2 by forcing their disposition in the existing categories, the results would not differ substantially.

143. A *chi-square* test examines the variances in the distribution of a population's data. WAGNER, *supra* note 101, at 275. This statistical tool is particularly useful in analyzing relationships between enumerative—i.e., nonquantitative—sets of data, such as the number of blue-eyed and brown-eyed individuals within a population. *Id.* at 274. The accepted formula for *chi-square* testing is: $X^2 = \Sigma[(n-E)^2 / E]$; with "n" being the actual experimental data and "E" representing the expected value of "n." *Id.* at 277.

judgment appealed can predict the likelihood of reversal or affirmance by the Federal Circuit.

The prediction from the *chi-square* test is logical in light of the different standards of review that the Federal Circuit applies. At one end of this spectrum, the Federal Circuit reviews summary judgments de novo without deference to the lower court.[145] By contrast, the court gives more deference to trial determinations: a bench trial's fact-findings are reviewed under the clearly erroneous standard,[146] while juries' factual determinations are subject to the more deferential test of substantial evidence.[147] Receiving the most deference, preliminary injunction decisions are reviewed under the abuse of discretion standard.[148] An abuse of discretion occurs when a court makes a clear error of judgment in weighing relevant factors

---

144. In their recent empirical study, John Allison and Mark Lemley provided an explanation of the *p*-value. *See* Allison & Lemley, *supra* note 77, at 204 n.54. For the convenience of the reader, Allison and Lemley's explanation is reproduced here:

> The p-value is a measure of the confidence with which a hypothesis can be rejected. Hypotheses in our study are generally in the null form. The null hypothesis posits "no difference" or "no relationship." If the null hypothesis is rejected, then one can state with confidence that there is a difference or a relationship. A rejection of the null hypothesis with a p-value of .01 means that such rejection can be made with 99% confidence; a rejection with a p-value of .05 or less means that such rejection can be made with 95% confidence; a rejection with a p-value of .10 or less means that such rejection can be made with 90% confidence. P-values less than .05 are viewed as an indication that the null hypothesis can be rejected with sufficient confidence and that any differences or relationships are statistically significant. Depending on several factors, one may view p-values up to .10 as supporting rejection with statistical significance. However, one should always view p-values greater than .10 for the null hypothesis as showing that any observed differences or relationships are not statistically significant.

Id.

145. *See, e.g.*, Augustine Med., Inc. v. Progressive Dynamics, Inc., 194 F.3d 1367, 1370 (Fed. Cir. 1999) ("On appeal, we review a grant of summary judgment de novo in which we view all evidence, make all reasonable inferences, and resolve all factual disputes in favor of the nonmovant, reapplying the standards of review used below.").

146. *See, e.g.*, Winner Int'l Royalty Corp. v. Wang, 202 F.3d 1340, 1344-45 (Fed. Cir. 2000) ("We review the district court's factual findings for clear error and its conclusions of law de novo, as with any bench trial.").

147. *See, e.g.*, Tronzo v. Biomet, Inc., 156 F.3d 1154, 1157 (Fed. Cir. 1998) ("[W]e will reverse a denial of a motion for JMOL only if the jury's factual determinations are not supported by substantial evidence or the legal conclusions implied from the verdict cannot be supported in law by those findings.").

148. *See, e.g.*, Sofamor Danek Group, Inc. v. DePuy-Motech, Inc., 74 F.3d 1216, 1219 (Fed. Cir. 1996) ("The grant of a preliminary injunction is within the trial court's discretion.").

or exercises its discretion based upon an error of law or clearly erroneous factual findings.[149] In sum, the differing levels of deference given to particular categories of judgments should logically affect the probability of affirmance.

This simple explanation is incomplete however. Given this spectrum of deference, it is logical and expected that the court would more frequently affirm cases involving deferential standards of review. For example, jury trial reviews should receive more deference and affirmances than summary judgments. In practice, the data does not demonstrate significant distinctions between these categories of cases*:* the Federal Circuit affirmed 52% of appealed summary judgments compared to only 45% of jury determinations.

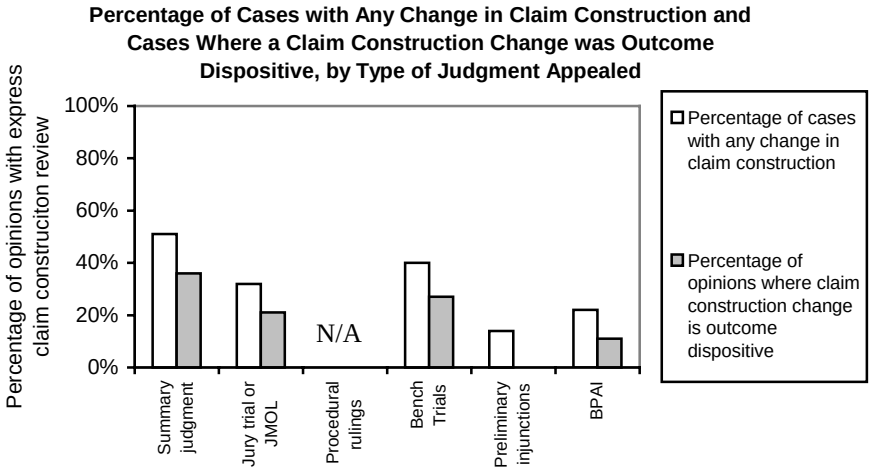
To find a better explanation, one must examine the Federal Circuit's application of the de novo standard to claim construction. Under *Cybor Corp.*, claim construction is a question of law. The de novo standard thus applies and eliminates any requirement for deference. Where claim construction is an issue on appeal, the traditional review standards applicable to a particular case becomes superfluous and subordinated to the effect of the de novo standard. Consequently, when the court of appeals reviews claim construction, it is free to substitute its own judgment for that of the lower court. This reason may explain why the affirmance rate of bench trials (56%) so closely matches that of preliminary injunctions (57%).

2. Appealed Judgments: *Claim Construction*

To further explore the possibility that the de novo standard of review renders superfluous the traditional standard applicable to a particular category of judgments, this study ascertained the percentage of cases in which the Federal Circuit changed a lower tribunal's claim construction, and the proportion of cases where such change was outcome dispositive. The results provided in Table B-3 and Figure B-3 depict the percentage of cases with changes in claim constructions and cases where the change in claim construction led to a reversal.

149. *See, e.g.*, Novo Nordisk of N. Am. v. Genentech, Inc., 77 F.3d 1364, 1367 (Fed. Cir. 1996) ("An abuse of discretion may be established by showing that the court made a clear error of judgment in weighing relevant factors or exercised its discretion based upon an error of law or clearly erroneous factual findings.").

Figure B-3



As Figure B-3 shows, the Federal Circuit has changed the lower court's claim construction in 51% of summary judgment cases involving an express review of claim interpretation (52 out of 102 cases), 32% of cases involving jury or JMOL rulings (11 out of 34 cases), and 40% of bench trial decisions (12 out of 30 bench trials). The remaining three categories—procedural rulings, preliminary injunctions and administrative appeals from BPAI—involved far fewer cases in which the Federal Circuit expressly reviewed claim construction. The court changed the BPAI's claim construction in only 2 of 9 cases expressly involving claim construction,[150] and modified the lower court's claim interpretation in only one preliminary injunction decision (1 out of 6 cases). Finally, the Federal Circuit did not modify the lower tribunal's claim constructions in either of the two procedural cases involving an express review of claim construction.[151]

For the judgments that the court reviewed more frequently, the Federal Circuit reversed a substantial percentage of those cases that involved a

150. In some cases, the BPAI must construe the rejected claim in order to decide whether that claim should be allowed. *See, e.g., In re* Dance, 160 F.3d 1339, 1344 (Fed. Cir. 1998) (reviewing and rejecting the BPAI's construction of the claim element "bulbous head" in a patent application directed to a catheter). Although such express claim constructions by the BPAI are rare, they nonetheless exist and are thus included in this study.

151. *See* Kolmes v. World Elastic Corp., No. 97-1587, 1998 U.S. App. LEXIS 9407 (Fed. Cir. May 6, 1998) (reviewing the district court's claim construction and infringement findings to decide whether the trial court's ruling of contempt was proper); Additive Controls & Measurement Sys., Inc. v. Flowdata, Inc., 154 F.3d 1345 (Fed. Cir. 1998) (reviewing claim construction in appeal of contempt finding).

change in claim interpretation*:* 70% of summary judgments, 64% of jury or JMOL rulings, and 67% of bench trials. In other words, once the Federal Circuit expressly reviewed and modified the lower court's claim construction, there was over a two-thirds chance that the court would reverse based on an erroneous claim interpretation. To determine whether any predictive value exists in this data, the following hypothesis was tested*:*

> *Hypothesis B-2:* There is no difference in the likelihood that the Federal Circuit will modify the lower court's claim construction if the judgment being appealed is a summary judgment, jury finding or JMOL, bench trial, preliminary injunction, or a decision from the BPAI.

The *chi-square* test p-value was 0.0721. Although the hypothesis cannot be rejected with 95% confidence, it can be rejected with 90% confidence. Thus, the type of judgment appealed can weakly predict the likelihood that the Federal Circuit would modify the lower court's claim construction.

3. Implications

From the above data, it is clear that claim construction review plays a significant role in the likelihood of reversal. In fact, the analysis of this data indicates that there is over a two-thirds chance of reversal once a claim construction is modified by the court of appeals. This probability is roughly constant, regardless of whether the appealed judgment was a summary judgment, a bench ruling or a jury verdict. The explanation for this similarity in reversal rates must rest on the main constant in the review of claim constructions for each type of judgment: the de novo standard of review. One potential conclusion is that the de novo review standard affects the reversal rates of the different types of judgments. The extent of that effect remains unclear.

C. The Identity of the Judge Issuing the Written Decision does not Seem to Impact the Likelihood of Reversal or Claim Construction Modification

Recently, Judge Michel acknowledged that practitioners often complained about a "panel dependency" problem.[152] As he explained, "practitioners, particularly in the patent field, often maintain that the outcome, as well as the rationale of court decisions, are strongly reflective of the iden-

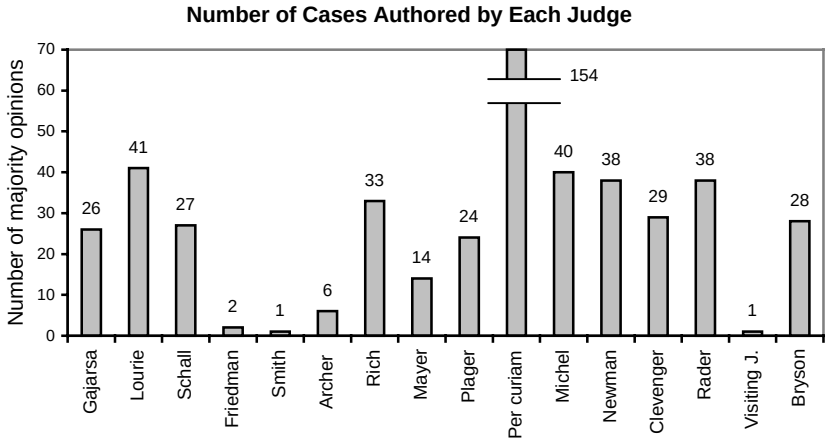
152. *See* Michel, *supra* note 118, at 1191 ("The problem most frequently mentioned by practitioners is known as 'panel-dependency.' Panel dependency is the belief that the result in a case is a function of the membership of the three-judge panel.").

tity of the three judges [on the panel]."[153] Although he dismissed those complaints as exaggerated,[154] a recent empirical study suggests that, for particular issues, the identity of the majority opinion author can influence the outcome of a particular case.[155] Could the identity of the judges on a panel also affect the rate at which the court modifies the lower court's claim construction?

1. Impact of Authorship: All Issues

To provide a better basic understanding of the Federal Circuit's authorship practices, Table C-1 in Appendix B and Figure C-1 below present the number of majority opinions authored by each judge during the period covered by this study.

Figure C-1



As Figure C-1 indicates, most Federal Circuit judges authored 25 to 40 patent cases over the twenty-eight months covered by this study, with an average of twenty-five opinions per judge.[156] At one end of the spectrum are senior judges Friedman, Smith, and Archer who authored 2, 1, and 6

153. *Id.*

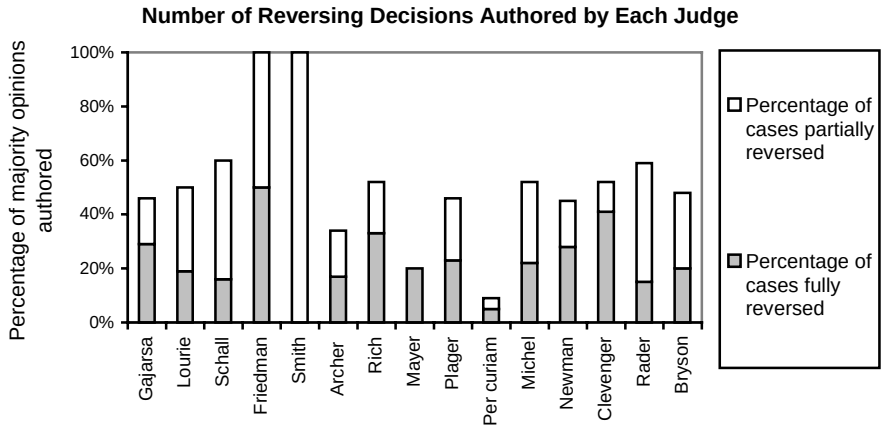
154. *Id.* ("I believe that these complaints are exaggerated. By informal monitoring, I estimate that in ninety percent of the cases the result would be the same with any combination of three judges from among the court's present complement of ten judges in full-time service.").

155. John R. Allison & Mark A. Lemley, *How Federal Circuit Judges Vote in Patent Validity Cases*, 27 FLA. ST. U. L. REV. 745, 757 (2000) (showing that whoever writes the majority opinion is related to whether the court finds the patent valid).

156. This average does not account for the per curiam cases and the case decided by the visiting judge.

patent cases respectively. At the other end, judges Lourie, Michel, Rader, and Newman respectively authored 41, 40, 38, and 38 patent cases. One active judge bucked the trend: Chief Judge Mayer authored only 14 patent decisions, about a third of the number written by Judge Lourie. Moreover, the late Judge Rich authored 33 cases before he passed away in mid-1999. From the trend between early 1998 and mid-1999, it is likely that he would have authored many more opinions had he lived through the entire period covered by this study. Finally, a large number of cases were per curiam decisions, principally the 106 summary affirmance decisions included in this study.[157] Further, the percentage of opinions per judge that either fully or partially reversed the lower court's ruling is illustrated in Table C-2 in Appendix B and Figure C-2.

Figure C-2



The rate of reversal for most Federal Circuit judges hovers around 50 to 60% for all issues, with differing proportions of fully and partially reversed for each judge.[158] Besides Judges Friedman and Smith whose few majority opinions translate into disproportionately high percentages in Figure C-2, three exceptions of low reversal rates stand out from this trend. Judge Archer reversed only a third of the opinions he authored. Chief Judge Mayer reversed only a quarter of his opinions. Moreover, when the court issued a per curiam opinion, it likely affirmed the lower

157. In this particular section, per curiam cases are included in the analyses depicted by Figures C-1 to C-3.

158. In examining Figure F-2, one should discount the data for Judges Friedman and Smith since they authored too few cases for their results to be meaningful.

tribunal's judgment.[159] To determine whether any predictive value exists in this data, this study tested:

> *Hypothesis C-1:* There is no difference in the likelihood that the Federal Circuit will affirm the district court when Judges Gajarsa, Lourie, Schall, Friedman, Smith, Archer, Rich, Mayer, Plager, Michel, Newman, Clevenger, Rader, or Bryson writes the majority's opinion.

The *chi-square* test p-value was 0.38. As the experimental p-value was greater than a p-value for a 95% confidence level, it is not possible to predict confidently that the Federal Circuit would rule differently in affirming the lower tribunal depending on the identity of the judge who authors the majority opinion.

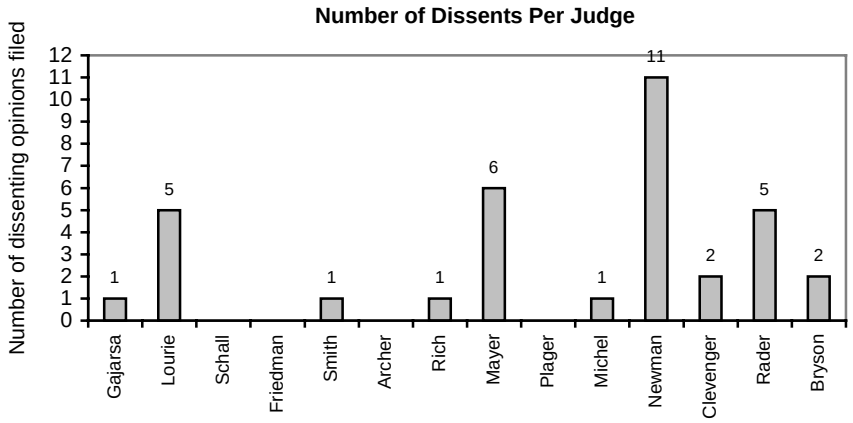
Another necessary inquiry was the level of disagreement between judges, as reflected in filings of dissenting opinions. Many cases demonstrated that Federal Circuit judges have strong, independent, and often conflicting perspectives on the development of patent law.[160] However, the apparent dissonance is less than one would expect, as illustrated in Table C-3 and Figure C-3.

---

159. This is somewhat of a circular statement. The source of the per curiam opinions dictates this result because most of them come from summary affirmance decisions.

160. *See, e.g.*, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558 (Fed. Cir. 2000) (en banc), *cert. granted*, 121 S.Ct. 2519 (U.S. Jun. 18, 2001) (No. 00-1543) (including two concurrences and four lengthy partial dissents); Cybor Corp. v. FAS Techs. Inc., 138 F.3d 1448 (Fed. Cir. 1998) (en banc) (including three concurrences and two dissents); Hilton-Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512 (Fed. Cir. 1995) (en banc), *rev'd on other grounds*, 520 U.S. 17 (1997) (including, in addition to the per curiam opinion, one concurrence and three dissents).

Figure C-3



Dissenting opinions were filed in only a tiny fraction of all patent cases. In this small subset of patent cases, Judge Newman filed more dissents than any of her colleagues. Judges Mayer, Lourie, and Rader wrote roughly half as many dissents as Judge Newman. The remaining judges shown in Figure C-3—Judges Gajarsa, Smith, Rich, Michel, Clevenger, and Bryson—filed one to two dissenting opinions during the entire twenty-eight months. Some, like Judges Archer, Schall, Friedman, and Plager, did not dissent at all during that period.[161] In fact, only 35 (7%) dissenting opinions were filed out of 502 cases, meaning that 93% of cases were decided with all the judges on the panel joining in the majority opinion or filing concurrences.

As surprising as this result may seem, it agrees with recent statistics cited by Judge Michel.[162] Thus, dissent within the circuit is rare. But occasional disagreements still exist and are often necessary to further the evolution of the patent law. As Judge Newman elegantly commented, "the occasional 'percolation' of divergent views illustrates the vigor of the ju-

161. However, judges often publish "additional views," rather than expressing dissents or concurrences. *See, e.g.*, Dawn Equip. Co. v. Kentucky Farms, 140 F.3d 1009, 1018-23 (Fed. Cir. 1998) (including additional views opinions by Judges Plager, Newman and Michel). For purpose of this tabulation, this study classified those "additional views" as concurrences rather than dissents.

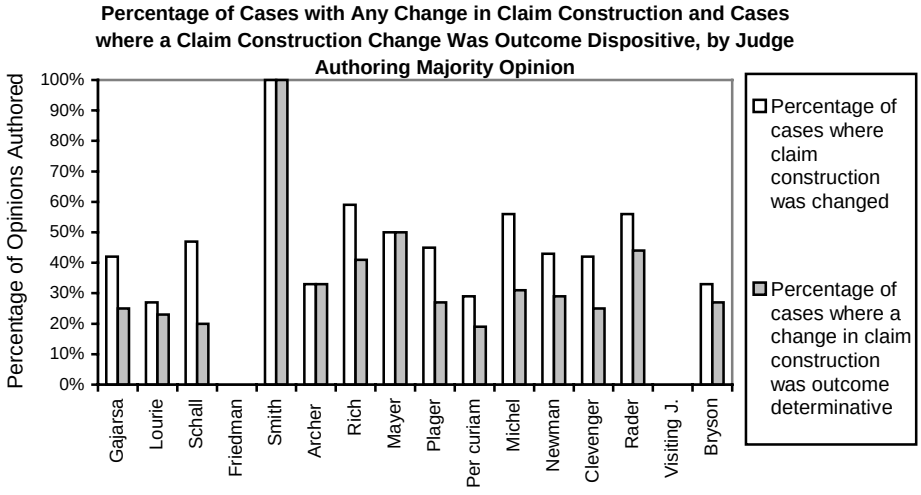
162. *See* Michel, *supra* note 118, at 1191 ("This estimate is similar to the statistic that approximately ninety percent of the time the panels rule unanimously, meaning that dissents are found in fewer than one out of every ten cases.")

dicial search for truth, the sometimes indirect progress toward the justice and fairness that animate the law."[163]

2. Impact of Authorship: *Claim Construction*

Although some Federal Circuit judges authored more patent opinions than their colleagues, the court appears remarkably unified in its rulings and its rate of reversal. The question remains whether this unified front conceals any tendency to modify the lower tribunal's claim construction. Using the data in Table C-1, Figure C-4 provides the answer to that query.

Figure C-4



Besides Senior Judge Smith, whose only case resulted in a change in claim construction and thus accounted for the disproportionate 100% reversal rate, the rate of change in claim interpretation for each judge hovers around 40 to 50%. Three judges stand out with relatively higher rates of claim construction changes: Judges Rich (59%), Michel (56%), and Rader (56%). On the other end of the spectrum, the opinions signed by Judges Lourie and Archer changed the lower court's claim construction much less frequently (27% and 33% respectively). So, does the identity of the author of the majority opinion affect the rate of claim construction modification? To determine the predictive value of this data, this study tested:

> *Hypothesis C-2:* There is no difference in the likelihood that the Federal Circuit will modify a lower court's claim construction

163. The Honorable Pauline Newman, *The Federal Circuit: Judicial Stability or Judicial Activism*, 42 AM. U. L. REV. 683, 683 (1993).

> when Judges Gajarsa, Lourie, Schall, Friedman, Smith, Archer, Rich, Mayer, Plager, Michel, Newman, Clevenger, Rader, or Bryson writes the majority opinion.

The *chi-square* test p-value was 0.8187. Since the experimental p-value exceeded the p-value for a 95% confidence level, this study cannot confidently predict the likelihood of claim construction modification based on the identity of the judge authoring the majority opinion.

In cases where the opinion changed a claim construction, the court was extremely likely to reverse. Judges Archer and Mayer reversed 100% of cases in which they modified the lower tribunal's claim constructions. The opinions authored by most other Federal Circuit judges changing claim construction reversed over two-thirds of such cases. Notably, three judges—Lourie, Rader and Bryson—filed majority opinions that overturned at least 80% of cases that involved a change in the lower court's claim construction.

3. Implications

In sum, claim construction review may not suffer from a panel dependency problem. Despite large variances in claim construction change rates among Federal Circuit judges, the *chi-square* test indicates that the author of an opinion does not predictably affect the outcome of a claim construction. Since the opinion's author must collaborate with his or her colleagues on the panel, it is logical to suppose that the membership of the three-judge panel has little impact on the rate of claim construction changes.[164] Judge Michel was perhaps correct in stating that the perceived problem of panel dependency was symptomatic of the general inability of attorneys to predict the outcome of a particular case.[165] This indeterminacy

---

164. Although the analysis in this section has focused on authorship of opinions, that parameter has been a weak surrogate for membership on a merit panel. No appellate judge works in a vacuum. To garner the necessary vote to remain in the majority, the authoring judge must collaborate with the other judges on the panel. The final opinion signed by the authoring judge must reflect the outcome desired by the other members of the majority on all appealed issues, including claim construction. Logic thus suggests that the authorship of an opinion should be related to the membership of the panel. Given this presumed relationship, the lack of correlation between authorship and claim construction changes would also mean that the presence of a judge on a merit panel would not relate to claim construction changes. Although logical, this conclusion does not necessarily flow from the dataset or the *chi-square* test.

165. *See* Michel, *supra* note 118, at 1191 ("I believe that the complaint regarding panel dependency may be symptomatic of broader ills, such as, 'indeterminacy' or 'unpredictability.' If most of the time-seasoned practitioners cannot predict the outcome of a given set of facts on an issue such as equivalent infringement, then a serious problem arises.").

places a substantial burden on our patent litigation system. As Judge Michel explained:

> The central problem is that neither litigants nor litigators can avoid, much less terminate, the litigation process because the resulting indeterminacy will mean unpredictability. First, until a panel of the Court of Appeals for the Federal Circuit decides the case, no one can know the correct outcome, and the trial court result will not be seen as acceptable. As a result, cases will be settled less often before the institution of proceedings, (i.e., the filing of a complaint). Second, between the filing of a complaint and the commencement of the trial or significant pretrial evidentiary hearings, such as those regarding proper claim construction in a patent case, the incentive to settle the case usually will be insufficient. Finally, the result on summary judgment, or even on mid-trial or post-trial judgment as a matter of law ("JMOL"), will not be accepted by the losing party without appeal because the chances of reversal are seen as at least fifty percent.[166]

As Judge Rader had predicted over three years ago, "a *de novo* review of claim interpretation has postponed the point of certainty to the end of the litigation process, at which point, of course, every outcome is certain anyway."[167] Short of an unlikely Congressional or Supreme Court intervention, only the Federal Circuit can effectively address this problem.[168]

Although it is beyond the scope of this discussion to endorse any specific approach, a member of the court has suggested a possible solution. Judge Bryson has argued that the Federal Circuit could grant greater deference to the lower tribunal's claim construction on issues where the district court has superior access to pertinent tools, such as a credibility judgment between two competing expert witnesses.[169] Many practitioners and law professors undoubtedly have their own ideas of how to solve this problem. Regardless of the approach, the pervasive symptoms of litigation

---

166. *Id.* at 1191-92.

167. *Cybor Corp. v. FAS Techs.*, 138 F.3d 1448, 1476 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting).

168. *See* Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1819 (1984) (noting that "our patent policymaker, Congress, is noted for inaction and has not changed the patent life in over a century"); *see also* Nicolas Oettinger, Note, *In re Independent Service Organizations Antitrust Litigation*, 16 BERKELEY TECH. L.J. 323, 335-38 (2001) (discussing the reasons why the Supreme Court grants few writs of certiorari in patent cases decided by the Federal Circuit and tends to affirm those that it reviews).

169. *See Cybor Corp*,.138 F.3d at 1463 (Bryson, J., concurring).

uncertainty continue to plague the patent system. Hopefully the Federal Circuit will choose to tackle this issue.[170]

D. The Particular Tribunal from which a Case Originates does not Predictably Affect the Outcome of the Appeal

The de novo review standard forces parties to "go past the district court's *Markman I* proceeding, past the entirety of discovery, past the entire trial on the merits, past post trial motions, past briefing and argument to the Federal Circuit . . . ."[171] Logically though, not all appeals should come before the court of appeals with the same chance of being affirmed. A lower court judge without much experience in patent litigation may misapply the arcane rules of claim construction, and therefore doom the appeal to certain reversal. On the other hand, claim construction by a trial judge with substantial patent experience—such as the judges in the District of Delaware or the Northern District of California—should theoretically increase the prospect of affirmance at the circuit level. Given the judges' divergent patent experiences and the fact that litigants have appealed approximately fifty percent of patent cases to the Federal Circuit in recent years,[172] correctly choosing the forum to originally litigate the case could greatly influence the ultimate outcome of the case. To assist patent counsels, this study examined how forum choice affects the outcome of an appeal.

1. Reversal Rates: All Issues

Before addressing the choice of forum, this section will provide a brief overview of the tribunals included in this study's population. During the period covered by this study, the Federal Circuit heard appeals from sixty-six out of the ninety-four district courts in the United States, in addition to appeals from the BPAI, the ITC, the Court of Federal Claims ("CFC"), and cases on remand from the Supreme Court. Table D-1 in Appendix B lists the tribunals originating the appeal and the number of such cases.

In examining the effects of forum choice, the first inquiry is whether the Federal Circuit is more likely to reverse a case appealed from a forum

---

170. In a recent en banc decision, the Federal Circuit has attempted to foster more certainty in the patent litigation system by creating a "complete bar" to equivalency where prosecution history estoppel applies to a claim element. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 569-78 (Fed. Cir. 2000) (en banc), *cert. granted*, 121 S.Ct. 2519 (2001) (No. 00-1543).

171. *Cybor Corp.*, 138 F.3d at 1476 (Rader, J., dissenting).

172. *See* Michel, *supra* note 118, at 1193 ("In the patent cases, the percentage in recent times has hovered at approximately fifty percent, perhaps due in part to the large damage awards that typically are given.").

that hears a substantial number of patent cases. To address this question, this study divided the population's appellate cases into two categories based on whether the cases originated from a "more active" tribunal or a "less active" forum.[173] The "more active tribunal" group included district courts from which the Federal Circuit reviewed more than ten cases during the studied period. These "more active" district courts were the Central District of California (C.D. Cal.), the District of Delaware (D. Del.), the District of Massachusetts (D. Mass.), the District of Minnesota (D. Minn.), the District of New Jersey (D.N.J.), the Eastern District of Michigan (E.D. Mich.), the Eastern District of Virginia (E.D. Va.), the Northern District of California (N.D. Cal.), the Northern District of Illinois (N.D. Ill.), the Southern District of Florida (S.D. Fla.), and the Southern District of New York (S.D.N.Y.).[174] In addition, the "more active" tribunal group comprised appeals from the BPAI, the CFC, and the ITC.[175] Together, these tribunals originated close to two-thirds of the appeals to the Federal Circuit during the period covered by this study. The "less active" courts include all the district courts not mentioned above.

The comparison between the "more active" and "less active" groups was as expected. As shown in Table D-2 in Appendix B and Figure D-1 below, the "more active" tribunals were less likely to be reversed than the "less active" courts.

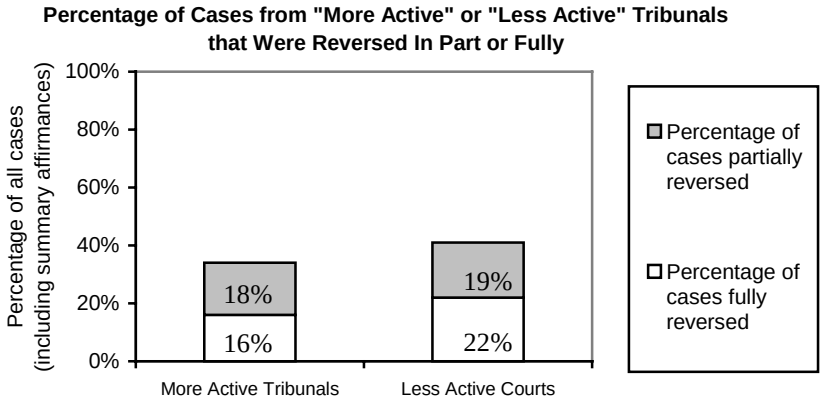
---

173. This particular calculation included summary affirmances under Federal Circuit Rule 36.

174. This list of active district courts agrees with Allison and Lemley's list of the most active jurisdictions for patent litigation from 1989-1996. *See* Allison & Lemley, *supra* note 77, at 246-47.

175. Although the Federal Circuit heard fewer than 10 cases from either the CFC (9 cases) or the ITC (7 cases), those two tribunals were included in the "more active" group because of the specialized nature of the cases heard by those forums. The CFC has jurisdiction over patent litigation brought against the U.S. government, while the ITC provides a special forum to litigate patent claims affecting imports of non-U.S. goods. It is assumed that those specialized jurisdictions would provide those tribunals with more experience with patent cases.

Figure D-1



As shown in Figure D-1, the Federal Circuit reversed more cases appealed from a "less active" court (41% of cases) than cases originating from a "more active" tribunal (34% of cases).[176] Although small, the difference in reversal rate is nontrivial. A look at some of the cases originating from these "less active" courts underscores this point. For instance, the only case appealed from the Northern District of Alabama was vacated on appeal.[177] Both cases from the Eastern District of Louisiana were reversed.[178] Similarly, three out of four cases originating from the Western District of Michigan resulted in a reversal in full or in part.[179]

To determine whether choosing a "more active" over a "less active" forum will affect the likelihood of affirmance, this study tested:

> *Hypothesis D-1:* There is no difference in the likelihood that the Federal Circuit will reverse a case appealed from either a "more active" or "less active" forum.

The *chi-square* test p-value was 0.451806. Because it was greater than a p-value of 0.05 for a 95% confidence level, this study cannot safely reject this hypothesis and, therefore, cannot predict with confidence that the district court from which the case originated would affect the court of appeals' likelihood of reversal.

---

176. This analysis includes summary affirmances under FEDERAL CIRCUIT RULE 36.

177. Intergraph Corp. v. Intel Corp., 195 F.3d 1346 (Fed. Cir. 1999).

178. Hockerson-Halberstadt, Inc. v. Converse Inc., 183 F.3d 1369 (Fed. Cir. 1999); Laitram Corp. v. NEC Corp., 163 F.3d 1342 (Fed. Cir. 1998).

179. Bickerstaff v. Dr. Shrink, Inc., No. 99-1091, 1999 U.S. App. LEXIS 21601 (Fed. Cir. Sept. 3, 1999); Lencco Racing Co. v. Jolliffe, No. 99-1074, 1999 U.S. App. LEXIS 14239 (Fed. Cir. Jun. 29, 1999); Donnelly Corp. v. Gentex Corp., No. 97-1391, 1998 U.S. App. LEXIS 22382 (Fed. Cir. Sept. 11, 1998).

2. "More Active" Tribunal Reversal Rates: All Issues

Choosing forums that are less experienced in patent law is often a matter of tactical choice for a litigant attempting to gain the home-field advantage. Where such advantage does not exist, should litigants seek a forum with more patent experience? To address that question, this study attempted to gain a better understanding of the individual tribunals included in the "more active" category. When the aggregate statistics presented in Figure D-1 are more closely examined, it is apparent that some lower tribunals are reversed more often than others. As shown in Table D-3 in Appendix B and Figures D-2 (including summary affirmances) and D-3 (excluding summary affirmances) below, the reversal rates for each lower tribunal differed widely, regardless of whether summary affirmances were included.

Figure D-2

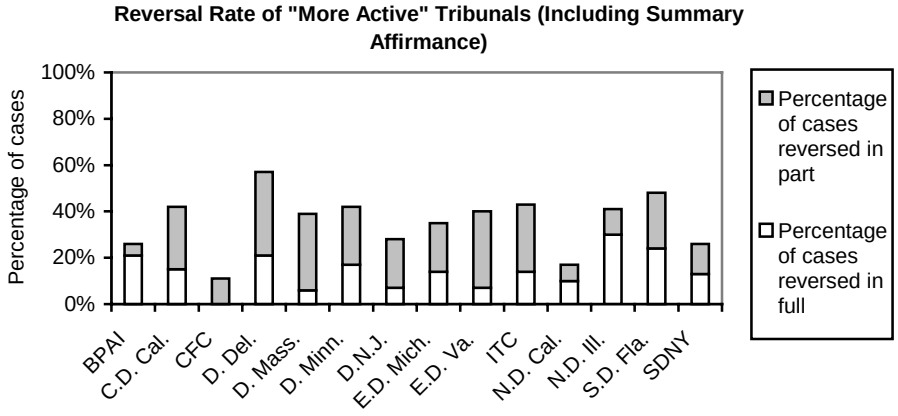
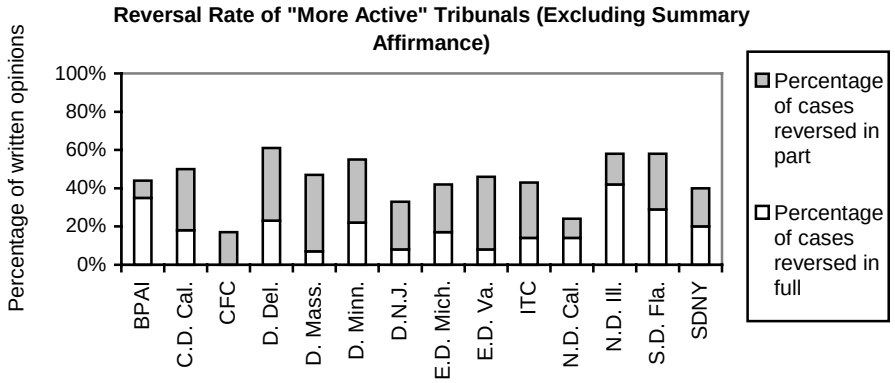


Figure D-3



Except for the BPAI, the addition of summary affirmance decisions did not drastically affect the rate at which the Federal Circuit affirmed the lower court's judgment. At one end of the spectrum, the court of appeals reversed only about 20% of patent cases originating from the Court of Federal Claims,[180] and the Northern District of California. At the other end, the Federal Circuit reversed almost 60% of cases from the District of Delaware[181] and the Southern District of Florida. To determine whether choosing any of these particular forums will affect the likelihood of affirmance, this study tested*:*

> *Hypothesis D-2:* There is no difference in the likelihood that the Federal Circuit will affirm a case appealed from the C.D. Cal., D. Del., D. Mass., D. Minn., D.N.J., E.D. Mich., E.D. Va., ITC, N.D. Cal., N.D. Ill., S.D. Fla., and S.D.N.Y.[182]

The *chi-square* test p-value was 0.249193. Since the experimental p-value was greater than a p-value for a 95% confidence level, this study cannot predict with accuracy the likelihood that the Federal Circuit will affirm a case appealed from these districts.

3. "More Active" Tribunal Reversal Rates: *Claim Construction*

The next question is whether the trial forum affects the Federal Circuit's rate of change in claim constructions. If a change occurred, this study further ascertained the percentage of such cases where the change was outcome dispositive. Table D-4 in Appendix B and Figure D-4 below examine this issue.

---

180. This number agrees with the 21% reversal rate of CFC's decisions that the Federal Circuit's official statistics listed for the 1999 calendar year. REPORTS OF THE PROCEEDINGS OF THE JUDICIAL CONFERENCE OF THE UNITED STATES, Table B-8, at 125 (1999).

181. This high reversal rate for the District of Delaware is surprising given the District's reputation as "one of the nation's premier trial courts for the resolution of major patent disputes." *See* William J. Marsden, *Delaware District is Top Choice for Patent Disputes*, NAT'L L.J., Mar. 27, 2000, at C3. The appellate reversal statistics may not tell the whole story. During the twenty-eight months covered by this study, the Federal Circuit only reviewed fifteen cases appealed from the District of Delaware. In contrast, nearly 100 patent cases were filed in that district in 1998, and over 150 intellectual property cases were on the court's docket at the end of 1999. *Id.* These facts suggest that the court of appeals may review only a small subset of cases from that district—perhaps those cases which the litigants believe have a greater probability of reversal on appeal.

182. This hypothesis omitted the CFC and BPAI because the BPAI does not try patent infringement cases while the CFC jurisdiction is restricted to claims against the United States government.

Figure D-4

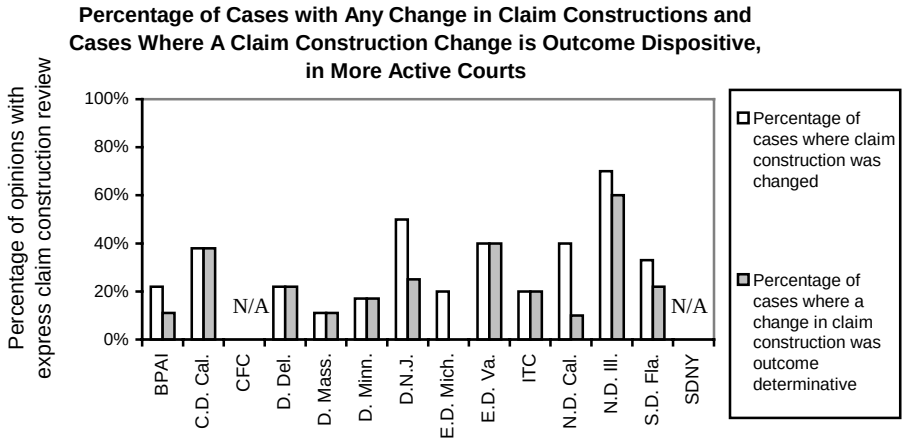


Figure D-4 presents a very different picture from Figures D-2 and D-3. Except for the Northern District of Illinois and the District of New Jersey, the Federal Circuit modified the lower court's claim construction in a relatively small fraction of appealed cases. For instance, the Federal Circuit modified claim constructions in only 22% of cases from the District of Delaware and 11% from the District of Massachusetts. The court of appeals did not modify any claim construction when it expressly reviewed claim interpretation in cases appealed from the Court of Federal Claims or the Southern District of New York. However, the disadvantage to this low rate of claim interpretation change is that, once the court has changed a claim construction, such modification will lead to an extremely high rate of reversal. This happened in the Central District of California, the Eastern District of Virginia, the District of Massachusetts, the International Trade Commission, the District of Delaware, and the District of Minnesota.[183] In light of these results, this study tested for predictive purposes*:*

> *Hypothesis D-3:* There is no difference in the likelihood that the Federal Circuit will change some claim construction in a case appealed from the C.D. Cal., D. Del., D. Mass., D. Minn., D.N.J., E.D. Mich., E.D. Va., ITC, N.D. Cal., N.D. Ill., S.D. Fla., and S.D.N.Y.

183. The danger of extrapolating from this figure, however, is that most of those 100% reversal rates are based on a small number of cases where claim constructions were changed (e.g., one case in Colorado, Minnesota, Massachusetts, Eastern District of Pennsylvania, and the ITC).

For this hypothesis, the *chi-square* test p-value was 0.40. Because it was greater than a p-value of 0.05 for a 95% confidence level, this study cannot safely reject this hypothesis and, therefore, cannot predict with confidence that the district court from which the case originated affects the likelihood that the Federal Circuit would change the lower court's claim construction.

Although it is not appropriate to rely on those statistics prospectively, one interesting aspect should be noted. The average claim construction-related reversal rate[184] for the "more active" tribunal is 19.7%,[185] which is lower than the average overall reversal rate of 34%.[186] Although surprising, this lower reversal rate seemingly supports the theory that claim construction by a trial judge with substantial patent experience may decrease the prospect of reversal on appeal. Perhaps there is some truth in the notion that experience does matter.

It is not necessarily wise to choose a trial forum with an eye to the likelihood of being affirmed on appeal. Although the data from this study suggest that the Federal Circuit's reversal rate and the claim construction modification rate differ among districts, these results cannot confidently predict that the court of appeals will follow the same pattern prospectively. The best lesson, perhaps, is that litigants should consider this data, but not rely on past results to inform their forum selection.

E. The Federal Circuit Reversed and Changed More Claim Constructions in Precedential Decisions than in Nonprecedential Cases

Some members of the patent bar have speculated that the Federal Circuit uses nonprecedential opinions in difficult cases.[187] Like many other circuits, the Federal Circuit's Rules differentiate between the types of decisions that the court issues.[188] As Judge Michel explained:

---

184. This relates to cases where a claim construction change is outcome dispositive.

185. This number was obtained by averaging the percentage of cases where a change in claim construction was outcome determinative. *See* Figure D-4 *supra* and Table D-4 *infra*.

186. *See* Figure D-1 *supra* and accompanying text.

187. *See* Michel, *supra* note 118, at 1187 ("Indeed, their use [of nonprecedential decisions] is often criticized, although sometimes because of misunderstanding. For example, members of the specialty bars complain informally at conferences. Some speculate that the court uses nonprecedential opinions in difficult cases."). Although Judge Michel did not define what he meant by "difficult cases," this study supposes that the term refers to cases with complicated legal questions and/or awkward facts.

188. *See* FED. CIR. R. 36, 47.6.

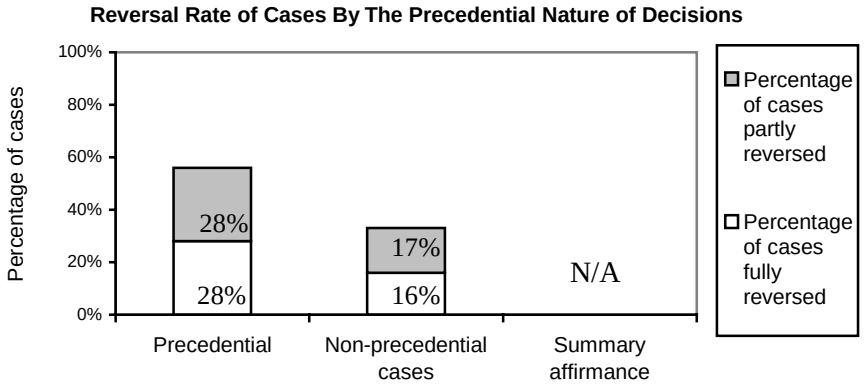
> the court disposes of almost a third of its cases by summary affirmance (i.e., without opinion) under Federal Circuit Rule 36. Second, the court disposes of another one-third of its cases under Rule 47.6 by "non-precedential" decision (i.e., a public opinion explaining the reasoning of the court but usually only in abbreviated form). These opinions, however, cannot be cited as precedent.[189]

In other words, only one-third of decisions issued by the court are "precedential." However, the Federal Circuit seems to spend more time writing patent opinions than other types of decisions. Of the 502 patent cases included in this study, 191 (38%) decisions were precedential, 205 (41%) were nonprecedential under Federal Circuit Rule 47.6, and 106 (21%) were summary affirmances under Federal Circuit Rule 36. Thus, a substantial number of cases are issued as nonprecedential rulings, with a smaller proportion published as "precedential." On first inspection, the greater number of nonprecedential decisions might bolster the criticism that the Federal Circuit uses nonprecedential opinions in difficult cases.

1. Precedential Decisions and Reversal Rates: All Issues

To test for this possibility, this study looked at the reversal rate of cases in each of these three categories. Table E-1 in Appendix B and Figure E-1 below illustrate the results.

Figure E-1



189. *See* Michel, *supra* note 118, at 1186-87.

As Figure E-1 shows, the Federal Circuit reversed more precedential cases than nonprecedential cases in this study.[190] The court fully reversed 28% (52 of 191 cases) of precedential opinions and partially reversed an equal proportion (53 of 191 cases). As for the nonprecedential opinions, the Federal Circuit fully reversed 16% (32 of 205 cases) and partially reversed 17% (34 out of 205 decisions) of those decisions. Of course, summary affirmances by their nature are not reversals. To determine whether any predictive value exists in these data, this study tested:

> *Hypothesis E-1:* There is no difference in the likelihood that the Federal Circuit will affirm or reverse the lower court if the decision is precedential or nonprecedential.[191]

The *chi-square* test p-value was 0.00549. This null hypothesis can thus be rejected with 99% confidence. Therefore, whether a decision is precedential or nonprecedential relates to the likelihood of reversal by the Federal Circuit.

Assuming that difficult cases are more likely to be reversed, Figure E-1 indicates that the members of the patent bar erred in speculating that the Federal Circuit used nonprecedential opinions in difficult cases. As indicated by the high rate of reversal of precedential decisions, it seems that more difficult cases are issued as precedential opinions.

In practice, this assumption has both strengths and weaknesses. On one hand, where a troublesome case has the potential to engender "bad law," the court may choose to resolve it as a nonprecedential ruling under Rules 36 or 47.6. On the other hand, the vote of only one panel member is sufficient to make a case precedential, thus indicating a strong presumption against nonprecedential status.[192] To avoid undue speculation, this study only concludes that appellate reversals occur more often in precedential than nonprecedential rulings.

---

190. It is logical to assume that appellate courts are more likely to reverse cases with difficult issues of law or awkward facts since there is more room for the trial court to commit reversible error. *See* Guy Goldberg & Gena Bunn, *Balancing Fairness & Finality: A Comprehensive Review of the Texas Death Penalty*, 5 TEX. REV. L. & POL. 49, 80 n.139 (2000) (noting, in the context of Texas death penalty cases, that "cases with more complicated legal issues are the ones that get published and are more likely to contain issues that require reversal").

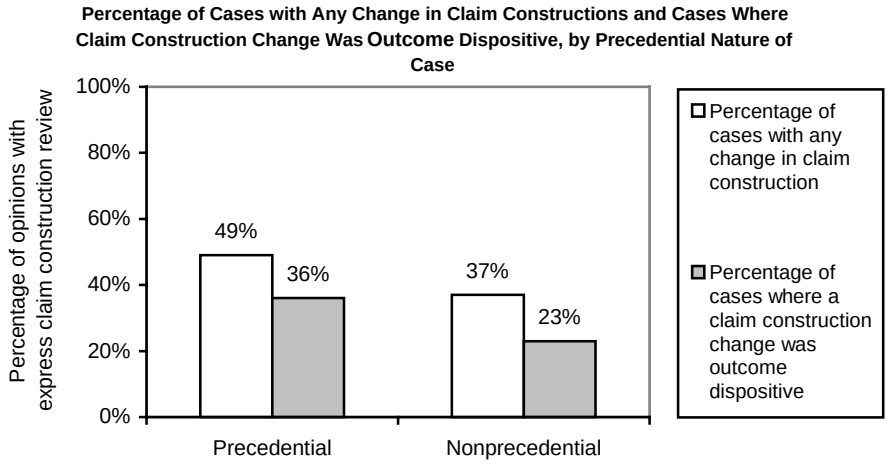
191. This calculation omitted procedural decisions involving issues such as writs of mandamus because their inclusion would substantially distort the *chi-square* test and they are of less interest to practitioners.

192. *See* Michel, *supra* note 118, at 1187.

2. Precedential Decisions and Reversal Rates: *Claim Construction*

Since there is a relationship between the precedential status of the Federal Circuit's written decisions and the rate of reversal, it is possible that certain classes of opinions have higher rates of claim construction changes. Table E-2 and Figure E-2 illustrate the result of this inquiry.

Figure E-2



As Figure E-2 illustrates, the Federal Circuit changed the lower court's claim construction in close to half of the precedential cases (44 of 90 opinions). Of those cases, almost three-quarters were reversed. The court showed more restraint in nonprecedential decisions. Only 37% (33 of 89 decisions) of the nonprecedential cases were subject to any change in claim construction, 61% of which were reversed. This study then tested*:*

> *Hypothesis E-2:* There is no difference in the likelihood that the Federal Circuit will modify the lower court's claim construction if the decision is precedential or nonprecedential.

The *chi-square* test p-value was 0.11052. It is thus inappropriate to reject the null hypothesis and to conclude that a relation exists between precedential opinions and the likelihood the court would modify the lower court's claim construction.

Nonetheless, the data indicates that the Federal Circuit has changed outcome dispositive claim constructions more often in precedential cases during the period covered by this study. It is possible that, within the studied population, the higher reversal rate of precedential cases may be

caused by the higher rate of change in claim constructions. Whether this notion applies beyond the current dataset, this study cannot say.

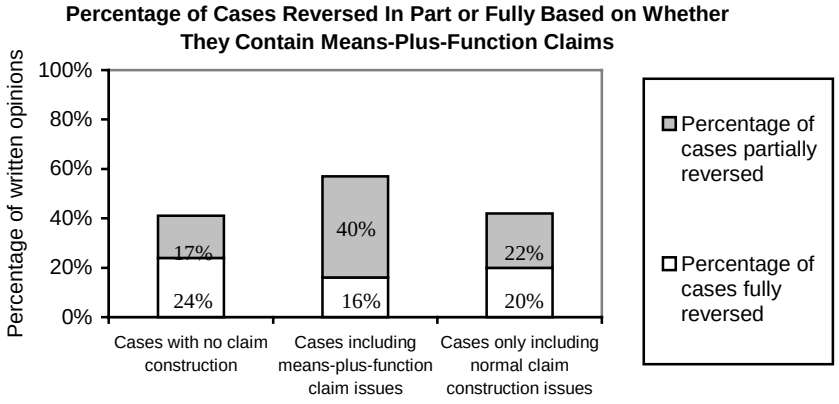
F. The Inclusion of a Means-Plus-Function Issue Affects the Likelihood of Reversal and Claim Construction Modifications

Unpredictability could also arise from the complexity of the case law. In the field of claim construction, arcane rules[193] govern the interpretation and application of means-plus-function claims under 35 U.S.C. § 112(6) ("112(6)").[194] If the complexity of the law affects the rate of reversal and claim construction change, the Federal Circuit should correct means-plus-function claim interpretation more often than normal claims.

1. Means-Plus-Function Claims and Reversal: All Issues

To evaluate this possibility, this study first determined the Federal Circuit's reversal rate in cases raising at least one issue relating to a 112(6) claim.[195] Those results are provided in Table F-1 in Appendix B and Figure F-1 below.

Figure F-1



193. *See* Patrick J. Flinn, *Claim Construction Trends in the Federal Circuit*, 572 PLI/PAT 317, 336-44 (1999) (discussing rules governing 112(6) jurisprudence).

194. Title 35 U.S.C. § 112(6) provides that a claim element could be expressed as a "means or step for performing a specified function." 35 U.S.C. § 112(6) (1994). This provision eliminates the need to recite structural terms that may be unnecessarily cumbersome or inadequate to describe an element of a claim, but requires that the patent specification describe some structure that performs the specified function. *See id; see also* Valmont Indus., Inc. v. Reinke Mfg. Co., Inc., 983 F.2d 1039, 1041-42 (Fed. Cir. 1993) (explaining the history and limiting effect of 35 U.S.C. § 112(6)).

195. This section only analyzed written opinions because summary affirmance cases lack the discussion necessary to ascertain whether they included a means-plus-function claim construction issue.

The Federal Circuit reversed 56% of cases (32 out of 57) that included means-plus-function claim issues. This proportion is substantially greater than in cases with no means-plus-function claim interpretation or cases without any claim construction. In those categories, only about 41 to 42% of cases were reversed. For predictive purposes, this study tested:

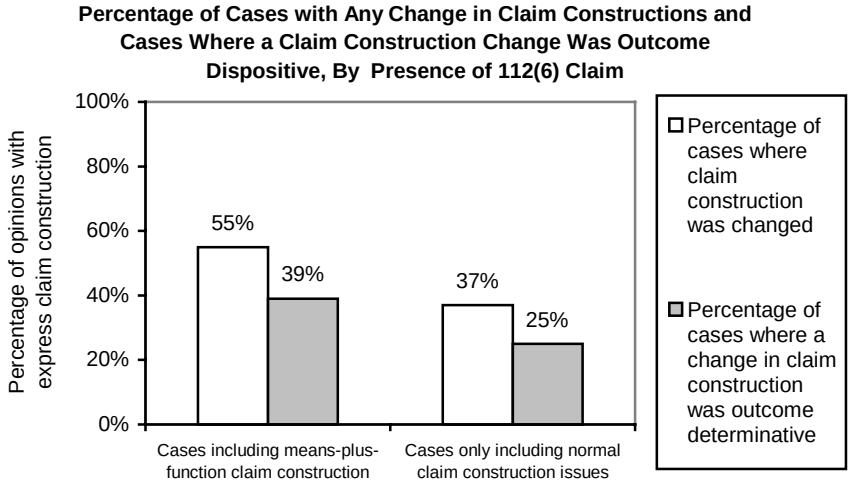
> *Hypothesis F-1:* Appealed cases containing means-plus-function claims are not more likely to be reversed.

The *chi-square* test p-value was 0.05, which matches the accepted p-value for a 95% confidence level. Therefore, it is possible to reject the null hypothesis and predict that whether an appealed case contains means-plus-function claims relates to its likelihood of being reversed by the Federal Circuit. However, it is also possible that a factor unrelated to claim construction led to those reversals. To eliminate that possibility, it is necessary to examine whether a claim construction modification was correlated to those reversals.

2. Means-Plus-Function Claims and Reversal: Claim Construction

Table F-2 in Appendix B and Figure F-2 illustrate the rates at which the Federal Circuit changed the lower court's claim constructions in cases with means-plus-function claims.

Figure F-2



The Federal Circuit modified claim interpretation in 55% of cases that included means-plus-function claims (31 out of 56 cases),[196] while cases with normal claims (42 out of 114 cases) were modified only 37% of the time. The proportion of cases in which a claim construction change was outcome determinative stood at 39% and 25% respectively. To determine whether any predictive value exists in this data, this study then tested:

> *Hypothesis F-2:* The Federal Circuit is not more likely to change a claim construction in appealed cases containing means-plus-function claims.

The *chi-square* test p-value was 0.072. This p-value indicates that the null hypothesis may be rejected with 90% confidence, but not at a 95% confidence level. Therefore, the presence of a means-plus-function claim is a weak predictor that the Federal Circuit will change at least one claim interpretation in a particular case.

3. Implications

Hence, an appellant dealing with a patent containing a means-plus-function claim has a good chance of success on appeal because the Federal Circuit is more likely to reverse and to change the interpretation of claim terms in such cases. Yet, why should cases containing 112(6) claims be subject to a more stringent treatment? The de novo standard of review cannot solely account for this discrepancy since it applies to cases with and without means-plus-function claims. A likely answer is that the arcane rules of 112(6) case law add substantial complexity to this area of patent law and thus increase the chance of reversible errors.

Although the Federal Circuit has made great strides in developing the law applicable to 112(6) claims,[197] substantial ambiguity remains. For example, the court has adopted a test to determine when a claim is subject to the special 112(6) rules:[198] If the word "means" appears in a claim element

---

196. The number of opinions here differs from the previous page (56 cases here compared to 57 cases in the previous page) because one opinion included in the previous page's data dealt with a means-plus-function claim without construing it. *See* Odetics, Inc. v. Storage Tech. Corp., 185 F.3d 1259 (Fed. Cir. 1999) (finding that the district court's infringement analysis and determination of equivalence misconstrued Federal Circuit precedent in *Chiuminatta Concrete Concepts, Inc. v. Cardinal Industries, Inc.*, 145 F.3d 1303 (Fed. Cir. 1998)). In *Odetics*, the Federal Circuit discussed claim constructions but only to reiterate its construction from an earlier appeal. *See Odetics*, 185 F.3d at 1259.

197. *See* Flinn, *supra* note 193, at 336-44 (discussing recent developments in the Federal Circuit's 112(6) jurisprudence).

198. Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1583 (Fed. Cir. 1996).

in combination with a function, the court will presume that 112(6) rules apply to that claim.[199] That presumption is rebuttable upon showing that the claim itself recites sufficient structure or material for performing the claimed function.[200] Conversely, a claim element without the word "means" would not fall within the ambit of 112(6), unless it invokes purely functional terms without any recital of specific structure or material for performing that function.[201] Although simple in formulation, the rule is harder to apply. In *Mas-Hamilton Group v. LaGard Inc.*,[202] the court found that the claim term "lever moving element" was a means-plus-function element because it was described in term of its function, not its mechanical structure.[203] However, in *Al-Site Corp. v. VSI, Int'l*,[204] the Federal Circuit concluded that the term "eyeglass hanger member" fell outside the scope of 112(6) because the claim recited sufficient structure.[205] The presence of sufficient structure appears to remain in the eye of the beholder.

Deciding what constitutes a disclosed or equivalent structure can present a substantial challenge to lower courts wrestling with the complexity of the law. In *B. Braun Medical, Inc. v. Abbott Laboratories*,[206] the court held that a "corresponding structure" must clearly link or associate that structure to the function recited in the claim, and must be specific enough to meet the definiteness requirement of section 112.[207] As simple as the rule sounds, what constitutes a "clear link" remains ambiguous. For example, the *B. Braun* court ruled that merely mentioning another embodiment of the disputed function was an insufficient link.[208] Thus, what constitutes "clear linking" remains to be determined.

Moreover, the ambiguous overlap of equivalence under 112(6) and the doctrine of equivalents has added to the complexity of construing means-

199. *See id.*; *see also* Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1320 (Fed. Cir. 1999).

200. York Prods., Inc. v. Central Tractor Farm & Family Ctr., 99 F.3d 1568, 1574 (Fed. Cir. 1996); Cole v. Kimberly-Clark Corp., 102 F.3d 524, 530-31 (Fed. Cir. 1996).

201. Personalized Media Communications, Inc. v. Int'l Trade Comm'n, 161 F.3d 696, 704 (Fed. Cir. 1998)

202. 156 F.3d 1206 (Fed. Cir. 1998).

203. *Id.* at 1213-15.

204. 174 F.3d 1308 (Fed. Cir. 1999).

205. *Id.* at 1318-19.

206. 124 F.3d 1419 (Fed. Cir. 1997).

207. *Id.* at 1424.

208. *Id.*

plus-function claims.[209] In *Chiuminatta Concrete Concepts, Inc. v. Cardinal Industries, Inc.*,[210] the Federal Circuit clarified that a lack of literal infringement under 112(6) *may* preclude a finding of equivalence under the doctrine of equivalents,[211] depending on whether the equivalent relies on a technology known at the time the patent issued.[212] Although the Federal Circuit reached an appropriate balance between preserving the doctrine of equivalents for the patentee and providing sufficient notice to competitors,[213] it also added substantial complexity to an already difficult area of law. Even if the 112(6) rules are reasonably clear to Federal Circuit judges and members of the patent bar, those canons may appear bewildering and perplexing to generalist trial court judges.

In addition to those complex rules, whether the disputed claim falls within the scope of 112(6) is reviewed by the Federal Circuit de novo. Since *Markman I*,[214] the Federal Circuit has carefully avoided deciding whether 112(6) equivalence is a question of law or fact.[215] However, the court has unequivocally held that a determination of whether claim language invokes 112(6) is a claim construction issue reviewed de novo as a

---

209. These two doctrines are related but different. *See, e.g.*, Endress + Hauser, Inc. v. Hawk Measurement Sys. Pty. Ltd., 122 F.3d 1040, 1043 (Fed. Cir. 1997):

> Though it is well understood that 'equivalents' under § 112 P 6 is a different concept from 'equivalents' under the judicially created doctrine of equivalents, the district judge correctly recognized that the statutorily required construction under § 112 P 6 must proceed on a limitation-by-limitation basis, not dissimilar to the analysis under the doctrine of equivalents.

210. 145 F.3d 1303 (Fed. Cir. 1998).

211. *Id.* at 1310 ("Thus, a finding of a lack of literal infringement for lack of equivalent structure under a means-plus-function limitation may preclude a finding of equivalence under the doctrine of equivalents.").

212. *Id.* at 1311 ("[W]here the equivalence issue does not involve later-developed technologies, but rather involves technology that predates the invention itself . . . a finding of nonequivalence for § 112, P 6, purposes should preclude a contrary finding under the doctrine of equivalents.").

213. *See* Jason Schultz, Note, *Chiuminatta Concrete Concepts Inc. v. Cardinal Industries, Inc. & Dawn Equipment Co. v. Kentucky Farms, Inc.*, 14 BERKELEY TECH. L.J. 173, 185-90 (1999) (discussing the policies advanced by the Federal Circuit's holding in *Chiuminatta*).

214. Markman v. Westview Instruments, Inc., 52 F.3d 967, 977 n.8 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 ("As that issue is not before us today, we express no opinion on the issue of whether a determination of equivalents under § 112, para. 6 is a question of law or fact.").

215. *See Chiuminatta*, 145 F.3d 1303 at 1309; Cybor Corp. v. FAS Techs., 138 F.3d 1448, 1457 n.7 (Fed. Cir. 1998) (en banc).

matter of law.[216] Thus, the resolution of a 112(6) question will not be final until the Federal Circuit rules on it.

In sum, the complexity of the case law compounds the existing unpredictability arising from the de novo standard. If *Markman I* aimed to foster predictability and certainty, the area of means-plus-function case law stands as a remarkable disappointment.

G. Although the Federal Circuit Expressly Construes Claims in Most Infringement Cases, it does not do so for a Substantial Proportion of Invalidity Reviews

In *Markman I*, the Federal Circuit ruled that "the court has the power and obligation to construe as a matter of law the meaning of language used in the patent claim."[217] Since then the Federal Circuit has vigorously applied that decree[218] both to infringement analyses[219] and to invalidity challenges.[220] Despite this requirement, many cases involving invalidity appeals lack any express claim construction.[221]

---

216. Rodime v. Seagate Tech., Inc., 174 F.3d 1294, 1302 (Fed. Cir. 1999) ("Whether certain claim language invokes 35 U.S.C. § 112, P(6) is an exercise in claim construction and is therefore a question of law . . . ."); Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed. Cir. 1998) ("A determination of corresponding structure, therefore, is a determination of the meaning of the 'means' term in the claim and is thus also a matter of claim construction.").

217. *Markman I*, 52 F.3d at 979.

218. *E.g.*, Digital Biometrics v. Identix, Inc., 149 F.3d 1335, 1343 (Fed. Cir. 1998); Festo Corp. v. Shoketsu Kizoku Kogyo Kabushiki Co., 72 F.3d 857, 863 (Fed. Cir. 1995) *vacated and remanded on other grounds*, 520 U.S. 1111 (1997) (stating that the Federal Circuit's law requires an "independent determination of the construction of the claims, as a matter of law, unencumbered by the trial process.").

219. *See, e.g.*, K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1362 (Fed. Cir. 1999) ("An infringement analysis is a two-step process in which the court first determines, as a matter of law, the correct claim scope, and then compares the properly construed claim to the accused device to determine, as a matter of fact, whether all of the claim limitations are present in the accused device, either literally or by a substantial equivalent."); *see also* Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1247-48 (Fed. Cir. 1998); General Mills, Inc. v. Hunt-Wesson, Inc., 103 F.3d 978, 981 (Fed. Cir. 1997); Young Dental Mfg. Co. v. Q3 Special Prods., Inc., 112 F.3d 1137, 1141 (Fed. Cir. 1997).

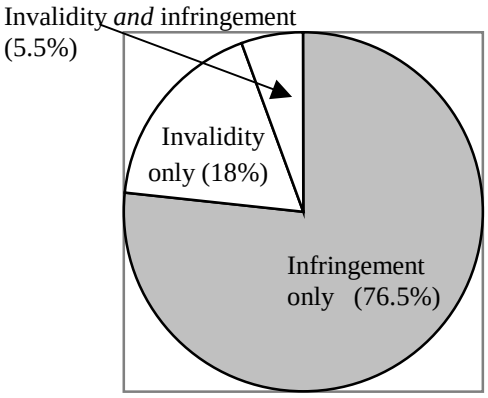
220. *See, e.g.*, SIBIA Neurosciences, Inc. v. Cadus Pharm. Corp., 225 F.3d 1349, 1355 (Fed. Cir. 2000) ("[T]he first step in any invalidity analysis is claim construction, an issue of law that this court reviews de novo."); Rockwell Int'l Corp. v. United States, 147 F.3d 1358, 1362 (Fed.Cir.1998) ("The first step in any invalidity . . . analysis is claim construction.").

221. *See, e.g.*, Mitsubishi Elec. Corp. v. Ampex Corp., 190 F.3d 1300 (Fed. Cir. 1999); Brasseler, U.S.A. L.L.P. v. Stryker Sales Corp., 182 F.3d 888 (Fed. Cir. 1999); *In re* Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH, 139 F.3d 877 (Fed. Cir. 1997).

1. Frequency of Claim Construction Reviews: All Issues

This study undertook to determine, within the studied population, how often the Federal Circuit has refrained from expressly construing the claims-in-suit in an invalidity challenge.[222] In particular, this study aimed to quantify the percentage of cases in which claim construction addressed infringement only, invalidity only, or invalidity *and* infringement issues. Table G-1 in Appendix B provides this result, which is depicted in Figure G-1 below.

Figure G-1



Percentage of Cases in which the Federal Circuit's Express Claim Construction Addressed Only Infringement, Only Invalidity, or Both Invalidity *and* Infringement Issues

Figure G-1 shows that, in an overwhelming number of opinions expressly reviewing claim construction (137 out of 179 cases, or 76.5%), the Federal Circuit *only* construed the claims in the infringement context. In a smaller fraction of such cases, the court's claim interpretation exclusively involved invalidity issues (32 cases, or 18%). Of the 32 cases involving invalidity issues, only nine came from the BPAI while the rest originated from district courts. Interestingly, barely 5.5% of cases involved claims construction expressly focusing on both infringement and invalidity issues.

These results raise the possibility that this study's population contained a disproportionate number of infringement issues relative to invalidity decisions. To control for this possibility, this study also analyzed all issues addressed in each opinion. In particular, those tabulated issues included infringement, invalidity, inequitable conduct, and others such as

222. In general, litigants may challenge the validity of a patent under 35 U.S.C. §§ 101 (patentable subject matter and utility), 102 (anticipation and statutory bars), 103 (obviousness), and 112 (required disclosure). *See* ROBERT P. MERGES ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 131 (2d ed. 2000).

antitrust or procedural rulings. The result appears in Table G-2 in Appendix B below.

Table G-2

Issues considered by the Federal Circuit	Number of cases	Percentage of cases
infringement only	77	19%
invalidity only	69	17%
inequitable conduct only	4	1%
other only (e.g., antitrust, procedural)	123	31%
infringement & invalidity	20	5%
infringement & inequitable conduct	2	1%
infringement & other	42	11%
invalidity & inequitable conduct	5	1%
invalidity & other	13	3%
inequitable conduct & other	8	2%
infringement, invalidity, & inequitable conduct	6	2%
infringement, invalidity & other	17	4%
infringement, inequitable conduct & other	2	1%
invalidity, inequitable conduct & other	2	1%
invalidity, infringement, inequitable conduct, & other	6	2%
Total	**396**	**100%**

Table G-2 indicates that 43% of written opinions (172 out of 396) involved infringement issues, 35% of cases (138 out of 396) dealt with invalidity challenges, 9% of cases (35 out of 396) addressed inequitable conduct problems, and 54% of cases (213 of 396) included at least one other issue such as antitrust or procedural questions.[223]

Two facts are apparent from this data. First, the Federal Circuit expressly construed patent claims in an overwhelming 85% of all infringe-

223. Because many cases included more than one type of tabulated issue, there were inevitable overlaps in the summaries of the different issues reviewed by the Federal Circuit.

ment opinions.[224] The remaining 15% lacking any claim construction is generally attributable to instances where the court had construed claims in a previous decision.[225] Second, the court failed to expressly construe the patent claims in most invalidity cases. In fact, it expressly construed the claims in only 30% of written opinions involving invalidity challenges.[226] After discounting the nine cases appealed from the BPAI and the ITC,[227] only 22% of invalidity cases appealed from district courts benefited from an express claim construction by the Federal Circuit. In sum, the results portrayed in Figure G-1 illustrate the issues covered by the Federal Circuit's claim construction.

These results suggest that the Federal Circuit may not have complied with the letter of the law decided in *Markman I.* Since that decision, the court has repeated the tenet that the first step in any invalidity or infringement analysis must be claim construction.[228] Yet, when it comes to applying that precept, the court has only complied with part of that rule. As the data above indicate, in general, the Federal Circuit expressly reviewed the lower court's claim constructions in opinions involving an infringement allegation, but failed to do so for invalidity decisions. Claim construction, however, is an integral part of an invalidity inquiry,[229] especially on issues

---

224. This number was obtained as follows: the total number of infringement cases where the court construed claims, 147 cases (137 cases whose claim construction issue focused only on infringement, and 10 cases with both infringement and invalidity), was divided by the total number of written opinions involving infringement issues, i.e.,172 possible cases. The resulting 85% of infringement cases include: (a) decisions whose claim construction only involved infringement, and (b) decisions involving both infringement and invalidity issues.

225. *See, e.g.*, Kamyr, Inc. v. Clement, No. 98-1557, 1999 U.S. App. LEXIS 30706 (Fed. Cir. Nov. 29, 1999); Bradshaw v. Igloo Prods. Corp., No. 98-1157, 1998 U.S. App. LEXIS 23347 (Fed. Cir. Sept. 18, 1998).

226. This number was obtained as follows: the total number of infringement cases where the court construed claims, 42 cases (32 cases with invalidity only and 10 cases with infringement and invalidity) was divided by the total number of written opinions involving invalidity issues, i.e., 138 possible cases.

227. Eleven cases involving invalidity issues were appealed from the BPAI (9 cases) and the ITC (2 cases) during the period covered by the study.

228. *See, e.g.*, Rockwell Int'l Corp. v. United States, 147 F.3d 1358, 1362 (Fed. Cir. 1998) ("The first step in any invalidity or infringement analysis is claim construction.").

229. *See, e.g.*, Beachcombers Int'l, Inc., v. WildeWood Creative Prods., Inc., 31 F.3d 1154, 1160 (Fed. Cir. 1994). The court Noted:

> MacCarthy argues that the trial court erred in denying its motion for JMOL on the anticipation and obviousness questions. We begin with the language of the claims. The first step involves the proper interpretation of the claims. The second step involves determining whether the

relating to anticipation under 35 U.S.C. § 102(a),[230] on-sale bar under 35 U.S.C. § 102(b),[231] obviousness under 35 U.S.C. § 103,[232] or enablement under 35 U.S.C. § 112.[233]

Although it is impossible to know definitively, a possible explanation for this practice are prudential concerns favoring judicial economy in deciding cases. If the court can dispose of an invalidity issue based on the facts of the case, there is no need to expend considerable judicial time and resources construing patent claims. By doing so, the court need not reach an issue that is unnecessary to the disposition of the case on its merits. In contrast, infringement cases require an interpretation of the claim's scope before determining whether the accused device or action falls within the ambit of the claim.[234] Alternatively, this practice may be based on the litigation strategies of the parties' attorneys. For instance, if the attorneys base their invalidity contentions on the facts of the case, the Federal Circuit may prudentially choose to limit its decision to those factual underpinnings instead of focusing on claim construction. Although further study is required to elucidate the underlying reasons for this practice, these theories may explain the disparity in the Federal Circuit's approach to reviewing claim interpretations.

Regardless of the reasons underlying this practice, the express construction of the litigated claims is imperative to adequately fulfill the public notice requirement of patents. Once the court has delineated the metes and bounds of a disputed, but valid, patent the patentee's competitors can assess their options. By deferring the construction of the claims until such interpretation becomes relevant, the Federal Circuit only postpones often inevitable decisions, wastes substantial resources at the trial court level,

---

> limitations of the claims as properly interpreted are met by the prior art, and in particular by Bennett's ODYLIC device.

Id.

230. *See, e.g.*, Union Oil Co. v. Atlantic Richfield Co., 208 F.3d 989, 995 (Fed. Cir. 2000) ("The first step in any invalidity . . . analysis is claim construction."); Atlas Powder Co. v. IRECO, Inc., 190 F.3d 1342, 1346 (Fed. Cir. 1999) ("The first task of this court on appeal is to construe independently the disputed claim term.").

231. *See, e.g.*, STX, LLC v. Brine, Inc., 211 F.3d 588, 591 (Fed. Cir. 2000) (construing disputed claim's preamble to decide a § 102(b) on-sale bar issue).

232. *See, e.g.*, Rockwell Int'l Corp. v. United States, 147 F.3d 1358, 1362 (Fed. Cir. 1998); *In re* Dance, 160 F.3d 1339, 1344-45 (Fed. Cir. 1998) (construing claims in affirming BPAI's obviousness rejection).

233. *See, e.g.*, Nat'l Recovery Techs. Inc. v. Magnetic Separation Sys., Inc., 166 F.3d 1190, 1194-95 (Fed. Cir. 1999) (construing claims in deciding whether a claim was enabled under § 112(1).

234. *See, e.g.*, Rodime PLC v. Seagate Tech., Inc., 174 F.3d 1294, 1302 (Fed. Cir. 1999).

and forces new defendants to bear the expenses of litigation merely because the contours of that patent remain undetermined. For the sake of public notice and overall judicial efficiency, the court should expressly construe all pertinent claims in the context of an invalidity challenge.[235]

2. Frequency of Claim Construction Reviews: *Invalidity v. Infringement*

Knowing that the Federal Circuit selectively construed the claims, the remaining step was to determine whether the particular issue—such as infringement or invalidity—influenced the rate at which the Federal Circuit changed lower tribunals' claim constructions. If a change occurred, it was imperative to ascertain whether the modification was outcome dispositive. Table G-3 and Figure G-3 present this result.

---

235. A practitioner commented that this argument asked the Federal Circuit to provide an "advisory opinion." By clearly construing the claims, the court would not provide any "advisory opinion" per se. An issue involving an advisory opinion arises when [1] a federal court answers an inquiry from a coordinate branch of the federal government about the legality of some contemplated conduct, see *Muskrat v. United States*, 219 U.S. 346 (1911); [2] there is no adversity between the parties seeking a resolution of a concrete and bona fide dispute, see *United States v. Johnson*, 319 U.S. 302 (1943); or [3] a federal court's decision is liable to be overturned by one of the coordinate branches, see *Plaut v. Spendthrift Farms, Inc.*, 514 U.S. 211 (1995). Here, the Federal Circuit neither answers an inquiry from a coordinate branch nor risks having its decision overturned by Congress or the Executive branch. In addition, the court would construe the claims in a bona fide infringement suit brought by adverse parties. Finally, this practice may advance some of the public policies underlying the Supreme Court's opinion in *Cardinal Chemical Co. v. Morton International, Inc.*, 508 U.S. 83, 99-102 (1993) (discussing the importance of preserving the litigant's desire to preserve the value of its judgment, the public's strong interests in the finality of judgments in patent litigation and in resolving the patent's validity, and the patentee's interests in having the validity issue correctly adjudicated and in avoiding the loss of its patent's practical value).

Figure G-3

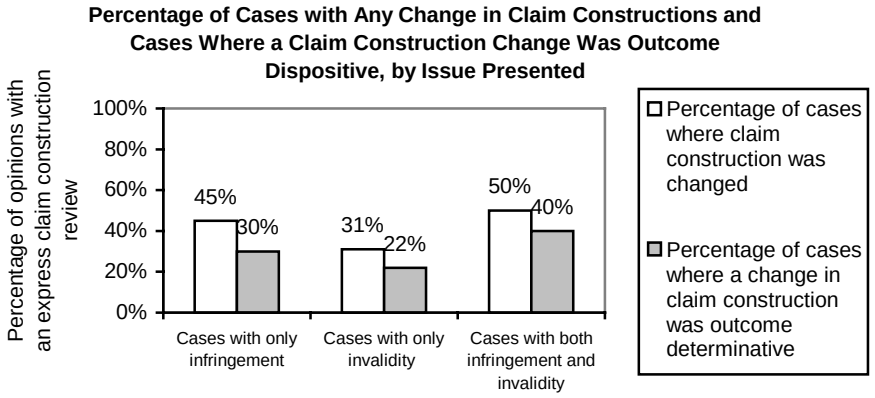


Figure G-3 indicates that the court modified the lower court's claim interpretation in almost half of all cases (62 out of 137 cases, or 45%) where the claim construction review only focused on infringement issues. However, a little more than one-third of decisions (10 out of 32 cases, or 31%) concerned with invalidity issues underwent any claim construction change on appeal. Finally, the court modified the claim interpretation in exactly half of the decisions (50%, or 5 out 10 cases) where the claim construction involved both invalidity and infringement issues. To determine whether this result bears any predictive value, this study tested*:*

> *Hypothesis G-1:* There is no difference in the likelihood that the Federal Circuit will modify the lower court's claim construction when the issues on appeal consist of infringement only, invalidity only, and invalidity and infringement.

The *chi-square* test p-value was 0.4603. Since the experimental p-value was greater than a p-value for a 95% confidence level, this study cannot predict with confidence that the Federal Circuit would decide differently based on which issue was included in the appeal.

In the minority of infringement and invalidity cases where the Federal Circuit modified a claim construction, it usually reversed the trial court's judgment. When the claim construction issue exclusively focused on infringement, the court reversed two-thirds (41 of 62 cases, or 66%) of the decisions. In other words, a litigant whose case only involved an infringement issue had a 34% chance that the Federal Circuit would reverse the case on the basis of erroneous claim constructions. By contrast, once the court changed the claims' meanings in a case where the only claim construction dispute centered on invalidity, there was a 70% chance of re-

versal. Finally, where the appealed claim construction issues involved both infringement and invalidity, the court reversed a staggering 80% of those cases. In sum, a litigant who wisely chose the issues he appealed could have increased his chances of success during the period covered by this study.

V. CONCLUSION

Based on a systematic examination of Federal Circuit decisions since early 1998 and the application of statistical methods, this study offers counter-intuitive results. Although the Federal Circuit has in aggregate reversed a smaller proportion of cases based on claim construction than before 1998, there is a trend showing an increase in claim construction modifications and claim interpretation-based reversals since *Cybor Corp.* This is the outcome that Judge Rader had warned against in his dissent. Underscoring this point is the fact that the de novo standard could explain the relationship between the type of judgment appealed and the likelihood of reversal and claim construction modification. In addition, some negative data, although not linking the review standard to the reversals or changes in interpretation, narrows the list of possible causes for the increase in claim construction modifications and related reversals. Indeed, the particular tribunal from which a case originates does not seem to affect the likelihood of reversal or claim construction modification, nor does the identity of the Federal Circuit judge who authors the majority decision appear to influence the outcome of the appeal. Of course, it is inappropriate to blame the standard of review for everything. For example, the relationship between the probability of reversal and whether a case is precedential has little relevance to any standard of review. Furthermore, other factors also contribute to the higher rates of reversal and claim construction change. As the discussion on means-plus-function claims indicates, the complexity of the law may bear part of the blame. Finally, if the Federal Circuit wishes to provide more predictability and clarity, it should practice what it preaches, and expressly construe the claims in invalidity challenges in the same proportion as for infringement reviews. In sum, the goal of greater predictability and certainty remains a tantalizing dream. Perhaps Justice Holmes summarized it best when he said, "[s]o in the broadest sense it is true that the law is a logical development, like everything else. . . . But certainty generally is illusion, and repose is not the destiny of man."[236]

---

236. HOLMES, *supra* note 1, at 705.

VI. APPENDIX A: EXTRAPOLATING A MORE COMPLETE PICTURE OF CLAIM CONSTRUCTION-BASED REVERSALS BY INCLUDING SUMMARY AFFIRMANCES IN THE ANALYSIS

Several practitioners shared their concerns that the methodology used in analyzing claim construction issues may not provide a complete picture because the approach only focuses on written opinions while excluding summary affirmances. Indeed, summary affirmance orders constituted 106 cases, or 21%, of the studied population.[237] Because at least some of the summary affirmance decisions must involve claim interpretation, the exclusion of these rulings may lead to an overcount of claim construction changes and reversals in this study.

By their nature, summary affirmance decisions provide no detail as to the Federal Circuit's reasoning and no information about claim construction.[238] Unfortunately, there is no efficient approach for determining the prevalence of claim construction issues in these summary affirmance decisions. Given the one-line order that is common to summary affirmance rulings, such determination cannot rely on the Federal Circuit's decision itself. Relying on an analysis of the lower tribunals' opinion in these summary affirmances is not feasible either. A random or systematic sampling of these lower tribunals' decisions is difficult because the LEXIS system does not contain all of those opinions. Hence, any sampling attempt would inevitably encounter a situation where the desired lower court's opinion is not available. Either ignoring or including that particular case would inevitably flaw the analysis. The same problem would plague any attempt at conceptualizing such analysis as a "population study;" those lower courts' opinions would still be missing. Although it is possible to request those missing slip opinions from the individual tribunals around the country, such approach would be logistically difficult and unduly burdensome.

However, it is possible to ascertain a range within which the actual number of claim construction-based reversals would fall.[239] On one end of

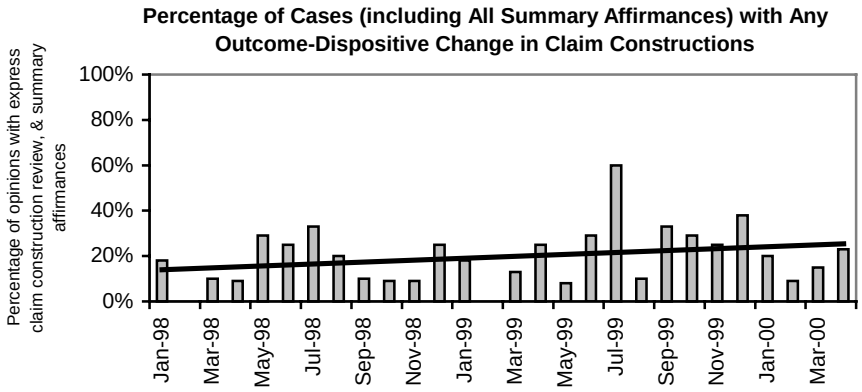
237. *See* Part IV.E *supra*.

238. In other words, by their very nature, summary affirmances do not involve any express claim construction review, since there is no expressed discussion of the issues involved in the case.

239. The author is indebted to Professor Lemley for the design of this elegant extrapolation approach.

the spectrum, Figure A-4 above presents the analysis that excludes summary affirmances. On the other end, Table App-1 in Appendix B and Figure App-1 below include all summary affirmances.[240]

Figure App-1



To determine whether there is a pattern over time, a trend line generated based on a least-square analysis was superimposed on Figure App-1. As in Figure A-4, the trend line's ascending slope suggests that, over time, there is an increase in the total number of cases with outcome-dispositive changes in claim construction. The calculated value of the correlation coefficient was +0.27047, suggesting a small correlation between the passage of time and this inclusive rate of claim construction-based reversal by the Federal Circuit. To determine whether this trend is statistically significant or merely an artifice, the following hypothesis was tested:

> *Hypothesis App-1:* There is no correlation between the passage of time and the rate of reversal based on change in claim construction (data including all summary affirmances) by the Federal Circuit.

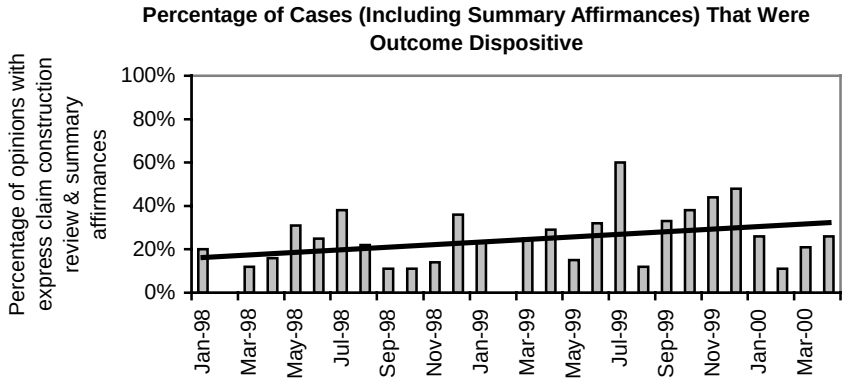
The significance *t* of this correlation coefficient was +1.4325. The critical value of *t* with 28 independent variables, at a 95% level of significance in a one-tail test, is +1.706. Because the significance *t* of the correlation coefficient is smaller than the critical value (+1.4325< +1.706), the null hypothesis above cannot safely be rejected.

---

240. Figure App-1 takes the same number of cases with changed claim constructions as in Figure A-4, but adds the summary affirmance decisions to the denominator. Because the number of summary affirmances differs from month-to-month, the resulting graph will inevitably differ from Figure A-4.

Although the trend in Figure App-1 is inconclusive, Figures A-4 and App-1 provide a range within which the true percentage of claim interpretation-based reversals must reside. One *nonstatistical* approach for estimating this true percentage is to postulate that there is the same percentage of claim construction issues in the 106 summary affirmance decisions as in the larger population of written opinions.[241] Given that 179 out of 396 opinions involved an express claim construction review, this postulated approach suggests that 45% of summary affirmances must also include such review. Out of that 45%, a smaller proportion involved a change in claim construction and an even smaller number resulted in claim interpretation-based reversals. Table App-2 in Appendix B provides this extrapolated data. Once the effects of summary affirmances are estimated and included in the analysis, the data indicates that the Federal Circuit changes claim interpretations in an average of 35% of all cases. This average is nine percent lower than the 44% reported in Part IV.A.2 *supra*.[242] Looking at claim-construction reversal rates, Table App-2 indicates that the Federal Circuit reversed 24% of cases involving claim construction reviews. Surprisingly, this is a mere five percent difference compared to the 29.6% average reported above.[243] Figure App-2 depicts the percentage of reversals based on claim constructions over the twenty-eight months in this study.

Figure App-2



241. This statement may not necessarily be accurate because summary affirmances may have more pro se cases where at least one of the parties lacked the requisite skills to present his case, or may involve more jurisdictional or procedural matters than in the population of written opinions.

242. The 35% average includes summary affirmances and written opinions, while the 44% average arises from an analysis of just written opinions.

243. *See* Part IV.A.2 *supra*.

As in Figures A-4 and App-1, the superimposed trend line suggests an upward inclination in the rate of outcome dispositive changes in claim construction as time passes. Again, it was necessary to assess the possibility that this trend may be within the margin of error. Thus, this null hypothesis was tested:

> *Hypothesis App-2:* There is no correlation between the passage of time and the rate of outcome dispositive claim construction changes (including summary affirmances).

The Pearson's correlation coefficient for this dataset is +0.356476, and the significance *t* is +1.9454879. When compared to the critical value of *t* for a 95% confidence level in a one-tail test (t_c= +1.706), it is possible to reject the null hypothesis because $t > t_c$ (i.e., +1.9454876> +1.706). In sum, within the studied period and when summary affirmances are included in the analysis, the passage of time was correlated to an increase in the number of cases in which a change in claim construction was outcome dispositive.

A methodological caveat is imperative here. The data presented in Table App-2 and Figure App-2 departed from the normal statistical methodology because there was no simple way for determining the requisite proportion of summary affirmance cases that involved claim construction-based reversals. For the data and analysis in this Appendix, this study adopted a nonstandard and nonstatistical approach in order to approximate the true percentage ofclaim construction-based reversals. Therefore, Table App-2 and Figure App-2 are only "educated guesses." The true answer lies within the range provided by Figures A-4 and App-1. Nonetheless, the estimated data still indicates an ascending trend in claim construction changes and claim interpretation-based reversals over time, with averages that are still too high for comfort.

VII. APPENDIX B*:* TABLES & DATA

1. Table A-1: *Rate of Case Disposition Over Time*

	Including Summary Affirmances				**Excluding Summary Affirmances**			
month & year	**% affd**	**% revd**	**% rev part**	**% tot revd**	**% affd**	**% revd**	**% rev part**	**% tot revd**
Jan-98	63%	19%	19%	38%	57%	21%	21%	43%
Feb-98	79%	14%	7%	21%	50%	33%	17%	50%
Mar-98	64%	27%	9%	36%	58%	32%	11%	42%
Apr-98	61%	22%	17%	39%	36%	36%	27%	64%
May-98	42%	42%	17%	58%	36%	45%	18%	64%
Jun-98	57%	14%	29%	43%	57%	14%	29%	43%
Jul-98	47%	27%	27%	53%	38%	31%	31%	62%
Aug-98	50%	11%	39%	50%	44%	13%	44%	56%
Sep-98	63%	11%	26%	37%	61%	11%	28%	39%
Oct-98	85%	0%	15%	15%	80%	0%	20%	20%
Nov-98	88%	0%	13%	13%	80%	0%	20%	20%
Dec-98	63%	19%	19%	38%	50%	25%	25%	50%
Jan-99	76%	12%	12%	24%	69%	15%	15%	31%
Feb-99	92%	8%	0%	8%	87%	13%	0%	13%
Mar-99	7 9%	1 1%	1 1%	2 1%	5 6%	2 2%	2 2%	4 4%
Apr-99	4 1%	3 2%	2 7%	5 9%	3 5%	3 5%	3 0%	6 5%
May-99	6 5%	2 4%	1 2%	3 5%	2 5%	5 0%	2 5%	7 5%
Jun-99	3 8%	1 3%	5 0%	6 3%	2 3%	1 5%	6 2%	7 7%
Jul-99	5 0%	3 5%	1 5%	5 0%	5 0%	3 5%	1 5%	5 0%

Aug-99	55%	30%	15%	45%	47%	35%	18%	53%
Sep-99	56%	28%	17%	44%	56%	28%	17%	44%
Oct-99	70%	10%	20%	30%	57%	14%	29%	43%
Nov-99	71%	14%	14%	29%	56%	22%	22%	44%
Dec-99	58%	25%	17%	42%	44%	33%	22%	56%
Jan-00	82%	0%	18%	18%	78%	0%	22%	22%
Feb-00	53%	13%	33%	47%	36%	18%	45%	64%
Mar-00	74%	16%	11%	26%	62%	23%	15%	38%
Apr-00	56%	17%	28%	44%	47%	20%	33%	53%

2. Table A-2: Rate of Change in Claim Construction

month & year	Rate of change in claim constructions	Absolute percentage of cases where claim construction change was outcome dispositive
Jan-98	22%	22%
Feb-98	0%	N/A
Mar-98	14%	14%
Apr-98	50%	25%
May-98	67%	33%
Jun-98	25%	25%
Jul-98	71%	43%
Aug-98	38%	25%
Sep-98	44%	11%
Oct-98	25%	13%
Nov-98	40%	20%
Dec-98	50%	50%
Jan-99	57%	29%
Feb-99	33%	0%
Mar-99	40%	40%
Apr-99	33%	33%
May-99	75%	25%
Jun-99	45%	36%
Jul-99	70%	60%
Aug-99	29%	14%
Sep-99	42%	33%
Oct-99	50%	50%
Nov-99	67%	67%
Dec-99	60%	60%
Jan-00	67%	33%
Feb-00	43%	14%
Mar-00	29%	29%
Apr-00	40%	30%
Total	**44%**	**30%**

3. Table A-3: Rate of Claim Elements Interpretation Changed Per Month

month & year	# of claims	# changed	average in that time
Jan-98	13	2	22.2%
Feb-98	1	0	0.0%
Mar-98	10	1	14.3%
Apr-98	9	3	37.5%
May-98	12	5	41.7%
Jun-98	7	2	25.0%
Jul-98	14	7	54.8%
Aug-98	14	4	25.0%
Sep-98	16	4	37.0%
Oct-98	17	4	21.9%
Nov-98	9	3	30.0%
Dec-98	9	4	43.8%
Jan-99	12	6	55.6%
Feb-99	9	4	58.3%
Mar-99	12	6	45.3%
Apr-99	8	3	50.0%
May-99	5	3	75.0%
Jun-99	21	10	55.5%
Jul-99	16	11	71.7%
Aug-99	13	2	28.6%
Sep-99	17	6	37.5%
Oct-99	10	4	26.7%
Nov-99	6	3	38.9%
Dec-99	9	3	50.0%
Jan-00	3	2	66.7%
Feb-00	12	3	28.6%
Mar-00	13	6	42.9%
Apr-00	12	5	40.0%

4. Table B-1: Types of Judgment Appealed to the Federal Circuit (excluding summary affirmances)

Types of judgment being appealed	**Cases decided in this category**	**% of total**
Summary Judgment	166	41%
Jury trials and judgments as a matter of law ("JMOL")	58	15%
Other types of rulings (e.g., on remand from the Supreme Court)	6	1%
Procedural rulings	71	18%
Bench trials	51	13%
Preliminary injunctions	14	3%
Appeals from the Board of Patent Appeals and Interferences	36	9%
Total	**402***	**100%**

***** Because six cases involved both an appeal from Summary Judgment and JMOL, both categories were credited with those six cases.

5. Table B-2: Disposition of Certain Types of Judgments Being Appealed

Types of judgment	**% Aff'd**	**Fully Rev'd**	**Rev'd in part**	**Rev'd in part or completely**
Summary Judgments	53%	24%	23%	47%
Jury trial or JMOLs	45%	16%	39%	54%
Other ruling	50%	25%	25%	50%
Procedural ruling	53%	26%	21%	47%
Bench Trial	56%	16%	28%	44%
Preliminary Injunction	57%	36%	7%	43%
BPAI	56%	35%	9%	44%

6. Table B-3: Percentage of Change in Claim Construction by Type of Judgment Reviewed

Types of judgment	**Rate of change in claim constructions**	**Number of cases where claim is changed**	**% of total opinions where claim construction change is outcome dispositive**
Summary Judgments	51%	52	36%
Jury trials or JMOLs	32%	11	21%
Other Rulings*	100%*	1	100%*
Procedural Rulings**	0%**	0	N/A*
Bench Trials	40%	12	27%
Preliminary injunctions	14%	1	0%
BPAI	22%	2	11%

* Because of the small number of cases in this category (only one case involved claim construction), the statistics here are disproportionate and unrepresentative.

** Because of the small number of cases in this category, the statistics here are disproportionate and unrepresentative.

7. Table C-1: Number of Cases Authored Per Judge, and Percentage of Claim Construction Changes & Reversals Per Authoring Judge

Opinion author	# of cases authored	% of cases where claim construction was changed	% of total opinions where a change in claim construction was outcome determinative
Arthur Gajarsa	26	42%	25%
Alan Lourie	41	27%	23%
Alvin Schall	27	47%	20%
Daniel Friedman	2	0%	0%
Edward Smith	1	100%	100%
Glen Archer	6	33%	33%
Giles Rich	33	59%	41%
Haldane Mayer	14	50%	50%
Jay Plager	24	45%	27%
Per curiam	154	29%	19%
Paul Michel	40	56%	31%
Pauline Newman	38	43%	29%
Raymond Clevenger III	29	42%	25%
Randall Rader	38	56%	44%
Visiting Judge	1	0%	0%
William Bryson	28	33%	27%

8. Table C-2: Disposition of Cases Per Authoring Judge

Opinion author	% of cases aff'd	% of cases fully rev'd	% of cases partially rev'd
Arthur Gajarsa	54%	29%	17%
Alan Lourie	50%	19%	31%
Alvin Schall	40%	16%	44%
Daniel Friedman	0%	50%	50%
Edward Smith	0%	0%	100%
Glen Archer	67%	17%	17%
Giles Rich	48%	33%	19%
Haldane Mayer	80%	20%	0%
Jay Plager	55%	23%	23%
Per curiam	91%	5%	4%
Paul Michel	49%	22%	30%
Pauline Newman	56%	28%	17%
Raymond Clevenger III	48%	41%	11%
Randall Rader	41%	15%	44%
William Bryson	52%	20%	28%

9. Table C-3: *Number of Dissenting Cases Per Judge*

Dissenting Judge	# of dissents filed
Arthur Gajarsa	1
Alan Lourie	5
Edward Smith	1
Giles Rich	1
Haldane Mayer	6
Paul Michel	1
Pauline Newman	11
Raymond Clevenger III	2
Randall Rader	5
William Bryson	2

10. Table D-1: Number of Cases Appealed Per District Court

Tribunal originating appeal	# of cases heard
BPAI	60
CDCA	34
CFC	9
DAZ	2
DCO	10
DCT	4
DDC	7
DDE	15
DKS	3
DMA	19
DMD	5
DMN	13
DNE	2
DNH	4
DNJ	18
DNV	4
DOR	2
DPR	1
DRI	1
DSC	2
DUT	4
DWY	1
EDCA	1
EDKY	1
EDLA	2
EDMI	14
EDMO	6
EDNC	1
EDNY	9
EDPA	5
EDTN	1

EDTX	2
EDVA	15
EDWI	4
ITC	7
MDFL	2
MDNC	1
MDPA	1
MDTN	1
NDAL	1
NDCA	33
NDFL	2
NDGA	7
NDIA	2
NDIL	28
NDIN	2
NDNY	3
NDOH	8
NDOK	1
NDTX	6
NDWV	3
On remand from S.Ct.	3
SDCA	7
SDFL	21
SDGA	1
SDIA	1
SDIN	2
SDNY	21
SDOH	7
SDTX	9
WDLA	1
WDMI	4
WDMO	1
WDNC	2
WDNY	4
WDPA	4

WDTX	2
WDVA	5
WDWA	7
WDWI	7
Unknown	4

11. *Table D-2: Reversal Rate in the "More Active" and "Less Active" Tribunals*

	% rev'd in full	**% rev'd in part**
More Active Tribunals	16%	18%
Less Active Courts	22%	19%

12. *Table D-3: Reversal Rate in the "More Active" Lower Tribunals*

	Including Summary Affirmance		**Excluding Summary Affirmance**	
District court and other tribunals	**% rev'd in full**	**% rev'd in part**	**% rev'd in full**	**% rev'd in part**
BPAI	21%	5%	35%	9%
CDCA	15%	27%	18%	32%
CFC	0%	11%	0%	17%
DCO	0%	33%	0%	60%
DDE	21%	36%	23%	38%
DMA	6%	33%	7%	40%
DMN	17%	25%	22%	33%
DNJ	7%	21%	8%	25%
EDMI	14%	21%	17%	25%
EDVA	7%	33%	8%	38%
ITC	14%	29%	14%	29%
NDCA	10%	7%	14%	10%
NDIL	30%	11%	42%	16%
SDFL	24%	24%	29%	29%
SDNY	13%	13%	20%	20%

13. *Table D-4: Percentage of Claim Construction Changes and Related Reversal in Appeals from the "Most Active" Lower Tribunals*

District court and other tribunals	% of cases where claim construction was changed	% of cases where a change in claim construction was outcome determinative
BPAI	22%	11%
CDCA	38%	38%
CFC	0%	0%
DDE	22%	22%
DMA	11%	11%
DMN	17%	17%
DNJ	50%	25%
EDMI	20%	0%
EDVA	40%	40%
ITC	20%	20%
NDCA	40%	10%
NDIL	70%	60%
SDFL	33%	22%
SDNY	0%	0%

14. *Table E-1: Disposition of Cases Per Precedential Status of Case*

	% aff'd	% fully rev'd	% partly rev'd	Total % of reversal	% of other decisions (e.g., man-damus, certified question)
Precedential	41%	28%	28%	56%	3%
Nonprecedential	52%	16%	17%	33%	15%
Summary affirmance	100%	0%	0%	0%	0%

15. *Table E-2: Rate of Claim Construction Changes & Related Reversal Based on the Precedential Status of Decision*

	Rate of change in claim constructions	**% of cases where claim construction change is outcome dispositive**
Precedential	49%	36%
Nonprecedential	37%	23%
Summary affirmance	N/A	N/A

16. *Table F-1: Disposition of Case Based on whether it Contains a Means-Plus-Function Claim*

Type of claims	**% aff'd**	**% of cases fully rev'd**	**% of cases partially rev'd**	**Total % of cases partially or fully rev'd**
Cases with no claim construction	43%	24%	17%	40%
Cases including means-plus-function claim construction	43%	16%	41%	57%
Cases only including normal claim	58%	20%	22%	42%

17. *Table F-2: Percentage of Claim Construction Changes Based on whether Case Contained a Means-Plus-Function Claim*

Types of claims	% of cases where claim construction was changed	% of cases where a change in claim construction was outcome determinative
Cases including means-plus-function claim construction	56%	39%
Cases only including normal claim	37%	25%

18. *Table G-1: Frequency of Claim Construction*

Claim construction issues	# of claims construed	% of all claim constructions
Infringement only	137	76.5%
Invalidity only	32	18%
Both Infringement *and* invalidity	10	5.5%
Total	**179**	**100%**

19. Table G-2: Frequency of Issues Considered on Appeal

Issues considered by the Federal Circuit	**# of cases**	**% of cases**
Infringement only	77	19%
Invalidity only	69	17%
Inequitable conduct only	4	1%
Other (e.g., antitrust, procedural)	123	31%
Infringement and invalidity	20	5%
Infringement and inequitable conduct	2	1%
Infringement and other	42	11%
Invalidity and inequitable conduct	5	1%
Invalidity and other	13	3%
Inequitable conduct and other	8	2%
Infringement, invalidity, and inequitable conduct	6	2%
Infringement, invalidity and other	17	4%
Infringement, inequitable conduct and other	2	1%
Invalidity, inequitable conduct and other	2	1%
Invalidity, infringement, inequitable conduct, and other	6	2%
Total	**396**	**100%**

20. Table G-3: Percentage of Claim Construction Changes Based on Frequency of Issues

Claim construction issues	**% of cases where claim construction was changed**	**% of cases where a change in claim construction was outcome determinative**
Infringement only	45%	30%
Invalidity only	36%	22%
Infringement *and* invalidity	50%	40%

21. Table App-1: Rate of Claim Construction-Based Reversals, Including ALL Summary Affirmances

month & year	Absolute % of cases where claim construction change was outcome dispositive
Jan-98	18%
Feb-98	0%
Mar-98	10%
Apr-98	9%
May-98	29%
Jun-98	25%
Jul-98	33%
Aug-98	20%
Sep-98	10%
Oct-98	9%
Nov-98	9%
Dec-98	25%
Jan-99	18%
Feb-99	0%
Mar-99	13%
Apr-99	25%
May-99	8%
Jun-99	29%
Jul-99	60%
Aug-99	10%
Sep-99	33%
Oct-99	29%
Nov-99	25%
Dec-99	38%
Jan-00	20%
Feb-00	9%
Mar-00	15%
Apr-00	23%
Grand Total	**19%**

22. Table App-2: Rate of Change in Claim Construction, Including Summary Affirmances

month & year	Rate of change in claim constructions, including summary affirmances	Absolute % of cases where claim construction change was outcome dispositive (including summary affirmances)
Jan-98	20%	20%
Feb-98	0%	0%
Mar-98	12%	12%
Apr-98	33%	16%
May-98	61%	31%
Jun-98	25%	25%
Jul-98	63%	38%
Aug-98	33%	22%
Sep-98	42%	11%
Oct-98	21%	11%
Nov-98	28%	14%
Dec-98	36%	36%
Jan-99	46%	23%
Feb-99	22%	0%
Mar-99	25%	25%
Apr-99	29%	29%
May-99	46%	15%
Jun-99	40%	32%
Jul-99	70%	60%
Aug-99	24%	12%
Sep-99	42%	33%
Oct-99	38%	38%
Nov-99	44%	44%
Dec-99	48%	48%
Jan-00	52%	26%
Feb-00	34%	11%
Mar-00	21%	21%
Apr-00	35%	26%
Total	**35%**	**24%**