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Pedraza-Farina, Laura G

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Understanding the Federal Circuit: An Expert Community Approach

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Laura Pedraza-Fariña
Northwestern University School of Law

UNDERSTANDING THE FEDERAL CIRCUIT: AN EXPERT COMMUNITY APPROACH

Laura G. Pedraza-Fariña[†]

ABSTRACT

The Court of Appeals for the Federal Circuit (“CAFC”)—the appeals court in charge of virtually all patent cases—has been fraught with controversy since its creation in 1982. To its critics, the Federal Circuit engages in puzzling behaviors, out of step with its role as an Article III appellate court. The Federal Circuit shows little deference to district courts on questions of fact and to the Patent and Trademark Office (“PTO”) on technical issues. It surprisingly resorts to formalistic rules in an area of the law that requires flexibility to adapt to changing technological landscapes. These criticisms have become increasingly salient, leading to calls for an end to the Federal Circuit’s exclusive jurisdiction over patent appeals. Several explanations have been put forth to account for these puzzling behaviors. Yet, none can fully explain the range of unique Federal Circuit conduct. Without a full explanation for Federal Circuit behavior, however, the debate over Federal Circuit jurisdiction will remain gridlocked.

Drawing upon studies from the sociology of expertise, this Article provides a model of Federal Circuit decision-making that explains and predicts Federal Circuit behavior as a product of four distinct but interrelated expert community features: (1) epistemic control, (2) codification, (3) typecasting, and (4) inability to self-coordinate. The drive that expert communities exhibit for maximal control and autonomy over their knowledge base—referred to as epistemic control—explains why the Federal Circuit is less likely to defer to solutions proposed by other expert communities, such as the PTO, than would be expected of generalist courts. Those motivations also predict that expert communities such as the Federal Circuit will be more likely to defy non-expert superior generalists, such as the Supreme Court, than would be expected under traditional accounts of behavior in judicial hierarchies. The codification feature of expert communities gives a richer account than

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[†] Assistant Professor, Northwestern University Law School, laura.pedraza-farina@law.northwestern.edu. I thank Jonas Anderson, Adam Candeub, Brian Casey, Kevin Emerson Collins, Mariana Craciun, Shari Diamond, Rochelle Dreyfuss, Peter diCola, Gil Eyal, Roger Ford, Ezra Friedman, John Golden, Paul Gugliuzza, Shubha Ghosh, Tonja Jacobi, Andrew Koppelman, Joshua Kleinfeld, Peter Lee, Orly Lobel, Peter Menell, Jide Nzelibe, Lisa Larrimore Ouellette, Matthew Sag, Joshua Sarnoff, David Schwartz, Nadav Shoked, Matthew Spitzer, Kristen Stilt, Melissa Wasserman, and audiences at Northwestern Law School, the American Bar Foundation, DePaul Law School, the 2014 Intellectual Property Scholars Conference, PatCon 2014, Works-in-Progress in Intellectual Property 2014, the 7th Annual Junior Scholars in Intellectual Property Conference, Michigan State University Law School, and the 2014 Intellectual Property Scholars Roundtable for their helpful comments and feedback. Jason Portis and Ryan Whalen provided excellent research assistance.

existing narratives of when and why the Federal Circuit may prefer inflexible rules of decision over flexible standards. It predicts that the Federal Circuit will resort to rules not only to simplify technical knowledge or control subordinate communities, but also to build external legitimacy and manage internal dissent. Normatively, this model offers a path out of the gridlock by revealing a framework to evaluate and design proposals for Federal Circuit reform. To minimize the distortive effects of typecasting in the context of a centralized court, while retaining the advantages of expertise, this Article proposes the use of advisory panels to house technological, sociological, and economic expertise. Additionally, the model has important implications beyond the Federal Circuit, as it provides a novel theoretical lens to analyze the behavior of other specialized courts.

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I. INTRODUCTION

Patent law has transitioned from an arcane topic¹ to a field that is increasingly forced to confront some of the thorniest issues of national public policy, such as the patentability of genes,² diagnostic methods,³ and

1. See, e.g., ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS 9 (2004) (arguing that the Supreme Court rarely heard patent cases before 1982 because “[t]he justices were reluctant to devote their time to these ‘banal’ commercial disputes”).

2. See, e.g., *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2111 (2013) (holding that isolated genomic DNA is patent ineligible).

3. See, e.g., *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012) (holding that a diagnostic method that helped doctors determine the appropriate dose of a drug was an unpatentable law of nature).

synthetic biology.⁴ As patent law captures national headlines,⁵ commentators have placed renewed focus on the workings of the U.S. Court of Appeals for the Federal Circuit (“CAFC” or the “Federal Circuit”)—the appellate court for virtually all patent cases.⁶

The Federal Circuit’s patent jurisprudence has come under sustained criticism. Commentators rue the Federal Circuit’s increasing preference for simple rules over standards,⁷ its unwillingness to defer to district court and the Patent and Trademark Office (“PTO”) findings of fact⁸ or to determinations by the International Trade Commission (“ITC”),⁹ its propensity for de novo review,¹⁰ and its overly expansive view of its own

4. See generally Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 TEX. L. REV. 1745 (2007).

5. See, e.g., Charles Duhigg & Steve Lohr, *The Patent, Used as a Sword*, N.Y. TIMES (Oct. 7, 2012), <http://www.nytimes.com/2012/10/08/technology/patent-wars-among-tech-giants-can-stifle-competition.html> (discussing offensive patent litigation among technology companies); Editorial, *Clarifying, and Tightening, Patent Law*, N.Y. TIMES (June 4, 2014), <http://www.nytimes.com/2014/06/05/opinion/clarifying-and-tightening-patent-law.html> (discussing recent Supreme Court opinions on patent law); *Take Back Your Genes*, AM. CIVIL LIBERTIES UNION, <https://www.aclu.org/take-back-your-genes/> (last visited July 8, 2014) (reporting on the Supreme Court decision in *Myriad*).

6. See, for example, the remarks of Hon. Diane Wood, Chief Judge of the 7th Circuit, in which she argued that the Federal Circuit’s exclusive jurisdiction over patent cases should be abolished. *Keynote Address: Is It Time to Abolish the Federal Circuit’s Exclusive Jurisdiction in Patent Cases?*, 13 CHI.-KENT J. INTELL. PROP. 1 (2013). For a general recent discussion of Federal Circuit jurisdiction see the responses to Hon. Diane Wood’s keynote in 13 CHI.-KENT J. INTELL. PROP. (2014).

7. See, e.g., John R. Thomas, *Formalism at the Federal Circuit*, 52 AM. U. L. REV. 771, 777 (2003); Rochelle Cooper Dreyfuss, *In Search of Institutional Identity: The Federal Circuit comes of Age*, 23 BERKELEY TECH. L. J. 787, 802-04 (2008); Timothy R. Holbrook, *Substantive Versus Process-Based Formalism in Claim Construction*, 9 LEWIS & CLARK L. REV. 123 (2005); Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2 (2010); Lucas S. Osborn, *Instrumentalism at the Federal Circuit*, 56 ST. LOUIS U. L.J. 419 (2012); but cf. David O. Taylor, *Formalism and Antiformalism in Patent Law Adjudication: Rules and Standards*, 46 CONN. L. REV. 415, 486 (2013) (arguing that the Federal Circuit is justified in adopting rule-formalism if it deems that the need for certainty in a particular area of patent law outweighs flexibility and accuracy concerns).

8. See, e.g., Ted D. Lee & Michelle Evans, *The Charade: Trying a Patent Case to All “Three” Juries*, 8 TEX. INTELL. PROP. L.J. 1, 14 (1999); Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 COLUM. L. REV. 1035 (2003) [hereinafter Rai, *Engaging Facts and Policy*]; Arti Rai, *Addressing the Patent Gold Rush: The Role of Deference to PTO Patent Denials*, 2 WASH. U. J.L. & POL’Y 199, 201 (2000).

9. See, e.g., Sapna Kumar, *Expert Court, Expert Agency*, 44 U.C. DAVIS L. REV. 1547, 1550–51 (2011); Rai, *Engaging Facts and Policy*, *supra* note 8, at 1052–56.

10. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1057–65; Rochelle Cooper Dreyfuss, *Giving the Federal Circuit a Run for its Money: Challenging Patents in the PTAB*, NOTRE DAME L. REV. 28-33 (forthcoming 2015), available at <http://ssrn.com/abstract=2572647>.

jurisdiction.¹¹ Critics argue that, in the aggregate, these features have given rise to a court that is unresponsive to the needs of communities of innovators and out of step with national innovation policy.¹² For example, John Thomas links what he terms the Federal Circuit's "adjudicative rule formalism" to the court's inability to adapt patent law to the changing conditions of technological innovation.¹³ Arti Rai characterizes the Court's aggressive de novo review as having "problematic effects across entire fields of technology."¹⁴ Sapna Kumar criticizes the Federal Circuit's unwillingness to defer to the ITC's patent decisions, in view of the ITC's greater political accountability and fact-finding capability.¹⁵ And Rochelle Dreyfuss cautions that the Federal Circuit's insistence on "particular analytical frameworks," and experimentation with "rigid interpretative methodologies," has made the law more precise at the expense of quality and accuracy.¹⁶ In part echoing these critiques, Chief Judge Diane Wood recently proposed that we eliminate the Federal Circuit's exclusive jurisdiction over patent law.¹⁷

These critiques are particularly troubling, as they flatly contradict a crucial assumption underlying the creation of the Federal Circuit: that placing the "unusually complex [and] technically difficult" patent cases in the hands of a single appeals court would lead not only to national uniformity but also to better-quality patent decisions.¹⁸ Thus, explaining these particular features of Federal Circuit jurisprudence is important both to provide a diagnosis of the current "patent failure"¹⁹ and to design a way out.

Drawing from and expanding upon studies in the sociology of expertise, this Article provides a novel perspective on the behavior of the Federal Circuit. Its central thesis is that understanding the Federal Circuit and improving judicial decision-making in patent law requires understanding expert communities, including their typical blind spots and strengths, and solutions that have been adopted in other fields to optimize centralized

11. See, e.g., Paul R. Gugliuzza, *Patent Law Federalism*, 2014 WIS. L. REV. 11, 30 (2014).

12. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1065; Thomas, *supra* note 7, at 775; Rochelle Cooper Dreyfuss, *Percolation, Uniformity, and Coherent Adjudication*, 66 S.M.U.L. REV. 505, 530 (2013) ("The core frustration [with the Federal Circuit] is "with rigid rules that are not adaptable to new technologies or to new business models and do not take account of the public's interest in access.").

13. Thomas, *supra* note 7, at 775.

14. Rai, *Engaging Facts and Policy*, *supra* note 8, at 1065.

15. Kumar, *supra* note 9, at 1552–53.

16. Dreyfuss, *supra* note 7, at 802–03.

17. Wood, *supra* note 6, at 9.

18. H.R. Rep. No. 97-312, at 22–23 (1981).

19. See JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK* (2008).

expert decision-making. An “expert community,” as the term is used here, refers to an institutionalized group of experts that develop and apply a system of abstract knowledge to address a specific set of questions. For example, psychologists have developed a system of abstract knowledge—partially codified in the Diagnostic and Statistical Manual of Mental Disorders (“DSM”)—to diagnose and treat mental illness.²⁰ Similarly, the Federal Circuit has developed its own system of abstract knowledge—a system to identify those inventions that require a patent to incentivize innovation, and designed to ultimately foster the “progress of science and useful arts.”²¹ I develop the concept of “expert community” as it relates to the Federal Circuit throughout this article. A key claim is that there are important, but unexamined, differences between how expert and non-expert generalists will decide cases and interact with other relevant actors, and in particular with other institutional actors such as agencies, district courts, other appellate courts, and the Supreme Court. Appreciating these differences is crucial to understanding the behavior of the Federal Circuit, and of specialized courts more broadly.

Sociologists have long been interested in understanding the development, organization, and control of expertise in society. This Article draws from two lines of sociological research. The first, the institutional approach to expertise, explores how expertise is institutionalized in organized groups of experts and how those organized groups interact with each other and with society at large.²² The second, the embodied approach to expertise, focuses on understanding the transition from novice to expert and, more specifically, how decision-making processes change once novices acquire expertise in a particular domain.²³

Taken together, four basic insights emerge from these studies. First, organized groups of experts seek maximal control in the development and application of the abstract knowledge base that constitutes their expertise (what this Article analyzes as the *epistemic control* feature of expert communities).²⁴ But, expert groups are embedded in an ecosystem composed of other expert groups with different knowledge systems that apply to overlapping sets of problems.²⁵ This overlap leads expert communities to

20. See AM. PSYCHIATRIC ASS'N, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS (5th ed. 2013).

21. U.S. CONST. art. I, § 8, cl. 8.

22. See *infra* Section III.A

23. See *infra* Section III.B

24. See *infra* Subsection IV.B.1.

25. See *id.*

engage in constant competition with one another for jurisdictional control.²⁶ As applied to the Federal Circuit, this unappreciated dynamic of jurisdictional competition between expert communities can explain the Federal Circuit's rigorous, non-deferential standard of review of PTO decisions—a behavior that stands in sharp contrast with the behavior of non-expert appellate courts with respect to findings of fact by administrative agencies.²⁷ In addition, the tendency for expert communities to struggle to maintain autonomy in the development of their respective knowledge bases predicts that expert communities will be more likely to defy solutions imposed by non-expert generalists than communities of non-experts.²⁸ In the specific case considered here, the lens of epistemic control predicts that the Federal Circuit is more likely to defy Supreme Court decisions than are other circuit courts.²⁹

Second, these studies present a more nuanced picture than existing accounts of why and when an expert community, such as the Federal Circuit, will prefer formal rules to flexible standards (what this Article analyzes as the *codification* feature of expert communities).³⁰ Expert practitioners differ from novices in their relationship to the use of rules to solve problems.³¹ Novices must self-consciously follow explicit rules to begin their path towards expertise—the teaching function of rules.³² In contrast, experts can draw on a wealth of contextual information gathered through training and practice that is not readily reduced to a set of written rules of decision (or what is often termed “tacit knowledge”).³³ A direct consequence of expert tacit knowledge is an unavoidable conflict between the rules as explained to novices and their actual application by experts to real-world conflicts. But rules serve three additional functions. They lend legitimacy to expert communities by showing non-expert novices and the public at large the

26. *See infra* Subsection IV.B.1.b).

27. *See infra* Subsection IV.B.1.a). *See also* Banks Miller & Brett Curry, *Experts Judging Experts: The Role of Expertise in Reviewing Agency Decision Making*, 38 LAW & SOC. INQUIRY 55, 55–56 (2013) (noting that courts are generally deferential to the decision-making of federal agencies).

28. *See infra* Subsection IV.A

29. There have been no quantitative empirical studies comparing Federal Circuit defiance of Supreme Court decisions to defiance by other circuits, or assessing whether the Federal Circuit is more likely to defy the Supreme Court in its perceived area of expertise (patent law) than in any of the other cases that make up its docket—both of which are predicted by this model. But qualitative evidence suggests this is indeed the case. *See infra* Part IV.B.1.c).

30. *See infra* Subsection IV.B.2.

31. *See infra* Subsection IV.B.2.a).

32. *See infra* Subsection IV.B.2.b).

33. *See infra* Subsection IV.B.2.a).

utility of the expert practice.³⁴ Rules can also help manage internal dissent by reducing variability in highly fractured expert communities.³⁵ Finally, because rules prevent recourse to more subjective contextual judgment, they are also an important mechanism of jurisdictional competition: expert communities often resort to rules to constrain and control the action of subordinate communities.³⁶ As applied to the Federal Circuit, the codification feature of expert communities explains the Court's preference for rules over standards as a mechanism to: (1) constrain subordinate expert communities, such as the PTO, (2) both teach and constrain the actions of district courts (conceptualized as subordinate generalist communities), (3) legitimize Federal Circuit expertise in the eyes of relevant audiences (such as the patent bar, scientists, academics, and the Supreme Court), and (4) manage internal dissent.

Third, expert communities compete for jurisdictional control by framing overlapping problems as best solved through a particular expert community's own abstract knowledge system (what this Article analyzes as the *typecasting* feature of expert communities).³⁷ Typecasting, however, has a clear shortcoming: when expert communities typecast a particular problem as similar to other problems already solved within their domain of expertise, they are less likely to look widely for other—potentially better—available solutions.

Fourth, studies of embodied expertise teach us that as novices become experts, they also grow progressively more emotionally attached to their area of expertise. This means that issues within an expert's area of expertise are particularly personally salient to that expert relative to the general public, and relative to other issues in other fields of expertise. When the best approach to a problem requires cooperation and coordination between two or more expert areas, a community with expertise in one area is likely to place inadequate weight on the competing considerations and interests of other expert communities (what this Article analyzes as the *inability to self-coordinate* feature of expert communities).³⁸

The remainder of the Article proceeds in three parts. Part II offers an overview of the critiques surrounding the performance of the Federal Circuit

34. Because rules articulate the steps taken by an expert to solve a particular problem, they help make explicit, and thus more transparent, the mechanisms of expert decision-making. See *infra* Subsection III.A.2.

35. See *infra* Subsection IV.B.2.c).

36. See *infra* Subsection IV.B.2.a).

37. See *infra* Subsection IV.B.3.

38. See *infra* Subsection IV.B.4.

as the sole appellate arbiter of patent disputes. Part III introduces the reader to studies in the sociology of expertise. Drawing and expanding upon these studies, Part IV develops a typology of four features that are closely associated with communities with attributed expertise in a particular subject matter: (1) epistemological control, (2) codification, (3) typecasting, and (4) inability to self-coordinate. This part demonstrates how conceptualizing the Federal Circuit as an expert community helps explain key features of its jurisprudence and predict additional behaviors. Part V develops the normative implications of an “expert community” analysis of the Federal Circuit. It argues that two features of expert communities—typecasting and inability to self-coordinate—are undesirable in a centralized specialized court. To minimize the distortive effects of typecasting in the context of a centralized court, this Article proposes the use of advisory panels to house technological, sociological, and economic expertise, a strategy that is widely used to optimize medical decision-making.

II. THE FEDERAL CIRCUIT UNDER FIRE

The Federal Circuit stands alone as the only Article III court with virtually exclusive appellate jurisdiction over a specific subject matter—patent law.³⁹ Despite generally favorable assessments of its performance during the first five years of its existence since its formation in 1982, criticism of the Federal Circuit began to mount in the early 1990s and has continued to this date.⁴⁰ Indeed, both academic commentators and judges have renewed calls to abolish the Federal Circuit’s exclusive jurisdiction over patent appeals—judging this specialized court to be the cause of an ossified jurisprudence that is out of step with the needs of communities of innovators.⁴¹ This Part places this Article’s contribution in the context of current debates surrounding the institutional design of the Federal Circuit. It argues that current institutional critiques of the Federal Circuit can be best framed as two concerns: (1) the relationship of the Federal Circuit with lower courts and agencies, and (2) the adjudicative “form” of patent law.

39. Approximately 55% of the Federal Circuit’s docket consists of patent cases. See Tony Dutra, *‘Introspective Look’ at Federal Circuit Highlights Breadth of Court’s Docket*, 77 PAT. TRADEMARK & COPYRIGHT J. 560, 560 (2009).

40. See, e.g., Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1, 1 (1989) (proposing that the Federal Circuit “shift its focus from patent law to competition law more generally” to be more efficient).

41. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1123; Thomas, *supra* note 7, at 796; Wood, *supra* note 6, at 1.

A. RELATIONSHIP WITH LOWER COURTS AND AGENCIES

Several commentators have criticized the Federal Circuit for its unusual, non-deferential relationship with both district courts and the two agencies (PTO and ITC) whose decisions it reviews. The critique can be summed up as follows: the Federal Circuit shows little deference to district courts on questions of fact—despite Rule 52(a) of the Federal Rules of Civil Procedure, which requires a more deferential clearly erroneous standard of review of factual issues—and shows little deference to the Patent and Trademark Office on technical issues—displaying considerable reluctance to applying the Administrative Procedure Act (“APA”).⁴² The next two sections analyze these critiques in depth.

1. *Relationship with Lower Courts*

Academic commentators have criticized the Federal Circuit for showing trial courts less deference than is required by traditional doctrines of appellate review. Under Rule 52(a),⁴³ an appeals court reviews legal conclusions *de novo*, but reviews factual findings under the more deferential *clearly erroneous* standard.⁴⁴ The Federal Circuit, however, has sidestepped this division of labor between trial and appellate courts, either by interpreting questions of fact, or mixed questions of law and fact, as purely questions of law, or by applying a *de novo* standard of review to inquiries the Federal Circuit itself has characterized as factual.⁴⁵ Commentators have blamed this behavior for creating increased unpredictability and uncertainty in patent claim construction⁴⁶ and, more broadly, for divorcing patent law from the context-specific needs of different innovation communities.⁴⁷

42. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8; Stuart Minor Benjamin & Arti K. Rai, *Who's Afraid of the APA?, What the Patent System Can Learn from Administrative Law*, 95 GEO. L.J. 269 (2007); Craig Allen Nard, *Deference, Defiance, and the Useful Arts*, 56 OHIO ST. L.J. 1415, 1421–22 (1995) (“[T]he court has adopted a highly questionable, if not erroneous, *de novo* standard of review [of PTO denials of patentability decisions].”).

43. FED. R. CIV. P. 52(a).

44. *Id.* In one of its only two patent opinions of the 1980s, the Supreme Court required the Federal Circuit to adhere to the same standard of review of factual questions as other Article III courts. See *Dennison Mfg. Co. v. Panduit Corp.*, 475 U.S. 809 (1986) (*per curiam*).

45. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1056 (noting that the Federal Circuit “has subjected trial court fact finding in infringement or declaratory judgment actions to a level of review that is contrary to traditional principles of appellate review”); William F. Lee & Anita K. Krug, *Still Adjusting to Markman: A Prescription for the Timing of Claim Construction Hearings*, 13 HARV. J.L. & TECH. 55, 67 (1999).

46. See, e.g., Jonas Anderson & Peter Menell, *Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 NW. U. L. REV. 1, 1 (2014) (“[T]he Federal Circuit’s adherence to the *de novo* standard has frustrated district courts’ distinctive capabilities for apprehending and resolving the factual disputes inherent in claim

The Federal Circuit's proclivity for interpreting arguably factual questions as issues of law is exemplified in claim construction—the determination of the “metes and bounds” of the inventive territory. Claim construction differs from statutory interpretation—an issue of law—in that patent claims are analyzed from the perspective of a “person having ordinary skill in the art” (“PHOSITA”).⁴⁸ Thus, there is a good argument that expert testimony regarding how a PHOSITA would understand a claim should play an important role in ensuring agreement between the relevant community of innovators and the ultimate interpretation of the claim language at issue. Evaluating expert evidence and its credibility is a task traditionally considered “fact-finding,” and therefore the province of the trial court.⁴⁹ Nevertheless, the Federal Circuit has not interpreted any aspect of claim construction—including the use and evaluation of expert testimony—as fact-finding.⁵⁰

This interpretive stance has generated vigorous criticism from both academics and district court judges. One scholar observed that the Federal Circuit is simply ignoring both the “significant role for facts in claim construction”⁵¹ as well as crucial Supreme Court language in *Markman v. Westview Instruments, Inc.* that characterizes claim construction as a “mongrel practice” involving both legal and factual issues.⁵² District court judges have also been critical of the Federal Circuit's penchant for de novo review in

construction determinations . . .”); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 259 (2008) (noting that the high reversal rates in claim construction decrease incentives for trial judges to learn, increases the unpredictability of appellate outcomes, and decreases the possibility of settlement); Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075, 1113 (2001) (noting that “claim construction review plays a significant role in the likelihood of reversal”).

47. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1106–07; Thomas, *supra* note 7, at 796; Craig Allen Nard & John F. Duffy, *Rethinking Patent Law's Uniformity Principle*, 101 NW. U. L. REV. 1619, 1623–25 (2007).

48. 35 U.S.C. § 103(a) (2006); Dreyfuss, *supra* note 10, at 29–32.

49. See, e.g., *Moberly ex rel. Moberly v. Sec'y of Health & Human Servs.*, 592 F.3d 1315, 1326 (Fed. Cir. 2010) (“Finders of fact are entitled—indeed, expected—to make determinations as to the reliability of the evidence presented to them and . . . as to the credibility of the persons presenting that evidence.”).

50. *Cybor Corp. v. FAS Techs., Inc.* 138 F.3d 1448, 1451 (Fed. Cir. 1998) (holding that, based on the Supreme Court's holding in *Markman*, “claim construction, as a purely legal issue, is subject to de novo review on appeal”).

51. Rai, *Engaging Facts and Policy*, *supra* note 8, at 1048.

52. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 378 (1996). Anderson and Menell have expressed similar concerns and urged the court to adopt a “hybrid standard” of review that “would defer to trial judges' factual determinations” on how a PHOSITA would understand technical terms but “would retain de novo authority over whether the trial court's factual finding inappropriately overrides more specific intrinsic indications of the patent's scope.” Anderson & Menell, *supra* note 46, at 1–2.

claim construction. For example, Chief Judge Saris of the District Court of Massachusetts argued that “[t]here should be more deference [to the district judge on claim construction] particularly when the district judge takes expert testimony or receives other extrinsic evidence.”⁵³ And while serving at the District Court for the Northern District of Ohio, Judge O’Malley (now a judge at the Federal Circuit) observed: “it is a hard pill to swallow as a district judge that, after seeing the experts, and hearing the experts, our efforts to answer those questions are subject to a completely de novo review and a blank record.”⁵⁴ Indeed, on January 20, 2015 the Supreme Court reversed the Federal Circuit on this particular issue, holding in *Teva Pharmaceuticals U.S.A., Inc. v. Sandoz, Inc.* that Rule 52(a)(6) requires the Federal Circuit to review subsidiary factual matters made in the course of claim construction of a patent claim for “clear error.”⁵⁵

The Federal Circuit’s tendency to review de novo arguably factual issues extends beyond claim construction. For example, two cases heard by the Supreme Court in its 2013 term involved the proper standard of review of district court decisions to award attorneys’ fees in exceptional cases pursuant to 35 U.S.C. § 285.⁵⁶ In *Highmark Inc. v. Allcare Health Management Systems, Inc.*, petitioners argued that the Federal Circuit had “arrogate[d] th[e] responsibility” to “apply the fact-dependent legal standard,” and thus “improperly divid[ed] labor between the trial courts and courts of appeal.”⁵⁷ In *Octane Fitness, LLC v. Icon Health & Fitness, Inc.*, petitioners similarly argued that the Federal Circuit had “improperly appropriate[d] a district court’s discretionary authority to award attorney fees to prevailing accused infringers in contravention of statutory intent and this Court’s precedent.”⁵⁸ In both cases, the Supreme Court sided with petitioners, striking down the Federal Circuit’s de novo standard of review.⁵⁹ The Court emphasized that the Federal Circuit had relied on an “unduly rigid” framework that

53. See, e.g., Kathleen M. O’Malley, Patti Saris & Ronald H. Whyte, *A Panel Discussion: Claim Construction from the Perspective of the District Judge*, 54 CASE W. RES. L. REV. 671, 679–80 (2004) (statement of Hon. Patti Saris).

54. *Id.* at 680 (statement of Hon. Kathleen O’Malley); Nard & Duffy, *supra* note 47, at 1620.

55. *Teva Pharma. U.S.A., Inc. v. Sandoz, Inc.*, 135 S. Ct. 831 (2015).

56. *Highmark Inc. v. Allcare Health Mgmt. Sys., Inc.*, 134 S. Ct. 1744 (2014); *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 134 S. Ct. 1749 (2014).

57. Petition for a Writ of Certiorari at 4, *Highmark*, 134 S. Ct. 1744 (2014) (No. 12-1163), 2013 WL 1209137.

58. Petition for a Writ of Certiorari at i, *Octane*, 134 S. Ct. 1749 (2014) (No. 12-1184), 2013 WL 1309080.

59. *Highmark*, 134 S. Ct. at 1748–49.

“impermissibly encumbers the statutory grant of discretion to district courts.”⁶⁰

Commentators have also criticized the Federal Circuit for acting as a fact-finder itself—even for issues that it recognizes as plainly factual matters. For example, even though the Federal Circuit considers the ultimate question of patent infringement to be a factual determination,⁶¹ it often issues a ruling on infringement following claim construction, rather than remanding the case to the district court for a new trial.⁶² In this same context, Arti Rai has criticized the court’s penchant for “simply declar[ing] that there can be no factual dispute with respect to infringement.”⁶³ And in decisions concerning patent validity, including non-obviousness and disclosure determinations, Rai contends that the Federal Circuit has “merely paid lip service to deference,” while actually substituting its own fact-finding for that of the district court.⁶⁴

Federal Circuit judges themselves are not all of a piece: some have opposed a purely de novo standard of review in claim construction and other arguably factual inquiries, such as whether a case is exceptional.⁶⁵ Yet, the relatively few dissents in claim construction and the recent Federal Circuit decision in *Lighting Ballast* confirming the continued validity of a purely de novo standard of review, imply a continued tendency to review arguably factual issues de novo.⁶⁶ Indeed, it is telling that Federal Circuit judges have characterized their own Court’s behavior as a “temptation to label everything legal and usurp the province of the fact finder with our manufactured de novo review.”⁶⁷

60. *Octane Fitness*, 134 S. Ct. at 1755.

61. *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1520–21 (Fed. Cir. 1995) (en banc) (“infringement, whether literal or under the doctrine of equivalents, is a question of fact”).

62. See, e.g., William C. Rooklidge & Matthew F. Weil, *Judicial Hyperactivity: The Federal Circuit’s Discomfort with Its Appellate Role*, 15 BERKELEY TECH. L.J. 725, 739–40 (2000).

63. Rai, *Engaging Facts and Policy*, *supra* note 8, at 1060.

64. *Id.* at 1063.

65. For example, Judge Mayer, joined by Judge Newman, wrote a dissent in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1330 (Fed. Cir. 2005) (Mayer, J., dissenting) reiterating his continued frustration with “the futility, indeed the absurdity, of this court’s persistence in adhering to the falsehood that claim construction is a matter of law devoid of any factual component.” And in *Highmark, Inc. v. Allcare Health Mgmt. Sys.*, 701 F.3d 1351, 1357 (Fed. Cir. 2012), five judges (Chief Judge Rader and Judges Moore, O’Malley, Reyna, and Wallach, dissenting from the Federal Circuit’s denial of rehearing en banc) argued that the court’s de novo standard of review in exceptional cases “invades the province of the fact finder.”

66. *Lighting Ballast Control v. Philips Elecs. N. Am. Corp.*, 744 F.3d 1272, 1276–77 (Fed. Cir. 2014) (en banc) (emphasis added).

67. *Highmark*, 701 F.3d at 1362 (Fed. Cir. 2012).

Whether a more deferential standard of review is normatively desirable is an open question, given the Federal Circuit's mandate to maintain uniformity, as well as its unique knowledge of patent law. Indeed, Rochelle Dreyfuss has suggested that the "Federal Circuit's unique responsibility towards patent law argues for a broader scope of review over fact finding."⁶⁸ Nevertheless, it is clear that the Federal Circuit has chosen not to defer to the district court on issues for which there is a strong case for deference under traditional principles of appellate review.

2. *Relationship with the Patent and Trademark Office and the International Trade Commission*

The Federal Circuit is also an outlier in its review of agency action: it has adopted a less deferential standard of review of administrative fact-finding and statutory interpretation than all other Article III appellate courts. The Federal Circuit interacts routinely with two agencies that are thought to possess a degree of expertise in patent law: the Patent and Trademark Office ("PTO") and the International Trade Commission ("ITC"). The Federal Circuit has an asymmetric relationship with the PTO: it can review directly its *denials* of patent protection, but not its patent *grants*. The latter only reach the Federal Circuit through an appeal from a district court decision.⁶⁹ The ITC makes trade-focused patentability decisions under section 337 of the Tariff Act, which gives the ITC authority to grant broad exclusion orders to entities whose patents have been infringed by imported goods.⁷⁰ ITC Section 337 determinations may be appealed directly to the Federal Circuit.⁷¹

In reviewing PTO patent denials, the Federal Circuit has not followed the traditional deference structure that appellate courts employ with administrative agencies. Under section 706 of the Administrative Procedure Act ("APA"), courts review administrative fact-finding under the highly deferential "arbitrary or capricious" or "unsupported by substantial evidence" standards.⁷² Yet, until the Supreme Court intervened in *Dickinson v. Zurko*,⁷³ the Federal Circuit maintained that the APA did not apply to its

68. Dreyfuss, *supra* note 40, at 61–62. In her more recent writings, however, Dreyfuss emphasizes that an examination of the history of the Federal Circuit underscores the emergence of "a problem that was largely unforeseen . . . the high cost of eliminating intercourt debate from the adjudicatory system." Dreyfuss, *supra* note 12, at 507. Dreyfuss favors increased deference to the PTO and specialization at the trial level as a way to increase institutional dialogue. *Id.* at 532–36.

69. 28 U.S.C. § 1295(a)(4) (2006).

70. 19 U.S.C. § 1337(a) (2006).

71. 19 U.S.C. § 1337(c) (2006).

72. 5 U.S.C. § 706(2)(A), (E) (2006).

73. *Dickinson v. Zurko*, 527 U.S. 150 (1999).

reviews of the PTO's findings of fact, choosing instead to apply a more rigorous standard of review.⁷⁴ And although the Supreme Court's *Zurko* decision held that the APA did apply to the Patent Act, commentators have observed that the Federal Circuit has continued to display considerable resistance to applying APA standards of review to its patent docket.⁷⁵

The Federal Circuit has repeatedly refused to grant deference to the PTO's substantive interpretations of the Patent Act.⁷⁶ Rather, it considers the PTO to have only procedural—not substantive—rule-making authority with respect to the Patent Act.⁷⁷ The Federal Circuit has also retained the power of adjudicating de novo whether a particular rule is procedural or substantive. As a consequence, the Federal Circuit reviews the PTO's findings of (substantive) law de novo, and its findings of fact under a clearly erroneous standard.⁷⁸ Many academic commentators have criticized this division of labor, arguing for greater deference to the PTO—for example, by deferring to the PTO's determinations of whether a rule is substantive or procedural,⁷⁹ or by granting the PTO substantive rule making authority and Chevron deference to its adjudicative decisions.⁸⁰

As elaborated further in Section III.A, the relationship between the Federal Circuit and the PTO can be described and understood as one of *jurisdictional competition* between two expert communities for control over patent law. In fact, this type of competition is expected under a sociological model of institutionalized communities of experts.

74. In re *Zurko*, 142 F.3d 1447, 1459 (Fed. Cir. 1998).

75. See, e.g., Rai, *Engaging Facts and Policy*, *supra* note 8, at 1055.

76. See, e.g., *Tafas v. Doll*, 559 F.3d 1345, 1352 (Fed. Cir. 2009) (holding that the PTO does not have “any general substantive rulemaking power”); *Brand v. Miller*, 487 F.3d 862, 869 n.3 (Fed. Cir. 2007) (holding that the PTO “does not earn *Chevron* deference on questions of substantive patent law”).

77. *Merck & Co. v. Kessler*, 80 F.3d 1543, 1549–50 (Fed. Cir. 1996) (noting that the PTO lacks the ability to promulgate rules on the core patentability standards that carry the force of law).

78. In re *Lueders*, 111 F.3d 1569, 1571–72 (Fed. Cir. 1997) (“We review the Board’s ultimate legal conclusion . . . *de novo* . . . [and] underlying findings of fact for clear error.”); In re *Zurko*, 142 F.3d 1447, 1449 (Fed. Cir. 1998) (“We believe section 559 of the [APA] permits . . . our continued application of the clearly erroneous standard in our review of these fact-findings.”).

79. See, e.g., Joseph Scott Miller, *Substance, Procedure and the Divided Patent Power*, 63 ADMIN. L. REV. 31, 49–50 (2011).

80. See, e.g., Michael J. Burstein, *Rules for Patents*, 52 WM. & MARY L. REV. 1747, 1751 (2011); Jonathan S. Masur, *Regulating Patents*, in 2010 THE SUPREME COURT REVIEW 275, 279 (Dennis Hutchinson et al. eds., 2011); Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1998 (2013).

The Federal Circuit has similarly refused to grant either *Chevron* or *Skidmore* deference to patent decisions from the ITC.⁸¹ Doctrinally, the case for deference to the ITC differs from the case for deference to the PTO. Since the ITC has interpretative authority over the Tariff Act only, deference would only be warranted under the APA and *Chevron* if the ITC is interpreting the Tariff Act—but not the Patent Act—when making patentability determinations.⁸² Normatively, commentators are divided on whether deference to ITC is desirable. For example, focusing on the importance of avoiding a fragmented patent regime, John Thomas argues against ITC deference in patentability and infringement determinations.⁸³ In contrast, Sapna Kumar has argued that considerations of institutional competence and political accountability favor granting *Chevron* deference to ITC patentability and infringement decisions.⁸⁴

Leaving aside whether increased deference is normatively desirable, what remains clear is that the Federal Circuit is an outlier among Article III courts in its review of agency action.⁸⁵ Significantly, the Federal Circuit has only attempted to arrogate power over fact-finding and statutory interpretation on patent law issues, while routinely granting APA and *Chevron* deference to agencies that do not handle patent disputes, and to PTO and ITC on non-patent matters.⁸⁶

81. See, e.g., *Linear Tech. Corp. v. Int'l Trade Comm'n*, 566 F.3d 1049, 1068 (Fed. Cir. 2009); *Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1338 (Fed. Cir. 2003); *Mead Corp. v. United States (Mead II)*, 185 F.3d 1304, 1305 (Fed. Cir. 1999); *Mead Corp. v. United States (Mead III)*, 283 F.3d 1342, 1344 (Fed. Cir. 2002). See also Kumar, *supra* note 9, at 1547; Kali Murray, *First Things First: A Principled Approach to Patent Administrative Law*, 42 J. MARSHALL L. REV. 29, 48–54 (2008).

82. See Kumar, *supra* note 9, at 1562–63 (arguing that the ITC is interpreting the Tariff Act when making patentability determinations to decide whether to grant an exclusion order); see also *Process Patents: Hearing Before the S. Comm. on the Judiciary*, 110th Cong. 86–87 (2007) (statement of John R. Thomas, Professor of Law, Georgetown University) (testifying that the ITC “is not charged with interpreting the Patent Act” whenever it makes patent-related determinations).

83. *Process Patents: Hearing Before the S. Comm. on the Judiciary*, 110th Cong. 6, 87 (2007) (statement of John R. Thomas, Professor of Law, Georgetown University).

84. See Kumar, *supra* note 9, at 1587, 1592.

85. See, e.g., Banks Miller & Brett Curry, *Experts Judging Experts: The Role of Expertise in Reviewing Agency Decision Making*, 38 LAW & SOC. INQUIRY 55, 55–56 (2013) (showing that courts are generally deferential to the decision-making of federal agencies).

86. Kumar, *supra* note 9, at 1566 (noting that the Federal Circuit grants both APA and *Chevron* deference “when patents are not at issue”); Craig Allen Nard, *Deference, Defiance and the Useful Arts*, 56 OHIO ST. L.J. 1415, 1430 (1995) (“The impact of *Chevron* has been lost on the Federal Circuit as it relates to the BPAI’s patentability determinations; whereas just the opposite can be said about the Federal Circuit’s nonpatent administrative caseload.”).

B. ADJUDICATIVE “FORM” OF PATENT LAW

In a seminal article, Duncan Kennedy distinguished two “different rhetorical modes” of private law adjudication regarding the *form* of legal decisions.⁸⁷ The first rhetorical mode “favors the use of clearly defined, highly administrable, general rules,” while “the other supports the use of equitable standards producing ad hoc decisions with relatively little precedential value.”⁸⁸ By all accounts, the Federal Circuit has consistently favored the use of clear and inflexible general rules.⁸⁹ Time and again, the court has attempted to distill patentability inquiries into highly administrable rules that eschew contextual analysis and that limit the ability of lower courts to adjust their decisions to the circumstances of the case. The Federal Circuit’s systematic preference for formal, rigid rules over flexible standards, many commentators believe, has contributed to patent law’s disconnect from the needs of communities of innovators working in a quickly-evolving technological environment.

One of the most prominent, and most criticized, examples of Federal Circuit rule formalism is the Court’s development of the “teaching, suggestion, or motivation” (“TSM”)⁹⁰ test for determining whether an invention is non-obvious under section 103 of the Patent Act.⁹¹ When an invention involves combining two or more references, the TSM test required that at least one of those references contain information that would suggest, teach, or motivate a PHOSITA to combine the references at issue.⁹² Although designed to avoid hindsight bias, the TSM test ultimately prevented consideration of contextual factors, such as tacit knowledge in the relevant

87. Duncan Kennedy, *Form and Substance in Private Law Adjudication*, 89 HARV. L. REV. 1685, 1685 (1976).

88. *Id.*

89. See, e.g., Dreyfuss *supra* note 12, at 530; Holbrook, *supra* note 7, at 123 (“In recent years, the . . . Federal Circuit has embraced the use of bright-line, formalistic rules . . .”); Nard & Duffy, *supra* note 47, at 1644 (suggesting that the Federal circuit “has retreated into its own legal formalisms at the expense of gaining a good understanding of industrial and technological needs”); Rai, *Engaging Facts and Policy*, *supra* note 8, at 1040 (“[T]he Federal Circuit has substituted formalist decisionmaking for the fact-specific, policy-oriented analysis that is required by the open-ended language of the patent statute.”); Thomas, *supra* note 7, at 774 (“[T]he Federal Circuit has embraced an increasingly formal jurisprudence.”); see also Lee, *supra* note 7, at 21–22 (arguing that the Federal Circuit resorts to inflexible rules to avoid engaging with complex technologies).

90. KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 399 (2007).

91. 35 U.S.C. § 103(a) (2006). See, e.g., Laura G. Pedraza-Fariña, *Patent Law and the Sociology of Innovation*, 2013 WIS. L. REV. 813, 823–26 (2013) (describing the evolution of the Federal Circuit’s formalist obviousness jurisprudence and contrasting it with the contextual approach embraced by the Supreme Court).

92. Pedraza-Fariña, *supra* note 91, at 825.

scientific community, that would lead one of ordinary skill in the art to combine references even absent an explicit indication to do so.⁹³ This is essentially the conclusion reached by the Supreme Court in *KSR International Co. v. Teleflex, Inc.* when it rejected the TSM test as the sole obviousness analysis, and replaced it with a case-by-case focus on what scientists and inventors would know or could develop during routine research.⁹⁴ Interestingly, although one might expect the Federal Circuit in the wake of *KSR* to begin placing much more attention on defining the attributes of a person having ordinary skill in the art,⁹⁵ the court still rarely does so.⁹⁶ Rather, the court appears to be sliding back into pre-*KSR* rule formalism.⁹⁷

While the court's obviousness jurisprudence is one of the most salient examples of its reliance on rigid rules, it is by no means the only one. The Federal Circuit has favored bright-line rules over flexible standards in determining whether an invention is novel, in patentable subject matter determinations, in establishing remedies and, more recently, in its extraordinary case jurisprudence.⁹⁸ In a key patentable subject matter decision, *In re Bilski*, the Federal Circuit developed the "machine or transformation test" as the "sole test" of patentability for process claims.⁹⁹ Under this test, a process may constitute patentable subject matter if it (1)

93. *Id.* at 823–25; Rebecca S. Eisenberg, *Obvious to Whom? Evaluating Inventions from the Perspective of PHOSITA*, 19 BERKELEY TECH. L.J. 885, 896 (2004) (arguing that the TSM test had the "practical effect of excluding from the analysis the tacit knowledge ordinary practitioners commonly possess").

94. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."); *see also* Daralyn J. Durie & Mark A. Lemley, *A Realistic Approach to the Obviousness of Inventions*, 50 WM. & MARY L. REV. 989, 999 (2008) ("[T]he one consistent strand that runs through the opinion is a rejection of rigid rules, replaced with a case-by-case focus on what actual scientists in the field would know or could develop with ordinary inventive skill.").

95. *See* Durie & Lemley, *supra* note 94, at 1000–03 (arguing that, in the aftermath of *KSR*, courts should pay increased attention to "the way in which PHOSITAs work in the real world").

96. *See, e.g.*, Emer Simic, *The TSM Test is Dead! Long Live the TSM Test! The Aftermath of KSR, What Was All the Fuss about?* 37 AIPLA Q.J. 227, 247–48 (2009) (discussing the Federal Circuit's unwillingness to clearly define a PHOSITA in multiple cases).

97. *See, e.g.*, Pedraza-Fariña, *supra* note 91, at 862–63 (showing how "in its more recent opinions, the Federal Circuit has taken a narrower and more formalistic view of analogous art," which is a key step in the obviousness inquiry).

98. *See* Thomas, *supra* note 7, at 778–81 (novelty); *In re Bilski*, 545 F.3d 943, 955–56 (Fed. Cir. 2008) (patentable subject matter); *Apple, Inc. v. Samsung Elec. Co.*, 678 F.3d 1314, 1335 (Fed. Cir. 2012) (remedies); *Icon Health & Fitness, Inc. v. Octane Fitness, LLC*, 496 Fed. App'x 57, 65 (Fed. Cir. 2012) (exceptional case jurisprudence).

99. *In re Bilski*, 545 F.3d 943, 955–56 (Fed. Cir. 2008). The "machine-or-transformation" test was first articulated in *Gottschalk v. Benson*, 409 U.S. 63, 69–70 (1972).

utilizes a particular machine or apparatus or (2) transforms an object into a different state or thing.¹⁰⁰ On appeal, however, the Supreme Court refused to limit the patentability inquiry to the machine or transformation test, calling it a “categorical rule” that would “frustrate the purposes of patent law” by hindering the adoption of technological advances.¹⁰¹ Similarly, prior to the Supreme Court’s decision in *eBay Inc. v. MercExchange, LLC*, the Federal Circuit relied on a “general rule” that injunctions should issue in patent infringement cases absent exceptional circumstances.¹⁰² The Supreme Court struck down this general rule and held that patent infringement cases were not an exception to “the traditional four factor test applied by courts of equity when considering whether to award permanent injunctive relief to a prevailing plaintiff.”¹⁰³ Most recently, the Supreme Court rejected as “rigid and mechanical” another bright-line rule that the Federal Circuit had developed in its exceptional case jurisprudence.¹⁰⁴

Commentators are split regarding the normative desirability of rule-formalism. Practicing patent attorneys have by and large welcomed the Federal Circuit’s turn to rules as increasing predictability,¹⁰⁵ while a majority of academic commentators have denounced it as inconsistent with patent law’s goal of promoting innovation.¹⁰⁶ As Part III elaborates, predictions from the model of expert decision-making described in this article undercut the assumption that rule formalism will generate uniform decisions. Specifically, communities of experts are expected to look for ways to free themselves from the very rules they create to constrain their subordinates when these rules do not accord with their intuitions, thus making a rule-

100. *In re Bilski*, 545 F.3d 943, 955–56 (Fed. Cir. 2008).

101. *Bilski v. Kappos*, 561 U.S. 593, 605 (2010).

102. *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388, 388 (2006) (disapproving of the use of a “general rule”); *Apple*, 678 F.3d at 1335 (noting that the Supreme Court rejected the “general rule” in *eBay*).

103. *eBay*, 547 U.S. at 388.

104. *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 134 S. Ct. 1749, 1755 (2014). *See also* Dreyfuss *supra* note 12, at 512–15 (describing “the debate between the Supreme Court and the Federal Circuit over the use of bright line rules” and the Supreme Court’s rejection of the Federal Circuit’s rule formalism).

105. *See, e.g.*, Russell B. Hill & Frank P. Cote, *Ending the Federal Circuit Crapsboot: Emphasizing Plain Meaning in Patent Claim Interpretation*, 42 IDEA 1, 2 (2002) (extolling “the need for uniform application of the presumption in favor of plain meaning in patent claim interpretation”); Lee & Evans, *supra* note 8, at 7 (discussing the historical right to a patent jury trials as “reaffirmed” in *Markman*); Victoria Slind-Flor, *Federal Circuit Judged Flawed*, NAT’L L.J., Aug. 3, 1998 (noting that some have accused the court of “unpredictability”); Thomas *supra* note 7, at 794 (noting that patent lawyers were a powerful lobby that advocated for clear rules in patent law).

106. *See* references listed *supra* note 7.

based system much less predictable than would otherwise be anticipated. That the Federal Circuit does indeed routinely break its own rules helps explain, at least in part, the puzzling observation that the Federal Circuit has in fact failed to bring uniformity and predictability to its docket.¹⁰⁷

* * *

This Part has provided a synthesis of two lines of critique of the Federal Circuit as an institution. First, the Federal Circuit consistently grants less deference to decisions by trial courts and agencies than other Article III appellate courts typically grant, and, arguably, less deference than is required by Rule 52(a) and the APA, respectively. Second, the Federal Circuit prefers inflexible rules of decision to flexible standards, even though the rapid advances in technology that characterize the field of patent law may call for a more contextual, case-by-case approach. The next Part introduces the reader to studies in the sociology of expertise and adapts insights from this literature to the hierarchical court system.

III. APPROACHES TO EXPERT DECISION-MAKING

This Part synthesizes and brings together two approaches to the study of expertise generally: the institutional approach and the embodied approach.

A. THE INSTITUTIONAL APPROACH TO EXPERTISE: SOCIOLOGY OF THE PROFESSIONS

An important approach to the study of expertise focuses on how expertise is organized and controlled in society. This line of research studies the development of professional organizations and other institutionalized forms of expertise, as well as how expert institutions interact with one another.¹⁰⁸ From this body of work emerge two key insights with important consequences for the study of expert courts. First, groups of experts seek to maximize their control and autonomy over both the development of a system of expert abstract knowledge and its range of application. These expert groups, however, exist in an ecosystem of other expert groups who apply their distinct knowledge systems to the same sets of problems. For example, both physicians and psychologists compete over the application of

107. See *infra* Subsection IV.B.2.

108. See generally ANDREW ABBOTT, *THE SYSTEM OF PROFESSIONS: AN ESSAY ON THE DIVISION OF EXPERT LABOR* (1988); ELIOT FRIEDSON, *PROFESSIONALISM: THE THIRD LOGIC* (2001); MAGALI SARFATTI LARSON, *THE RISE OF PROFESSIONALISM: A SOCIOLOGICAL ANALYSIS* (1977); Elizabeth H. Gorman & Rebecca L. Sandefur, "Golden Age," *Quiescence, and Revival: How the Sociology of Professions Became the Study of Knowledge-Based Work*, 38 *WORK & OCCUPATIONS* 275 (2011).

their expert knowledge to mental health issues. The overlap between communities leads to competition for jurisdictional autonomy and control. Second, professions employ two key mechanisms in their competition for jurisdictional control: (1) *framing* of overlapping problems as being best solved through a particular expert community's abstract knowledge system, and (2) *codification* of a portion of that abstract knowledge into rules of easy application. I explore these two themes below.

Through a series of studies of professional organizations, such as those of doctors and psychologists, Andrew Abbott, Eliot Friedson, and others have theorized that the essence of a profession is to seek maximal autonomy and control over the set of abstract principles within its "jurisdiction."¹⁰⁹ In turn, a profession's jurisdiction is simply those tasks the profession considers to be (and that it convinces society should be) within its body of expert knowledge.¹¹⁰ Take, for example, the field of childhood health and development. Doctors have jurisdiction over the diagnosis and treatment of physical ailments, but a number of other professional groups have increasingly claimed jurisdiction over a subset of childhood physical problems, such as physical therapists, occupational therapists, speech language pathologists, and developmental therapists. Because of their overlapping claims to jurisdiction, these groups will often compete with each other and with physicians over the appropriate diagnosis and treatment of a problem. Having complete jurisdictional control means having the power to define and classify a problem, to define and apply the correct treatment, and to evaluate the treatment's success.¹¹¹ These studies define the term "profession" quite broadly, to encompass any exclusive or semi-exclusive community of experts that develops abstract knowledge and applies it to particular cases.¹¹²

In essence, the claim is straightforward: because organized groups of experts will seek to maintain control over their body of knowledge (composed of abstract principles), they will reject claims by those outside the profession to legitimately dictate what those professionals do or how they do it. Yet, this claim has crucial implications for understanding the interaction among expert communities and between experts and non-experts. This initial

109. Abbott, *supra* note 108, at 71 ("Full jurisdictional claims are, in general, the goal of all other types of settlements."); ELIOT FREIDSON, PROFESSIONAL POWERS: A STUDY OF THE INSTITUTIONALIZATION OF FORMAL KNOWLEDGE (1986).

110. Abbott, *supra* note 108, at 59.

111. *Id.*

112. See, e.g., Gorman & Sandefur, *supra* note 108, at 277 ("In the eyes of contemporary scholars, the commonalities between traditional professions and new forms of knowledge-based work are more important than the differences.").

claim immediately implies another: professions do not exist in isolation, but are embedded in an ecosystem where they compete with one another for jurisdictional control.¹¹³ In turn, dissecting the mechanisms by which such competition takes place is important for understanding expert community dynamics. The following subsections explore two such mechanisms: (1) competing framings of tasks and problems as best solved within a profession's system of abstract knowledge, and (2) codification of (at least a portion of) such abstract knowledge.

1. *Competing Framings of Tasks and Problems*

Professions seek to gain and maintain jurisdictional control through the development and control of a *system of expert abstract knowledge*, which only members of the profession have access to and can apply to specific cases.¹¹⁴ For example, different medical specialties have developed abstract knowledge systems that correlate symptoms with disease diagnoses, mechanistic explanations for the disease, and appropriate treatments.¹¹⁵ Law is itself built on different systems of abstract knowledge. In patent law, concepts such as “a person of ordinary skill in the art,”¹¹⁶ “conception,”¹¹⁷ and “non-obviousness,”¹¹⁸ to name only a few, are elements in an abstract knowledge system designed to ultimately incentivize innovation.

Professions use abstract knowledge to classify and offer solutions for tasks and problems. Tasks can be conceptualized as having both objective and subjective elements. Objective elements are features of a problem so broadly agreed upon as constitutive of that problem that they come to represent fixed characteristics not easily reinterpreted.¹¹⁹ The most obvious objective element of a problem is given by its natural or factual characteristics. For example, any treatment for alcoholism is bounded by objective characteristics of alcohol consumption itself, such as loss of fine motor skills, as well as coarse motor skills and sensory function at high consumption levels.¹²⁰ Thus, objective elements of tasks require that a

113. See, e.g., Abbott, *supra* note 108, at 115 (discussing how external forces impact the development of expert communities).

114. See, e.g., *id.* at 70.

115. See, e.g., THE MERCK MANUAL OF DIAGNOSIS AND THERAPY (Robert S. Porter et al. eds., 19th ed. 2011) (“As it has for over 110 years *The Manual* provides health care practitioners . . . with straightforward, practical explanations of ‘what to do’ to diagnose and treat . . . conditions.”)

116. 35 U.S.C. § 103 (2006).

117. *Id.* § 201(g).

118. *Id.* § 103.

119. See, e.g., Abbott *supra* note 108, at 35–40.

120. Abbott, *supra* note 108, at 37–38.

profession's definition of a problem remain closely linked to that problem's fixed attributes. Subjective elements, on the other hand, are *framings* of a particular problem claimed by a particular profession.

Professions compete for jurisdictional control by framing problems as best solved within their unique abstract knowledge system. But there are often multiple ways to frame a problem's subjective qualities. Thus, the act of classifying a problem creates the arena where jurisdictional struggles take place. A classic example of jurisdictional competition through the control of a system of abstract knowledge concerns the struggle among clergy, medicine, psychiatry, and criminal law to define and treat alcoholism. Each one of these four communities sought to frame alcoholism—and thus to control the market for treatment—according to their own abstract knowledge systems:

At first [alcoholism was] a moral and spiritual problem; ministers were the relevant experts. The doctors soon attacked, substituting the claim of cure for the clergyman's mere condemnation and forgiveness. In the late nineteenth century, the problem was pronounced a legal one, although the lawyers and the police dealt with alcoholism simply by incarcerating it. The psychiatrists also claimed alcoholism in this period.¹²¹

Alcoholism framed as a mental disorder concerning addiction and impulse control grants primary jurisdictional control over treatment to psychologists or psychiatrists; framed as a problem involving neurotransmitter hypersensitivity, it grants primary jurisdictional control to physicians.

2. Rule-Making or Codification

A second, and complementary, form of control involves the *codification of abstract knowledge*. Codification, or rule making, allows professions to delegate work to subordinate professions while maintaining control over the abstract principles that create those rules.¹²² Codification allows expert communities to expand their jurisdiction by enlisting other—subordinate—communities

121. *Id.* at 37. A more recent iteration of this type of competition is between “scientific psychiatry,” embodied in the DSM manual, and “psychoanalysis” for the treatment of mental illness. *See, e.g.*, STUART A. KIRK & HERB KUTCHINS, *THE SELLING OF DSM* 7, 11 (1992) (arguing that psychologists “worried that the DSM-III was an attempt by psychiatrists to medicalize more human problems, laying claim by professional territory that was being hotly contested by them and others.”).

122. *See* Abbott, *supra* note 108, at 72 (“The direct creation of subordinate groups has great advantages for the professions with full jurisdiction. It enables extension of dominant effort without division of dominant prerequisites.”).

to render services under the dominant expert community's supervision.¹²³ For example, doctors have delegated the provision of on-site emergency aid (or pre-hospital aid) to paramedics, whose conduct is regulated by, for example, the "Basic Life Support Guidelines" and "Advanced Life Support Guidelines," both codifications of doctors' abstract knowledge.¹²⁴ As a general rule, deviation from these guidelines requires direct medical oversight, thus sharply reducing paramedic discretion.¹²⁵

Codification of expert knowledge, however, also makes knowledge more accessible to non-specialists and would be expected to ultimately erode specialists' control over that knowledge domain. Indeed, some medical sociologists predict that the use of information systems to monitor medical examinations, assist with diagnoses, and direct treatment plans would lead to a considerable erosion of physicians' power and autonomy.¹²⁶ But just as complete codification of expert knowledge would erode jurisdictional control, so would absolute abstraction. Abstract knowledge that remains completely inaccessible to the lay public precludes the public from evaluating the effectiveness of the expert community's jurisdictional claims, especially if that community also controls the tests that evaluate effectiveness itself. Absolute abstraction demands absolute trust in individual members of the profession as possessing the required, inaccessible expertise to solve the relevant problems. Therefore, codification also serves to legitimate a claim to effective treatment by making accessible to the lay public an expert community's claims to expertise through a simplified, rule-based version of

123. This particular role for rules as devices to control subordinate communities aligns most closely with traditional principal-agent models of judicial decision-making, in which principals use rules to constrain their agents' discretion. *See, e.g.,* Tonja Jacobi & Emerson H. Tiller, *Legal Doctrine and Political Control*, 23 J.L. ECON. & ORG. 326, 339 (2007) (modeling a higher court's choice of clear rules or flexible standards on the level of political alignment between the two courts, with higher political alignment resulting in a choice of standards and vice versa).

124. *See, e.g.,* Jerry P. Nolan et al., ERC Guidelines Writing Group, *European Resuscitation Council Guidelines for Resuscitation 2010*, 81 RESUSCITATION 1219–1276 (2010); STAMFORD HOSP. EMS SPONSOR HOSP. PROGRAM, ADVANCED CLINICAL CARE GUIDELINES, POLICIES AND PROCEDURES, 1 (2013), available at <http://www.stamfordems.org/Library/2012%20Adult%20and%20Pedi%20Treatment%20Guidelines.pdf>.

125. Stamford Hospital, *supra* note 124, at 4 ("No provider shall deviate from these guidelines without direct medical oversight . . .").

126. *See, e.g.,* John D. Stoeckle, *Reflections on Modern Doctoring*, 66 MILLBANK Q. 76, 82–83 (1988). Similarly, several legal scholars predict that information systems, allowing for the proliferation of low-cost, do-it-yourself court filings, would erode lawyers' control over the provision of legal services. *See, e.g.,* Richard L. Marcus, *The Impact of Computers on the Legal Profession: Evolution or Revolution?*, 102 NW. U. L. REV. 1827 (2008) (listing sources).

the experts' knowledge.¹²⁷ Thus, jurisdictional control requires a balance between codification and abstraction.

For example, sociologists of medicine argue that the DSM—a manual that codifies mental health diagnostic categories—was developed to address “the [psychiatric] profession’s self-doubts and its vulnerability to public and scientific criticism.”¹²⁸ Similarly, the turn towards the standardization of medical care was made, at least in part, to address a legitimacy crisis.¹²⁹ A series of studies documented wide divergences in the medical treatments offered to similarly situated patients, thus undermining the credibility of health care practitioners.¹³⁰ The solution adopted by the medical profession was to convene expert medical panels to draft rule-like clinical practice guidelines for a range of medical procedures, based on the best available scientific evidence.¹³¹ In both of these cases, however, codification reduced the discretion of members *within* the expert group, not just the discretion of members of subordinate professions. Because the adoption of guidelines limited doctors’ ability to rely on their intuition based on practice experience, they have proved controversial.¹³² Indeed, several studies have found that only a minority of doctors complies with guidelines in their field, despite being familiar with them.¹³³

Because codification serves not only to control subordinate communities, but also to restore the public’s trust in the objectivity and reliability of expert judgment, expert communities that enjoy a low level of public trust are expected to rely on inflexible rules most often.¹³⁴

127. See, e.g., THEODORE M. PORTER, TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE 4 (1995) (“Mechanical objectivity . . . has a powerful appeal to the wider public. It implies personal restraint. It means following the rules.”); Abbott *supra* note 108, at 60 (“By revealing to the public some of its professional terminology and insights, a profession attracts public sympathy to its own definition of tasks and its own approach to solving them.”).

128. Kirk & Kutchins, *supra* note 121, at 13.

129. See, e.g., Stefan Timmermans & Emily S. Kolker, *Evidence-Based Medicine and the Reconfiguration of Medical Knowledge*, 45 J. HEALTH & SOC. BEHAV., 177, 177 (2004).

130. See, e.g., THE CTR. FOR THE EVALUATIVE CLINICAL SCI., DARTMOUTH MEDICAL SCHOOL, THE DARTMOUTH ATLAS OF HEALTH CARE 1998 2 (John E. Wennberg et al. eds., 1998) (mapping the frequency and variety of surgical interventions by geographical area to similarly situated patients, and showing that “in health care, geography is destiny”).

131. See Timmermans & Kolker, *supra* note 129, at 181.

132. *Id.* at 186.

133. *Id.* (noting that other studies have “overestimated the role of guidelines in daily clinical practice”).

134. Porter, *supra* note 127, at 229–30 (noting that recourse to inflexible rules is most salient in scientific communities that are poorly insulated from public criticism).

B. THE EMBODIED APPROACH TO EXPERTISE: HOW NOVICES BECOME EXPERTS

A second strand of sociological thought has focused on the interplay between explicit rules of decision and contextual knowledge in both expert training and expert decision-making.¹³⁵ The key insight derived from this line of inquiry is that expertise is inextricably linked with tacit knowledge—“inarticulatable skills of which one cannot fully give account”¹³⁶—that make it impossible to fully codify an expert’s body of knowledge into a set of written rules.

Nevertheless, rule making plays an important role in accounts of expertise acquisition. Self-conscious following of explicit rules is what enables a novice to begin his or her path towards expertise.¹³⁷ But while the novice applies “context free” rules—being incapable of taking into account contextual factors that may require the modification of these rules—an expert not only internalizes but also transcends rules.¹³⁸ While a novice slowly and deliberately strives to follow rules, through a “painful” and “jerky” process, an expert experiences “flow” as he “unselfconsciously” recognizes complex contextual cues.¹³⁹ In fact, experts often tend not to follow the heuristics they relied upon during their training.¹⁴⁰ An expert relates to context in “a fluid way using cues that it is impossible to articulate and that if articulated would usually not correspond, or might even contradict, the rules explained to novices.”¹⁴¹ Thus, a direct consequence of expert intuition is an unavoidable conflict between the rules as explained to novices and their actual application by experts to real-world contexts.

Gaining expertise, however, requires more than following rules that are eventually transcended through repeated practice. Rather, to fully grasp expert knowledge requires “enculturation”: interactively immersing oneself

135. See, e.g., HARRY COLLINS, TACIT AND EXPLICIT KNOWLEDGE (2010); HARRY COLLINS & ROBERT EVANS, RETHINKING EXPERTISE (2007); HUBERT L. DREYFUS & STUART E. DREYFUS, MIND OVER MACHINE: THE POWER OF HUMAN INTUITION AND EXPERTISE IN THE ERA OF THE COMPUTER (1986); Robin Cowan, *Expert Systems: Aspects of and Limitations to the Codifiability of Knowledge*, 30 RES. POL. 1355, 1356 (2001) (describing the limitations of a computer expert system—i.e., computer code designed to simulate expert decision-making—as lacking the ability to make contextual decisions).

136. EVAN SELINGER, EXPERTISE: PHILOSOPHICAL REFLECTIONS 10 (2011).

137. Dreyfus & Dreyfus, *supra* note 135, at 21–36.

138. *Id.*

139. *Id.*

140. Selinger, *supra* note 136, at 19 (describing experts as having “acquired and embodied skills that provide the basis for determining whether rule following or intuitive comportment are meaningful guides for acting in the field one becomes expert in”).

141. Collins & Evans, *supra* note 135, at 25.

into expert culture.¹⁴² In other words, acquiring expertise requires learning by doing.¹⁴³ One important consequence of locating expertise within the expert community rather than with the individual is that both becoming and continuing to be an “expert” requires embeddedness in the relevant expert community: “expertise can be lost if time is spent away from the group.”¹⁴⁴

Despite this division between novices and experts—with the former relying more heavily on rules to make decisions—there is a high level of variability in the extent to which experts themselves resort to rules as decision-making tools. Theodore Porter’s research on expert communities in science shows that communities that are fractured by internal dissent and that lack widely shared background assumptions—or what he terms “weak” communities—tend to be more rule-bound than established, “strong” expert communities.¹⁴⁵ Experts in strong communities are more likely to rely on tacit, contextual knowledge to make decisions, and to relegate rules to novice training.¹⁴⁶ For example, Porter describes how the research community of high-energy physicists relies on the “long process of socialization” and a “tight network of personal contacts” to operate with a high degree of informality. Only graduate students (that is, novices) “pay much attention to published papers; mature scientists interact mainly by talking, not writing.”¹⁴⁷

Finally, from these studies emerge two additional insights. First, when beginners reach the expert stage they are transformed, not only in their ability to dispense with rules, but also in their affective relationship to their field of expertise.¹⁴⁸ The process of acquiring expertise represents a progression “from relative detachment to engaged commitment.”¹⁴⁹ Second, experts will have difficulty communicating with non-experts precisely because non-

142. Collins & Evans, *supra* note 135, at 23–24.

143. See, e.g., THOMAS KUHN, *STRUCTURE OF SCIENTIFIC REVOLUTIONS* 47 (1962) (pointing out that serious science is done only by those who have been well socialized into a body of specialists).

144. Collins & Evans, *supra* note 135, at 3.

145. Porter, *supra* note 127, at 228 (“[T]he relative rigidity of rules for composing papers, analyzing data, even formulating theory, ought to be understood in part as a way of generating shared discourse, of unifying a weak research community.”).

146. *Id.* at 230 (“In . . . fields dominated by a relatively secure community, much of what we normally associate with the scientific mentality—such as an insistence on objectivity, on the written word, on rigorous quantification—is to a surprising degree missing. Scientific knowledge is most likely to display conspicuously the trappings of science in fields with insecure borders, communities with persistent boundary problems.”).

147. *Id.* at 222.

148. Dreyfus & Dreyfus, *supra* note 135, at 19 (arguing that it is this affective transformation following skill acquisition—in addition to tacit knowledge—that differentiates expert communities from computerized expert systems.).

149. See *id.* at 35.

experts can be likened to novices who only have access to the rules, but not the intuition, of the expert community.¹⁵⁰

IV. A TYPOLOGY OF FEATURES OF EXPERT COMMUNITIES

Understanding the behavior of organized groups of experts requires recognizing their unappreciated dynamic of jurisdictional competition for maximal control and autonomy in the development and application of an expert body of knowledge. It also requires an appreciation of the mechanisms through which that competition takes place, including the multiple roles of formal rules as mechanisms of controlling subordinate communities and increasing external legitimacy, as well as the importance of competing framings of tasks and problems. Finally, it requires understanding how expert decision-making differs from that of novices. Applying these insights to the Federal Circuit and potentially to specialized courts more broadly, however, involves, first, an exploration of whether the Federal Circuit can be analogized to the expert communities studied by sociologists of expertise and described in Part III. Doing so requires a fine-grained understanding of how various aspects of expert community behavior interact with each other. Second, these insights must be adapted to the hierarchical court system. Drawing from and synthesizing the work discussed in Part III, Section IV.A argues that the Federal Circuit behaves like an expert community. Section IV.B unbundles expert behavior into four inter-related characteristics: (1) epistemic control, (2) codification, (3) typecasting, and (4) inability to self-coordinate. Finally, Section IV.C discusses alternative explanations of Federal Circuit behavior.

A. THE FEDERAL CIRCUIT AS AN EXPERT COMMUNITY

Much of the research presented in the previous section studied traditional professional groups—institutions that are largely autonomous from the state, with independent entrance exams, licensing procedures, and ethical guidelines. Does this research apply to an institution like the Federal Circuit? Answering this question requires understanding both similarities and differences between the Federal Circuit and those expert groups studied by sociologists. Where the Federal Circuit is different, how might it be different, and how might these differences impact behavior predictions that flow from these sociological studies?

150. See Selinger, *supra* note 136, at 22.

Sociologists who study traditional professions already have in mind a broader definition of the term “profession” than how the term is colloquially understood. For example, sociologist Andrew Abbott adopted what he termed a “very loose” definition of “profession” in his work as “somewhat exclusive groups of individuals applying somewhat abstract knowledge to particular cases.”¹⁵¹ And sociologist Gil Eyal argues that jurisdictional competition can take place between “any groups that can lay a claim of expertise.”¹⁵² In turn, this suggests that insights derived from the sociology of expertise are applicable to the Federal Circuit, so long as it can be conceptualized as a relatively exclusive group with a claim to expertise in patent law.

Expertise in patent law can be disaggregated at least into three levels. First, the Federal Circuit has particular expertise in formulating patent doctrine to fulfill the dual congressional mandate of uniformity and efficiency.¹⁵³ Second, the Federal Circuit has special knowledge on how to apply abstract patent doctrine to technical fact patterns.¹⁵⁴ Third, the Federal Circuit has technical expertise, which involves an understanding (or at least a comparative advantage vis-à-vis other courts) of the complex and evolving technology often involved in patent litigation.¹⁵⁵ Although it is debatable whether the Federal Circuit judges *in fact* possess the required legal and technical expertise, Congress, other courts (including the Supreme Court), and academic commentators have *attributed*¹⁵⁶ these types of expertise to the Federal Circuit.¹⁵⁷ Importantly, recent empirical studies show that district

151. Abbott, *supra* note 108, at 318.

152. Gil Eyal, *For a Sociology of Expertise: The Social Origins of the Autism Epidemic*, 118 AM. J. SOC. 863, 869 (2013). See Gorman & Sandefur, *supra* note 108, at 277 (arguing that “the commonalities between traditional professions and new forms of knowledge-based work [were] more important than their differences.”).

153. See H.R. Rep. No. 97-312, at 20 (1981).

154. See *id.* at 22–23; S. Rep. No. 97-275, at 23 (1981).

155. For example, Daniel Meador, a key figure in the creation of the Federal Circuit, praised its limited subject matter jurisdiction as a means to increase the judges’ expertise in that subject area. See S. Rep. No. 97-275, at 6 (1981).

156. Attributed, as opposed to substantive, expertise does not require an objective, external measure of competence. Rather, under an attributional view of expertise, being an expert means that other relevant audiences attribute the quality of expertise to a particular community that also views itself as expert.

157. See, e.g., *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 40 (1997) (noting the Federal Circuit’s “special expertise” in patent law); Transcript of Oral Argument at 28, *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347 (2014) (No. 13-298) (Breyer, J.) (describing the Supreme Court decisions in *Mayo*, 132 S. Ct. 1289 and *Bilski v. Kappos*, 561 U.S. 593 (2010) as “sketch[ing] an outer shell of the content, hoping that the experts, you and the other lawyers and the . . . circuit court, could fill in a little better than we had done the content of that shell”); John M. Golden, *supra* note 157, at 660 (arguing that the

courts accord the Federal Circuit greater institutional authority in patent law (compared to the Supreme Court) than they accord other circuit courts in copyright law (compared to the Supreme Court).¹⁵⁸ This suggests that district courts also view the Federal Circuit as deserving of increased deference in issues of patent law, likely by virtue of their relevant expertise. In addition, the Federal Circuit has self-identified as an expert community. For example, the Federal Circuit has often noted that it possesses “special” and “useful” expertise on matters of patent law based in part on the large volume of patent cases it decides.¹⁵⁹

There are, however, two key differences between the Federal Circuit and the expert groups described in the previous sections: (1) embeddedness in a hierarchical court structure and (2) high epistemic diversity among members of the court. Because the Federal Circuit is embedded in a hierarchical court structure, it is subject to rules of deference (such as Rule 52(a) requiring deference to the district court’s findings of fact, or the required deference to Supreme Court holdings) that place limits on its autonomy and thus on its ability to compete freely with other expert communities. In addition, current Federal Circuit judges have no say over new judicial appointments¹⁶⁰—in contrast to most expert groups that control admittance into their community. Of course, other expert communities are subject to external controls as well. For example, medical malpractice law regulates doctors’ behavior.¹⁶¹ And several states have passed laws banning some types of scientific research, such as human reproductive and therapeutic cloning.¹⁶² Nevertheless, the hierarchical structure of the judicial system does not map neatly onto other types of regulation imposed on the expert communities traditionally studied by sociologists.

Federal Circuit “hears enough patent cases to acquire unquestionable expertise on questions of substantive patent law”).

158. David R. Pekarek Krohn & Emerson H. Tiller, *Federal Circuit Patent Precedent: An Empirical Study of Institutional Authority and Intellectual Property Ideology*, 2012 WIS. L. REV. 1177, 1194 (2012).

159. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 571–72 (Fed. Cir. 2000) (en banc). *See also Highmark, Inc. v. Allcare Health Mgmt. Sys., Inc.*, 687 F.3d 1300 (Fed. Cir. 2012), *reh’g denied*, 701 F.3d 1351, 1356 (Fed. Cir. 2012) (“The Federal Circuit brings to the table useful expertise. Our court sees far more patent cases than any district court, and is well positioned to recognize those ‘exceptional’ cases in which a litigant could not, under the law, have had a reasonable expectation of success.”).

160. *See* U.S. CONST. art. II, § 2, cl. 2; 28 U.S.C. § 44(a) (2006).

161. 42 U.S.C. § 11131 (2006).

162. *See, e.g.*, ARK. CODE ANN. §§ 20-16-1001-1004 (2003); 2005 Ind. Acts No. 268; MICH. COMP. LAWS §§ 333.26401-26403 (1999); N.D. CENT. CODE §§ 12.1-39 (2003); S.D. CODIFIED LAWS § 34-14-27 (2004); VA. CODE ANN. §§ 32.1-162.22-2 (2001).

Second, there is greater diversity in the background and training of Federal Circuit judges (what I term “epistemic diversity”) than would be expected of members of traditional professions. There is no standard curriculum that makes a Federal Circuit judge an expert in patent law.

This level of epistemic diversity among Federal Circuit judges is not completely unheard of in other expert communities. In fact, many expert communities could be subdivided into sub-communities with closer epistemic connections. For example, expert communities of geneticists contain within them communities of human geneticists, mouse geneticists, fruit fly geneticists, and so on. Nevertheless, the epistemic diversity of the Federal Circuit raises the question of whether it can still be considered a coherent, single community. Several lines of argument indicate that the Federal Circuit does indeed behave like a single expert community—albeit one with a high potential for internal dissent and fracture. First, the Federal Circuit sees itself as an institution with a collective “special expertise” in patent law—a self-perception that is shared across government actors, including Congress, lower courts, and the Supreme Court.¹⁶³ Second, epistemic diversity upon entering the court does not preclude the development of shared norms in the course of making patent decisions. Indeed, an important finding of sociologists of expertise is that communities that work towards a shared goal (in this case, to develop a coherent body of patent law) will tend to develop shared understandings and norms.¹⁶⁴ In this framework, new members of the Federal Circuit are expected to be enculturated into existing Federal Circuit norms. Still, high levels of epistemic diversity are likely to make the Federal Circuit more akin to “weak” expert communities, with high levels of internal dissent.

Finally, the Federal Circuit has recently experienced a high turnover rate in its judicial membership. Six of the eleven active Federal Circuit judges have been appointed by the Obama administration between 2010 and 2013, imposing a potentially important disruption of the CAFC’s composition.¹⁶⁵

163. See *supra* notes 164–166.

164. See, e.g., Thomas Gieryn, *Boundaries of Science*, in THE HANDBOOK OF SCIENCE AND TECHNOLOGY STUDIES 393, 412 (Sheila Jasanoff, Gerald E. Markle, James C. Petersen & Trevor Pinch, eds., 1995).

165. Kathleen M. O'Malley, *Circuit Judge*, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/judges/kathleen-m-omalley-circuit-judge.html>; Jimmie V. Reyna, *Circuit Judge*, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/judges/jimmie-v-reyna-circuit-judge.html>; Evan J. Wallach, *Circuit Judge*, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/judges/evan-j-wallach-circuit-judge.html>; Richard G. Taranto, *Circuit Judge*, UNITED STATES COURT OF APPEALS FOR THE FEDERAL

Can a high-turnover, small group of judges be analogized to an “expert community” of the type studied by sociologists of expertise? It is certainly the case that one potential hurdle to conceptualizing the Federal Circuit as an expert community concerns the stability of its expertise given judge turnover. The model of expert communities introduced here assumes the development of a set of practices and social norms associated with the Federal Circuit’s role as an expert in patent law.¹⁶⁶ It further assumes that those norms are likely to persist in spite of personnel changes, as new judges are enculturated into the practices of the expert community.¹⁶⁷ Of course, this logic has a limit: if all Federal Circuit judges were to be replaced overnight, there would remain no or little institutional repository for existing norms. But given a stable core of Federal Circuit judges over time the assumption of a stable set of practices is likely justified. There may be particular times in the Federal Circuit’s history, however, when its institutional identity as an expert court is particularly fragile. During these times, we would expect the Federal Circuit to mirror the behavior of “weak” expert communities described in Part III.

The typology of Federal Circuit decision-making developed below adapts insights from the sociology of expertise to the context of specialized courts in light of the hierarchical structure in which the court is embedded and the epistemic diversity of the Federal Circuit.

B. FOUR FEATURES OF EXPERT COMMUNITIES AND THEIR APPLICATION TO FEDERAL CIRCUIT BEHAVIOR

This Section introduces the four features of the typology and their interrelationship. It then applies each feature to the Federal Circuit, showing how conceptualizing the Federal Circuit as an expert community has both explanatory and predictive power for Federal Circuit behavior.

1. *Epistemic Control*

Jurisdictional control over both abstract analyses and solutions for problems within an expert community’s field of expertise requires the twin forces of monopoly and autonomy—which this Article bundles under the term “epistemic control.” *Epistemic monopoly* allows control over the *supply* of expertise by placing the expert community as the only source of valid

CIRCUIT, <http://www.cafc.uscourts.gov/judges/richard-g-taranto-circuit-judge.html>; Raymond T. Chen, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/judges/raymond-t-chen-circuit-judge.html>; Todd M. Hughes, Circuit Judge, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <http://www.cafc.uscourts.gov/judges/todd-m-hughes-circuit-judge.html>.

166. See, e.g., Pedraza-Fariña, *supra* note 91, at 844–45.

167. *Id.*

solutions for a particular problem. *Epistemic autonomy* refers to an expert community's independence in defining the significance and relevance of its knowledge base. Autonomy leads to jurisdictional control over the classification and definition of a problem as pertaining to an expert community's sphere of expertise. Epistemological autonomy allows control over the *demand* for expertise by granting an expert community's independence in framing its knowledge base.

An example of how these two forces may be unlinked is illustrative: a government agency could grant *epistemological monopoly* to an expert community to solve problem X but retain *epistemological autonomy* to define precisely what X is and whether X requires the application of the knowledge base of a particular community. Complete epistemic control implies control both over the system of knowledge (abstractions) used to solve a particular problem, and the framing of the problem itself as amenable to solution by that particular set of abstractions.

Several consequences follow from an expert community's drive for epistemic control. First, epistemic monopoly will reduce deference to findings by subordinate non-experts—thus helping *explain* the CAFC's non-deferential relationship to lower courts (which act as subordinate generalist communities). Second, the drive for epistemic monopoly will lead to jurisdictional competition with other expert communities—thus helping *explain* the CAFC's fraught relationship with the PTO, characterized by both lack of deference on the CAFC's part and by the PTO's resistance and defiance to the CAFC. Third, epistemic monopoly *predicts* resistance to solutions for a particular problem proposed by non-experts in positions of authority—the problem of *defiance*. Finally, epistemic autonomy is likely to lead to resistance to alternative framings of or solutions for the problems under study that usurp an expert community's ability to address that problem—thus predicting *jurisdictional expansion*. These four implications of epistemic control are discussed more fully below.

a) Explaining the Federal Circuit's Relationship with Lower Courts:
Non-Deference

As discussed in Section II.A, the Federal Circuit has arrogated power over facts, or construed mixed questions of law and fact as questions of law—issues on which appellate courts traditionally grant deference to district courts. This model complements existing explanations of Federal Circuit behavior that attribute its lack of deference to lower courts simply to its

better judgment on or knowledge of patent issues.¹⁶⁸ If superior understanding of how to apply patent law to a particular technological area were the only factor driving this lack of deference, one may expect the Federal Circuit to follow the general rule of deference to trial courts on factual matters but make reasoned, case-by-case corrections when its understanding of the technology or reliability of expert testimony differed from that of the district court. Instead, the Federal Circuit has resorted to blanket rules of non- or reduced deference that increase its monopoly on decisional authority, and allow it to avoid having to give explanations for deviating from a trial court's interpretation of expert testimony. Indeed, it is telling that the Federal Circuit has been most resistant to show deference to district courts on claim construction—an issue that is often outcome-determinative of all other questions in a patent case.¹⁶⁹ This behavior is more consistent with an expert community's drive for maximal control over the supply of expertise in patent law.

The Federal Circuit's lack of deference to trial courts on issues of patent law stands in sharp contrast to the court's non-patent decisions, which are characterized by high affirmance rates and deferential standards of review.¹⁷⁰ Patent law scholars have relied on theories of institutional design of administrative agencies to explain the Federal Circuit's disparate treatment of patent and non-patent cases.¹⁷¹ Specifically, these theories predict that agencies with multiple tasks will tend to give prominence to one of those tasks that implicate "agency culture, history, monitoring difficulties, and political concerns."¹⁷² Under this view, the Federal Circuit expands its jurisdiction on issues central to its core mission, but surrenders it on peripheral issues.¹⁷³ This model offers an alternative, yet complementary,

168. See, e.g., Dreyfuss, *supra* note 40, at 48 ("A trial judge who has never read a technical document before is less likely to interpret it correctly, no matter how many expert witnesses are called to testify, than an appellate judge who has extensive experience in dealing with such matters.").

169. See, e.g., Oskar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 SETON HALL L. REV. 1, 7 (2012) ("[E]very substantive aspect of patent law is controlled by the claims."); Giles S. Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499 (1990) ("The claim is the name of the game.").

170. See Ted L. Field, "Judicial Hyperactivity" in *the Federal Circuit: An Empirical Study*, 46 U.S.F. L. REV. 721, 759–63 (2012) (reporting a 28.8% reversal rate in patent cases and a 14.3% reversal rate in nonpatent cases).

171. See, e.g., Paul R. Gugliuzza, *The Federal Circuit As A Federal Court*, 54 WM. & MARY L. REV. 1791 (2013).

172. *Id.* at 1799.

173. *Id.*

explanation: the Federal Circuit's unique behavior in the area of patent law flows from its attributed expertise in the subject.

b) Explaining the Federal Circuit's Relationship with Other Expert Bodies: Jurisdictional Competition

The drive to maintain maximal control and to displace alternative framings of a problem predicts competition with other expert communities. In the area of patent law, the Federal Circuit, the PTO, and the ITC would be expected to compete with each other for maximal monopoly and autonomy in the design and application of patent law. Competition between expert communities can take different forms, depending on the tools available to those communities to maintain and expand their epistemic monopoly and autonomy. As elaborated in the next section, codification (or rulemaking) remains one of the most powerful mechanisms where a superior expert community can both delegate authority to a subordinate expert community and control how that authority is exercised. The role of codification, and its impact on the relationship between the Federal Circuit and the PTO, is explored in depth in the next section.

But codification is not the only means of competition. The Federal Circuit has used additional strategies to avoid according deference to the PTO—from refusing to recognize the existence of factual disputes to applying a more stringent standard of review than that mandated by the APA.¹⁷⁴ On its part, the PTO has been keen on expanding its influence over patent law and policy, challenging the Federal Circuit's power at the Supreme Court and, more quietly, simply refusing to apply Federal Circuit guidelines—providing further evidence of the competitive relationship between these two communities.¹⁷⁵

c) Predicting Federal Circuit Behavior: Defying the Supreme Court

An expert community's drive to control both the system of knowledge (abstractions) used to solve a particular problem and how that problem is framed leads to an inevitable confrontation with other communities that are granted authority over the expert community. This prediction is consistent

174. See *Brand v. Miller*, 487 F.3d 862, 869 n.3 (Fed. Cir. 2007).

175. See, e.g., Clarisa Long, *The PTO and the Market for Influence in Patent Law*, 157 U. PA. L. REV. 1965, 1966 (2009) ("The PTO has been vying to gain more influence in the market for supplying legal rules and norms."); Craig Allen Nard, *Deference, Defiance and the Useful Arts*, 56 OHIO ST. L.J. 1415 (1995) ("[T]he PTO, as of late, has displayed an independent temperament, at times to the point of defiance, and has argued for greater deference with respect to its patentability decisions and interpretations of various provisions of the patent code.").

with findings that in hierarchical organizations (be it private or public) specialized subordinates are likely to grant less authority to their generalist superiors than are generalist subordinates.¹⁷⁶

There have been no quantitative empirical studies comparing Federal Circuit disobedience of Supreme Court decisions to disobedience by other circuits,¹⁷⁷ or assessing whether the Federal Circuit is more likely to defy the Supreme Court in its attributed area of expertise (patent law) than in any of the other cases that make up its docket—both of which are predicted by this model. Nevertheless, qualitative evidence suggests that this is the case. Indeed, Chief Justice Roberts has remarked on the Federal Circuit's unusual behavior, noting that it seemed an exception to the rule that lower courts generally follow Supreme Court precedent.¹⁷⁸ An analysis of Federal Circuit case law reveals a pattern of resistance to implementing Supreme Court decisions overruling Federal Circuit precedent—a pattern consistent with the model's prediction of defiance to decisions by generalist superiors.¹⁷⁹

For example, in one of the two Supreme Court cases reviewing the Federal Circuit in the 1980s, *Dennison Manufacturing Co. v. Panduit Corp.*, the Court remanded the case to the Federal Circuit with explicit instructions to provide an opinion “clearly setting forth” its reasoning on why Rule 52(a) did not mandate deference to the district court's factual determinations on nonobviousness.¹⁸⁰ Following the Court's decision, however, several Federal Circuit cases simply continued applying a de novo standard of review to the entire non-obviousness determination.¹⁸¹

176. JAMES Q. WILSON, BUREAUCRACY: WHAT GOVERNMENT AGENCIES DO AND WHY THEY DO IT 91–101 (1989).

177. A citation study of the Court of Customs and Patent Appeals, which existed alongside appellate courts prior to the creation of the Federal Circuit and heard appeals from PTO denials found that it “consistently cited the Supreme Court at lower rates than did the courts of appeals.” Lawrence Baum, *Specialization and Authority Acceptance: The Supreme Court and Lower Federal Courts*, 47 POL. RES. Q. 693, 700 (1994).

178. *See Carlsbad Tech., Inc. v. HIF Bio, Inc.*, 129 S. Ct. 1862, 1868 (2009).

179. *See supra* Part II.

180. 475 U.S. 809 (1986), *see also* Rai, *Engaging Facts and Policy*, *supra* note 8, at 1061 (analyzing *Dennison* and its aftermath).

181. *See, e.g., Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 765 (Fed. Cir. 1988) (arguing that the case presented no issues of fact and reviewing the trial court's non-obviousness determination de novo, even though deciding the case required solving factual dispute regarding the differences between the prior art and the patent at issue); *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051 (Fed. Cir. 1988) (granting no deference to the trial court's findings, which were based on its evaluation of expert testimony, that a PHOSITA would have been motivated to combine two prior art references to make the invention at issue).

As discussed in Section II.A.2, in *Dickinson v. Zurko*,¹⁸² a case involving deference to the PTO's findings of fact, the Supreme Court reversed a long line of Federal Circuit precedent holding that the deferential standard of review to agency fact-finding set forth in the APA did not apply to the PTO.¹⁸³ Subsequent cases, however, continued to review PTO fact-finding more stringently than required by the APA. They did so by interpreting the APA's "substantial evidence" standard as being more stringent than the "arbitrary and capricious" standard when applied to judicial review of agency fact-finding—in contravention of Supreme Court precedent.¹⁸⁴

The Federal Circuit's tendency to stray from Supreme Court opinions extends further than cases concerning the proper standard of review of district court and agency action. As mentioned in Section II.B, in *KSR v. Teleflex*, the Supreme Court rejected the Federal Circuit's "teaching, suggestion, and motivation test" as the sole rule to determine whether an invention is "obvious" under section 103 of the Patent Act.¹⁸⁵ The Court deemed the Federal Circuit's "rigid approach" at odds with Supreme Court precedent in *Graham v. John Deere Co. of Kansas City*,¹⁸⁶ which called for a flexible, functionalist inquiry.¹⁸⁷ The Court also made clear that a real-life PHOSITA's research would not be limited by explicit teachings or suggestions to combine elements from her own field of discovery.¹⁸⁸ Rather, a PHOSITA would be driven by "design incentives and other market forces" to find solutions to existing problems worked out within the PHOSITA's own field or a different one.¹⁸⁹

KSR had clear implications for the doctrine of analogous arts, which seeks to identify the content of all relevant prior art that would be available to a PHOSITA at the time of invention.¹⁹⁰ At a minimum, it suggested that determining the contours of analogous art requires a case-by-case determination of which sources a PHOSITA would be driven to consult, given existing market forces and design incentives. Nevertheless, and despite dicta in Federal Circuit opinions recognizing that *KSR* modified the

182. 527 U.S. at 154 (1999).

183. *Id.*

184. *See, e.g.*, *Flo Healthcare Solutions, LLC v. Kappos*, 697 F.3d 1367, 1378 (Fed. Cir. 2012); *Taylor v. U.S. Patent & Trademark Office*, 339 Fed. App'x 995, 998 (Fed. Cir. 2009); *Millman v. U.S. Patent & Trademark Office*, 257 Fed. App'x 307, 311 (Fed. Cir. 2007).

185. 550 U.S. at 400.

186. 383 U.S. 1, 21 (1966).

187. *KSR*, 550 U.S. at 401.

188. *Id.* at 401–02.

189. *Id.* at 401.

190. *See* 35 U.S.C. § 112(f) (2006); *Festo*, 234 F.3d at 564.

analogous art inquiry,¹⁹¹ the Federal Circuit has adopted a formalistic approach. In fact, in an important analogous art decision announcing a new rule for determining the contours of analogous art, *In re Klein*,¹⁹² the Federal Circuit did not even cite *KSR* as relevant authority.¹⁹³

Other recent cases reflect a similar tendency to disregard Supreme Court decisions that strike down long-standing Federal Circuit doctrine. In patentable subject matter, the Federal Circuit all but ignored the Court's instructions on remand in *Association for Molecular Pathology v. Myriad Genetics*¹⁹⁴ to decide the case in light of the Court's decision in *Mayo v. Prometheus*.¹⁹⁵ *Myriad* concerned the patentability of isolated genomic DNA (i.e., DNA extracted from a cell) and cDNA (i.e., the portion of DNA that codes for a protein, which is manufactured in the laboratory). Relying on its "product of nature" doctrine, the Federal Circuit had reasoned in *Myriad* that both genomic and cDNA were patent eligible because the genomic DNA and cDNA molecules obtained by laboratory manipulation were different from those existing in their natural state inside a cell.¹⁹⁶ *Mayo* concerned the patentability of a diagnostic method for adjusting the dosage of a drug to avoid toxicity while preserving therapeutic effectiveness.¹⁹⁷ The method relied upon a finding that concentrations in the blood above a threshold level of certain drug metabolites led to toxicity. The Court in *Mayo* reasoned that the "relationships between the concentration in the blood of certain thiopurine metabolites and the likelihood that the drug dosage will be ineffective or induce harmful side-effects"¹⁹⁸ were patent-ineligible laws of nature.¹⁹⁹

An application of the reasoning in *Mayo* to *Myriad* could have led the Federal Circuit to focus on the informational content of DNA—a code that

191. *See, e.g.*, *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010).

192. 647 F.3d 1343, 1352 (Fed. Cir. 2011).

193. *See id.*

194. *Ass'n for Molecular Pathology v. U.S. Patent and Trademark Office*, 689 F.3d 1303, 1308–09 (Fed. Cir. 2012), *aff'd in part, rev'd in part sub nom.* *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013).

195. *Mayo*, 132 S. Ct. 1289.

196. More specifically, the opinion authored by Judge Lourie focused on how isolating genomic DNA required breaking chemical bonds, and how the cDNA molecule did not exist in nature, but had to be synthesized in the laboratory. *Ass'n for Molecular Pathology*, 689 F.3d at 1329.

197. *Mayo*, 132 S. Ct. at 1290–91.

198. *Id.* at 1294.

199. *Id.*

gives instructions for translating DNA into a specific protein sequence.²⁰⁰ If the DNA code is a patent-ineligible law of nature, simply separating the DNA from the genome, using what the Federal Circuit itself characterized as “routine methods,” may not have been sufficient under *Mayo* to render genomic DNA patent-eligible.²⁰¹ Nevertheless, the Federal Circuit simply declared that *Mayo* was not applicable to the issue of patentability of genomic and cDNA.²⁰²

*Gunn v. Minton*²⁰³ is another example of Federal Circuit defiance. In *Gunn*, the Supreme Court reversed the Federal Circuit’s interpretation of its own jurisdiction as encompassing virtually any state law claim that raised issues of patent validity, enforceability, or infringement.²⁰⁴ *Gunn* concerned a suit for attorney malpractice in patent litigation, filed in a Texas state court.²⁰⁵ In *Gunn*, the Supreme Court rejected the Federal Circuit’s bright-line rule that all patent malpractice cases must be brought into Federal Court.²⁰⁶ Nevertheless, even though *Gunn* rejected the Federal Circuit’s interpretation of its own jurisdictional reach,²⁰⁷ the Federal Circuit has already suggested that the decision should be interpreted narrowly, thus preserving much of its previous jurisdictional caselaw.²⁰⁸

d) Predicting Federal Circuit Behavior: Jurisdictional Expansion

The feature of epistemic autonomy predicts that the Federal Circuit will tend to frame cases that involve other bodies of law (such as state and antitrust law) but that have a patent law component, as primarily about patent law—ultimately resulting in jurisdictional expansion. An extensive scholarly literature on patent law federalism supports this prediction.²⁰⁹ For

200. The genetic code can be understood as specifying a relationship between triplets of DNA base pair molecules and single proteins. This relationship is not determined by man, but rather represents the (natural) logic that allows the reproduction of all living organisms.

201. The case involved both cDNA and genomic DNA claims. *Mayo*, 132 S. Ct. at 1294 (“We find that the process claims at issue here do not satisfy these conditions. In particular, the steps in the claimed processes (apart from the natural laws themselves) involve well-understood, routine, conventional activity previously engaged in by researchers in the field.”)

202. *Ass’n for Molecular Pathology*, 689 F.3d at 1324–25.

203. *Gunn v. Minton*, 133 S. Ct. 1059 (2013).

204. *Id.* at 1061.

205. *Id.*

206. *Id.*

207. *Id.*

208. *Forrester Env’tl Servs., Inc. v. Wheelabrator Techs., Inc.*, 715 F.3d 1329, 1334 (Fed. Cir. 2013) (noting that much of the Federal Circuit’s jurisdictional case law “may well have survived the Supreme Court’s decision in *Gunn*”).

209. See, e.g., Shubha Ghosh, *Short-Circuiting Contract Law: The Federal Circuit’s Contract Law Jurisprudence and IP Federalism*, U. Wis. Legal Studies Research, Paper No. 1247, at 2014,

example, Shubha Ghosh argues that the Federal Circuit has appropriated jurisdiction over state contract law by creating its own federal common law of contracts.²¹⁰ Similarly, the Federal Circuit has interpreted its Congressional grant of jurisdiction as encompassing any state law claim that simply requires the application of patent law.²¹¹ Paul Gugliuzza argues that this expansive interpretation is contrary to Supreme Court precedent, which granted the Federal Circuit a narrower jurisdiction over state law claims, arising only when those claims raised pure issues of patent law.²¹² And antitrust scholars have repeatedly criticized the Federal Circuit for “increasing the scope of its exclusive jurisdiction to decide appeals of antitrust and other non-patent claims that implicate issues of patent law.”²¹³

2. Codification

All communities of experts strive to codify into written rules at least part of their abstract knowledge base. Institutional approaches to expertise described in Part III focus on the *external* functions of codification—the use of codification to *teach, delegate, and control* other (often subordinate) communities, or to *gain legitimacy* in the eyes of external audiences. The institutional approach to expertise focuses on the use of rules as a tool of jurisdictional competition between expert communities. Codification enables a superior expert community to both delegate authority to a subordinate expert community and control how that authority is exercised. And by legitimizing its approach in the eyes of relevant actors, expert communities compete with each other for the demand of their services. In contrast, embodied approaches to expertise focus on the *internal* functions of codification—the use of rules for purposes internal to the expert community (to *train novices* and to *manage internal dissent*). The interplay between the internal and external functions of codification is depicted in Figure 1 below.

The codification feature provides a richer account of the role of rule-making in expert communities than traditional explanations for the choice of rules over standards that tend to focus on rules solely as a form of control.

available at <http://ssrn.com/abstract=2390214>; Gugliuzza, *supra* [Fed. Cir. as Fed. Court] note 171; Camilla A. Hrdy, *State Patent Laws in the Age of Laissez Faire*, 28 BERKELEY TECH. L.J. 45, 47 (2013); Xuan-Thao Nguyen, *Dynamic Federalism and Patent Law Reform*, 85 IND. L.J. 449 (2010).

210. Ghosh, *supra* note 209, at 3.

211. Gugliuzza, *supra* note 11, at 30.

212. *Id.* at 31–32.

213. Scott A. Stempel & John F. Terzaken III, *Casting a Long IP Shadow over Antitrust Jurisprudence: The Federal Circuit's Expanding Jurisdictional Reach*, 69 ANTITRUST L.J. 711, 711 (2002); see also Ronald S. Katz & Adam J. Safer, *In Ruling on Antitrust, Does Fed. Circuit Overstep?*, NAT'L L.J., at C20, (Oct. 16, 2000).

Specifically, it predicts that the Federal Circuit will resort to rules not only to control and teach subordinate communities, but also as a key mechanism to manage its relationships with other relevant audiences, such as the patent bar and the public at large, and to diminish discord among its own members.

These features of codification, however, need to be modified to take into account both the hierarchical structure in which the Federal Circuit is embedded and the epistemic diversity of the Federal Circuit. First, court hierarchy may introduce a paradox that is not traditionally present in other expert communities, in which members of the expert group are free to announce rules to guide subordinate—but not expert—behavior.²¹⁴ Specifically, rules designed to control or teach subordinates also bind the Federal Circuit, thus preventing it from deploying its own expertise. The Federal Circuit appears to have solved this paradox by often ignoring its own rules, a phenomenon that will be explored in the next section. Second, the high levels of epistemological diversity characteristic of the Federal Circuit, and its recent high turnover rate, suggest that it will behave like a weak expert community and attempt to gain legitimacy through codification. Finally, as a weak community, this model predicts that the Federal Circuit would resort to rules on issues characterized by high levels of internal dissent.

The next sections explore in more depth how the codification feature of expert communities can both explain and predict Federal Circuit behavior.

a) Explaining the Federal Circuit's Relationship with Lower Courts and Agencies: Teaching, Delegation, and Control

The Federal Circuit is in a dual relationship with district courts. On the one hand, the expert Federal Circuit has a *teaching relationship* with generalist district courts, which can be conceptualized as non-experts in the patent law field. As novices, district courts need rules to begin to learn the art of making patent law decisions and cannot be trusted to correctly implement standards, or open-ended, flexible inquiries.²¹⁵ On the other hand, the district court is a *subordinate community* vis-à-vis the Federal Circuit. In this context, the Federal Circuit can be expected to use codification as a means to both delegate a subset of tasks to district courts, and to tightly control the exercise of that delegation.

214. See *supra* text accompanying note 124 (explaining the relationship between paramedics and medical doctors).

215. This view is consistent with recent comments by Justice Alito during oral argument in the case *Octane Fitness*. Justice Alito suggested that the district court does not have sufficient experience in patent law to be able to judge, without more explicit guidance, whether a patent law case is “exceptional.” Transcript of Oral Argument at 13, *Octane Fitness, LLC v. ICON Health & Fitness*, 134 S. Ct. 1749 (No. 12-1184) (Alito, J.).

Examples abound of rule development by the Federal Circuit and its admonition to district courts that rules need to be rigidly implemented. For example, in *KSR* itself, the Federal Circuit chastised the district court for failing to make specific findings on what “understanding or principle within the knowledge of a skill artisan . . . would have motivated one with no knowledge of [the] invention to make the combination in the manner claimed.”²¹⁶ In other words, the Federal Circuit demanded that the district court make its reasoning explicit, which in practice meant finding prior art of record demonstrating a reason to combine references.²¹⁷ The Federal Circuit thus denied the lower court recourse to its own judgment in determining both the skill in the art in the relevant technology and whether an artisan of that skill would have combined the references under consideration. Importantly, finding the level of skill in the art, and elucidating in light of all the factual evidence whether a PHOSITA would have combined the references at issue, is a fact-laden inquiry of the type that district courts are traditionally in the best position to perform.

The boundary between these twin functions of rules—as teachers, and as instruments of delegation and control—is not sharply delineated. Using rules to teach implies controlling what tasks are delegated to novices and how those tasks are performed. The key distinction is that the *delegation* and *control* functions of codification take place in the context of a competitive, rather than a mentoring, relationship between communities. Importantly, teaching also implies relinquishing at least some control after learning has taken place.

Disentangling whether the Federal Circuit is acting as a teacher or as a delegator/controller can be quite difficult given their overlap, but one can make some testable predictions as to the likely consequences of Federal Circuit behavior in each one of these roles. First, the teaching function implies that the Federal Circuit will modify its behavior as a function of district court learning, thus relaxing control by allowing more flexibility in the application of rules. There is some evidence suggesting that the Federal Circuit has increased its deference to district court decisions,²¹⁸ and in particular to decisions by specific district court judges who have sat with the Federal Circuit,²¹⁹ which is consistent with the teaching function of

216. *Teleflex, Inc. v. KSR Int'l Co.*, 119 Fed. App'x 282, 288 (Fed. Cir. 2005).

217. See, e.g., *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577 (Fed. Cir. 1984); *In re Geiger*, 815 F.2d 686, 688 (Fed. Cir. 1987).

218. Anderson & Menell, *supra* note 46; Jason Rantanen & Lee Petherbridge, *Disuniformity*, Univ. Iowa Legal Studies Research, Paper No. 13–42, 2014, available at <http://ssrn.com/abstract=2351993> and <http://dx.doi.org/10.2139/ssrn.2351993>.

219. Mark A. Lemley & Shawn P. Miller, *If You Can't Beat 'Em, Join 'Em? How Sitting by Designation Affects Judicial Behavior*, Stanford Public Law Working Paper No. 2449349, available

codification.²²⁰ Second, the tension between teaching and control implies the existence of a tipping point in which greater district court expertise won't lead to greater Federal Circuit deference, because an expert district court will become in fact a competitor to the Federal Circuit.²²¹

The logic of competition, rather than mentoring, is predicted to be most prominent in the Federal Circuit's interactions with other expert communities such as the PTO and the ITC—communities that can claim to have developed their own expert abstract knowledge base in patent law and policy. Rules control the PTO or the ITC by denying them recourse to their own expertise while simultaneously cementing the Federal Circuit's epistemic control over patent policy. Indeed, the Federal Circuit has similarly relied on a rigid interpretation of the TSM test to limit the PTO's ability to use its technical expertise.²²²

The teaching function of codification is consistent with Peter Lee's information-cost theory, which argues that expert communities resort to rules to codify and simplify expert knowledge for external, lay consumption.²²³ But as shown here, an equally important function of codification is that it permits an expert community to serve as the gatekeeper of its own jurisdictional power.

Finally, the delegation/control function gives rise to an important paradox in the context of a court hierarchy. As emphasized in the previous Section, the Federal Circuit would be expected to look for ways to free itself from the very rules it created to constrain their subordinates when these rules do not accord with their own intuitions. Indeed, the Federal Circuit appears to often "break" its own rules. For example, district court judges have

at SSRN: <http://ssrn.com/abstract=2449349>. For a list of district court judges who have visited the Federal Circuit from 2006 to 2013, see <http://www.cafc.uscourts.gov/images/stories/judicial-reports/vjchartforwebsite2006-2013.pdf>.

220. Increased deference to the opinions of fellow expert community members takes place not simply because new expert members "know better" than non-members, but also because they have been socialized into the practices of the expert community and have, as a consequence, gained the trust of their peers. *See, e.g.*, Porter, *supra* note 127, at 223 (arguing that "informal judgments of character and reliability are crucial for interpreting . . . experiments"). Lemley and Miller conclude that it is this increase in trust that accounts for increased deference to district court judges who sit by designation in the Federal Circuit. *Supra* note 219, at 28.

221. *See* Arti Rai, *Specialized Trial Courts: Concentrating Expertise on Fact*, 17 BERKELEY TECH. L.J. 877 (2002).

222. *See, e.g.*, *In re Lee*, 277 F.3d 1338, 1430 (Fed. Cir. 2002) ("[C]ommon knowledge and common sense even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority."); *In re Rouffet*, 149 F.3d 1350, 1356–57 (Fed. Cir. 1998); *In re Fritch*, 972 F.2d 1260, 1265–66 (Fed. Cir. 1992).

223. Lee, *supra* note 7. *See infra* Part C.II.

criticized the Federal Circuit for routinely ignoring its own rules in matters of claim construction.²²⁴ Commentators have leveled a similar criticism to the Federal Circuit's choice of law jurisprudence, noting how the court "inconsistently applied its choice of law rules"²²⁵ or "simply ignore[d] the choice of law rules issue altogether."²²⁶ This paradox also makes a rule-based system much less predictable than would otherwise be anticipated. In turn, this helps explain the observation that the Federal Circuit has in fact failed to bring uniformity and predictability to its docket.²²⁷

The degree to which the Federal Circuit will in fact break its own rules when those rules do not accord with its tacit or contextual knowledge will depend, however, on the extent to which rules also serve to secure external legitimacy and manage internal dissent—a role which is more important in weak expert communities. These two additional functions require that experts themselves abide by their rules and provide clear explanations when they choose to deviate from them.

The "rules vs. standards" debate in the legal literature has not generally considered these two additional functions of rules.²²⁸ The next Section begins to fill this gap by applying these two features of codification to Federal Circuit behavior.

b) Predicting External Relationships: Seeking Legitimacy through Rules

To generate demand for their services and acceptance of their diagnoses and treatments, expert communities require sociological legitimacy from relevant audiences.²²⁹ Sociological legitimacy refers to the acceptance (by the public at large, or by specific relevant audiences) of a particular expert community's authority in its area of expertise, based on reasons other than fear of sanctions or expectations of personal gain.²³⁰ Expert communities

224. See, e.g., O'Malley, Saris & Whyte, *supra* note 53, at 676.

225. Field, *supra* note 170, at 645.

226. *Id.* at 653.

227. See, e.g., Gugliuzza, *supra* note 171, at 1457–59 (noting that the Federal Circuit has failed to bring predictability to patent appeals).

228. See, e.g., Dan L. Burk, *Legal and Technical Standards in Digital Rights Management Technology*, 74 *FORDHAM L. REV.* 537 (2005); Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 *DUKE L.J.* 557 (1992); Russell B. Korobkin, *Behavioral Analysis and Legal Form: Rules vs. Standards Revisited*, 79 *OR. L. REV.* 23 (2000); Eric A. Posner, *Standards, Rules, and Social Norms*, 21 *HARV. J.L. & PUB. POL'Y* 101 (1997).

229. See, e.g., Cathryn Johnson, Timothy J. Down & Cecilia L. Ridgeway, *Legitimacy as a Social Process*, 32 *ANN. REV. SOC.* 53 (2006).

230. See, e.g., Richard H. Fallon, Jr., *Legitimacy and the Constitution*, 118 *HARV. L. REV.* 1787, 1795 (2005).

with low levels of sociological legitimacy are expected to rely on codified, rule-like procedures that make diagnoses and treatments more mechanical and transparent, and less reliant on an expert's tacit knowledge.²³¹ In contrast, expert communities that enjoy high levels of sociological legitimacy (and thus higher levels of trust) can rely more heavily on tacit or uncoded contextual knowledge.²³²

Tying rule formalism to legitimacy crises more precisely requires, at a minimum, both carefully documenting public opinion (and the opinion of relevant audiences) about the Federal Circuit's performance and correlating low public-opinion periods with increases in rule formalism. Such an undertaking is beyond the scope of this article. Nevertheless, observations about Federal Circuit behavior are consistent with the hypothesis that it has turned to rule formalism to address legitimacy crises. The Federal Circuit was created to bring consistency and expertise to patent law, which many believed was crippled by widely divergent standards of patentability among circuits and rampant forum-shopping.²³³ Although during the first decade of its existence, members of the patent bar and academic commentators generally agreed that the Federal Circuit was succeeding in bringing uniformity and predictability to patent law,²³⁴ criticism began to mount in the late 1990s.²³⁵ Specifically, several commentators blamed the Federal Circuit for inconsistent, panel-dependent opinions that failed to bring uniformity to patent law.²³⁶ The Federal Circuit's turn to rule formalism closely followed these waves of critiques.²³⁷ This is consistent with the hypothesis that rule formalism was (at least in part) a response to a crisis in sociological

231. See, e.g., Porter, *supra* note 127, at 226–28.

232. *Id.* at 220 (“Arguments within a [strong] community of specialists can be made with a minimum of formality, only a modest concern for rigor, and with frequent recourse to shared, often tacit knowledge.”).

233. See, e.g., Howard T. Markey, *The Federal Circuit and Congressional Intent*, 2 FED. CIR. B.J. 303, 303 (1992) (describing Congress's “express intent” that the Federal Circuit “contribute to increased uniformity and reliability in the field of patent law”); Charles Shifley, *Flawed or Flawless: Twenty Years of the Federal Circuit Court of Appeals*, 2 J. MARSHALL REV. INTEL. PROP. L. 178, 180 (2003) (praising the Federal Circuit for unifying patent law and arguing that internal disagreement within the Federal Circuit “pales in comparison to the conflicts that the patent law had before creation of the Court”).

234. See, e.g., Dreyfus, *supra* note 40, at 74 (“On the whole, the CAFC experiment has worked well for patent law . . .”).

235. See, e.g., Victoria Slind-Flor, *Federal Circuit Judged Flawed*, NAT'L L.J., Aug 3, 1998.

236. *Id.* (“[M]any members of the intellectual property bar . . . accuse the . . . court of unpredictability, claiming that results are often panel-dependent . . .”).

237. See Thomas, *supra* note 7, at 796 (describing the rise of adjudicative rule formalism at the Federal Circuit in the late 1990s).

legitimacy—much like the DSM was thought to have been developed to address psychology’s vulnerability to public and scientific criticism.²³⁸

c) Predicting Internal Relationships: Managing Dissent

Sociological studies of expertise indicate that experts—who have an “engaged commitment” to their area of expertise—are more prone than novices to develop and defend their individual opinions in the face of disagreement.²³⁹ In turn, this suggests that expert judges will be less prone to follow the norm of “consensus” that is theorized to limit dissenting panel opinions.²⁴⁰ The Federal Circuit’s epistemic diversity is likely to make the court even more prone to disagreement among its members than expert communities that share a common technical background that includes many years of education and socialization into a discipline.²⁴¹

Empirical studies of the Federal Circuit have shown that it dissents significantly more often than other circuit courts on issues of patent law—but not on other issues under its jurisdiction.²⁴² And disagreement appears to be growing: Jason Rantanen and Lee Petherbridge have shown that unanimous decision rates have fallen from more than 80% of all opinions to only 60% between 2005 to 2013.²⁴³

These results support the hypothesis that the Federal Circuit is a “weak” expert community with mounting internal divisions in the area of its expertise. Thus, much like the “weak” expert communities studied by sociologists of expertise, the Federal Circuit would be expected to resort to rule formalism as a mechanism to cure or minimize internal divisions. More specifically, if the prediction that rules serve as a tool to manage internal disagreement holds for the Federal Circuit, one would expect, first, that rules

238. Rochelle Dreyfuss has similarly linked the Federal Circuit’s preference for bright line rules leading to more precise decisions to “the court’s focus on public acceptance” and the need (at least in the Federal Circuit’s early years) to “build public support” for the court. Dreyfuss, *supra* note 7, at 816–17.

239. See *supra* Section III.B.

240. See, e.g., Joshua Fischman, *Estimating Preferences of Circuit Judges: A Model of Consensus Voting*, 54 J.L. & ECON. 781 (2011) (including a “cost of dissent” in the judicial utility function to account for the social norm of consensus in three-judge Federal Circuit panels).

241. See, e.g., Porter, *supra* note 127, at 222 (describing the community of high-energy physicists as “remarkably homogeneous, not only in scientific commitments, but even in terms of personal habits, mannerisms, and dress”).

242. Christopher A. Cotropia, *Determining Uniformity Within the Federal Circuit by Measuring Dissent and En Banc Review*, 43 LOY. L.A. L. REV. 801, 815 (2010) (finding that Federal Circuit judges had a 9.28% dissent rate in patent opinions between 1998 and 2009, while other circuits had a significantly lower rate, ranging from 1.14% to 4.56%, and comparable to the Federal Circuit’s dissent rate of 3.51% across all subject areas).

243. Rantanen & Petherbridge, *supra* note 218.

will be more prominent in particularly divisive issues, and second, that overall reliance on rules versus loose standards would increase with mounting disagreement.

The empirical studies carried out to date do not precisely address these two predictions. These studies do not include the pre-1998 period in which the Federal Circuit enjoyed relatively high levels of sociological legitimacy, and do not attempt to measure the prevalence of rules versus standards. Nevertheless, qualitative evidence is consistent with this explanatory framework. The Federal Circuit's tendency to develop rules is particularly salient on issues that have generated a great deal of internal disagreement, such as patentable subject matter or claim construction. On these and other divisive issues, the Federal Circuit has announced rules after hearing a case *en banc*.²⁴⁴ *In fact, the Federal Circuit also bears a larger proportion of its cases en banc than do other Circuit Courts, and routinely requests and considers briefs by amici curiae—a procedure that Ryan Vacca has likened to administrative rule-making.*²⁴⁵ Thus, the *en banc* process by which the Federal Circuit has developed rules in divisive areas also suggests that rule-making is a mechanism to manage internal dissent and seek external legitimacy.

One final, important feature of codification bears emphasizing: jurisdictional control requires a balance between codification and abstraction. Codification can allow for delegation, increase legitimacy, and manage internal dissent, but at the cost of reducing expert autonomy and discretion. And complete codification of expert skills makes expertise irrelevant in the performance of those tasks. In the context of an expert court, extensive reliance on rules can lead external audiences to question the need for expertise. In this context, the Supreme Court's insistence that the Federal Circuit employ flexible standards,²⁴⁶ and its description of its own role in patent law as providing an "outer shell"²⁴⁷ to be filled out by the Federal Circuit's expertise, could be understood as a call for the Federal Circuit to

244. See, e.g., *CLS Bank Int'l v. Alice Corp.*, 717 F.3d 1269 (Fed. Cir. 2013) (*en banc*); *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (*en banc*); *Cyber Corp. v. FAS Techs., Inc.*, 138 F.3d 1448 (Fed. Cir. 1998) (*en banc*).

245. Ryan Vacca, *Acting Like an Administrative Agency: The Federal Circuit En Banc*, 73 MO. L. REV. 733 (2011).

246. See, e.g., Lee, *supra* note 7, at 46 (arguing that the Supreme Court's interventions in patent law call for "holism and contextual engagement," in contrast with the Federal Circuit's preference for inflexible rules).

247. Transcript of Oral Argument at 28, *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2352 (2014) (No. 13-298) (Breyer, J.).

return to a more active use of its expertise—that is, its contextual, tacit knowledge of patent law and technology.²⁴⁸

* * *

These three aspects of codification present a more complex and nuanced view of how the Federal Circuit uses rules as a mechanism of jurisdictional competition (the external function of rules) and as a means to minimize internal dissent (the internal function of rules). Disentangling whether a particular rule serves to teach, control, legitimate, or cure internal divisions is a complicated task—in part because a rule can serve all of these functions simultaneously, and in part because the change over time from standards to rules (or vice-versa) is difficult to operationalize empirically. Nevertheless, further empirical analysis can serve to more rigorously test these multiple functions of rules in the Federal Circuit and other specialized courts. For example, one could measure whether a court is more likely to prefer bright-line rules over flexible, indeterminate tests in periods of high-judge turnover, in periods with the greatest epistemic diversity among judges, or in periods of crises of negative public opinion. Internal comparisons between the patent and non-patent docket with respect to the court's tendency to rely on rules would also be informative. So would horizontal comparisons with other expert courts, such as those of bankruptcy and tax (although their different position in the judicial hierarchy would complicate data interpretation).

3. *Typecasting*

Typecasting captures the role of *framing* in problem-classification and -analysis by expert communities. As Subsection III.A.1 emphasizes, the subjective aspects of a problem enable different communities of experts to frame a problem as best solved by the specific abstract system of their particular community. In the context of jurisdictional competition, *framing* is a tool that allows a community of experts to both defend and expand its jurisdiction. But an expert community's abstract knowledge system also constrains that community's available framings.²⁴⁹ For example, doctors are constrained by their abstract knowledge system to conceptualize a broken

248. See John M. Golden, *The Supreme Court as "Prime Percolator": A Prescription for Appellate Review of Questions in Patent Law*, 56 UCLA L. REV. 657, 662 (2009) (arguing that—given the comparable institutional expertise of the Federal Circuit—the Supreme Court's role in reviewing the Federal Circuit is justified only as combatting "undesirable ossification of legal doctrine").

249. See Steven Shapin, *Here and Everywhere: Sociology of Scientific Knowledge*, 21 ANN. REV. SOC. 289, 292 (1995) (arguing that knowledge acquisition and concept-application is bounded by the "existing structure of knowledge given . . . by their community and within a structure of purposes sustained by their community").

bone as an ailment of the human body, and to look for solutions and analogies in medical textbooks, not in engineering manuals.²⁵⁰ Yet, engineering principles turned out to have clear applications to bone repair.²⁵¹ Expert communities *typecast* a particular problem as similar to other problems already solved within their abstract knowledge system, and thus amenable to the same type of solutions, and may be less likely than generalists to look widely for available solutions.²⁵²

Consider the following examples in the evolution of patent law jurisprudence, which illustrate the rule of typecasting at the Federal Circuit.

a) Professional Typecasting in *Diamond v. Chakrabarty*

In 1980 the Supreme Court issued a decision, *Diamond v. Chakrabarty*,²⁵³ that many believed ushered in the age of biotechnology commercialization.²⁵⁴ In *Chakrabarty*, a divided Court held that living organisms engineered in the laboratory were patent eligible.²⁵⁵ The unpatentability of microorganisms and of living things more broadly, however, had been a tenet of patent law under the “product of nature” doctrine for at least the previous forty years.²⁵⁶

How, then, was this tenet challenged? Peculiar to this story is the fact that Chakrabarty carried out his research at General Electric—a company traditionally focused on physical technologies.²⁵⁷ Challenging this long-standing view required a new analogy that was readily available to those

250. See, e.g., Pedraza-Fariña, *supra* note 91, at 847 (describing resistance from engineers, biologists and funding institutions to an approach to biology that incorporated insights from engineering).

251. See, e.g., Anne Eisenberg, *Replacement Bones, Grown to Order in the Lab*, N.Y. Times, May 27, 2010.

252. See Joseph Fishman, *Creating Around Copyright*, 128 HARV. L. REV. 1333 (2015) (describing research on creativity that shows that problem-solving is constrained by available, familiar solutions to similar problems—or “prior exemplars”).

253. *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

254. See, e.g., Sally Smith Hughes, *Making Dollars out of DNA: The First Major Patent in Biotechnology and the Commercialization of Molecular Biology, 1974–1980*, 92 ISIS 541, 569 (2001) (showing that *Chakrabarty* was a “critical ruling for commercial biotechnology”).

255. *Chakrabarty*, 447 U.S. 303.

256. The “product of nature” doctrine, which was long thought to block the patentability of living things, dates back to 1889 when the U.S. Commissioner of Patents rejected the application for a patent on a fiber found in a needle of a pine tree. Ex Parte Latimer, 12 Mar. 1889, C.D., 46 O.G. 1638, U.S. Patent Office, *Decisions of the Commissioner of Patents and of the United States Courts in Patent Cases . . . 1889* (Washington, D.C., 1890), 1230127.

257. Daniel J. Kevles, *Ananda Chakrabarty Wins a Patent: Biotechnology, Law, and Society, 1972–80*, 25 HIST. STUD. PHYS. BIOL. SCI. 111, 114 (1994).

working with mechanical inventions and within a different patent culture.²⁵⁸ To most biological scientists and their attorneys, microorganisms—even those manipulated in the laboratory—were not different in kind from products of nature, and were thus unpatentable.²⁵⁹ But to engineers and their patent attorneys, microorganisms manipulated in the laboratory could be analogized to physical products made of different parts.²⁶⁰ Once this new analogy was articulated, it became possible—and even a matter of simple legal logic—to think of living organisms not as natural products, but as items manufactured out of chemical subunits.²⁶¹

This example does not directly or uniquely involve the Federal Circuit as an expert community. It does, however, illustrate that different expert communities (in this case patent attorneys specializing in biotechnology versus those specializing in mechanical products) are bounded by their most readily available framing of a problem. The next example directly concerns the Federal Circuit and the PTO.

b) Technical Typecasting in *Myriad Genetics*

Following the Supreme Court's decision in *Diamond v. Chakrabarty*, the PTO began granting patents to isolated DNA sequences²⁶²—analogizing DNA sequences that had been extracted from an organism to purified chemical compounds, which had long enjoyed patent protection.²⁶³ But DNA, and specifically DNA sequences within a gene, could also be analogized to an information carrier whose main role is to hold and transmit information, rather than participate in chemical reactions.²⁶⁴ Neither the PTO nor the Federal Circuit appears to have given much consideration to this

258. According to *Chakrabarty*, “companies like major drug firms, long accustomed to the product-of-nature barrier to patents, would not have filed a patent application on his new bugs.” 447 U.S. at 117.

259. *Id.*

260. *Id.*

261. *See, e.g.*, In re Application of Bergy, 596 F.2d 952, 974–75 (“The nature and commercial uses of biologically pure cultures of microorganisms . . . are analogous in practical use to inanimate chemical compositions . . . used in the chemical industry.”).

262. *See, e.g.*, U.S. Patent 4,370,417 (filed Jan. 25, 1983) (claiming DNA sequence for plasminogen activator protein); U.S. Patent 4,703,008 (filed Oct. 27, 1987) (claiming DNA sequence for erythropoietin).

263. *See* Utility Examination Guidelines, 66 Fed. Reg. 1092, 1093 (Jan. 5, 2001) (“Like other chemical compounds, DNA molecules are eligible for patents when isolated from their natural state and purified or when synthesized in a laboratory from chemical starting materials.”).

264. *See, e.g.*, Rebecca S. Eisenberg, *How Can You Patent Genes?* 2 AM. J. BIOETHICS 3, 9 (2002) (“The DNA molecule itself may be thought of as a tangible storage medium for information about the structure of proteins.”).

distinction.²⁶⁵ Rather, it was the Southern District of New York in its *Myriad* decision that engaged in a discussion of the implications of the information carrier analogy for the patentability of genes.²⁶⁶ The district court concluded that the DNA-as-information-carrier analogy rendered isolated genes unpatentable products of nature.²⁶⁷

The Federal Circuit considered the *Myriad* case twice—once on appeal from the Southern District of New York and again on remand from the Supreme Court, which instructed the Federal Circuit to reconsider the case in light of its decision in *Mayo v. Prometheus*.²⁶⁸ As emphasized in Part IV.B.1.c), an application of the reasoning in *Mayo* to *Myriad* could have led the CAFC to focus on the informational content of DNA. Nevertheless, Judge Lourie focused on the molecular structure of genomic DNA, framing DNA as a molecule with a “distinctive chemical structure and identity from those found in nature,” rather than an information carrier.²⁶⁹ Under this framing, Judge Lourie concluded that “*Mayo* does not control the question of patent eligibility.”²⁷⁰ Isolated DNA is not a “product of nature” because it “exists in a distinctive chemical form—as distinctive chemical molecules—from DNAs in the human body.”²⁷¹ Judge Lourie holds a Ph.D. in chemistry and it is plausible that his views in this case are shaped and filtered through his previous technical training.²⁷² Arti Rai has similarly hypothesized that Judge Lourie’s obviousness analysis of DNA-based inventions was influenced by his technical background in chemistry.²⁷³

265. See, e.g., *Ass’n for Molecular Pathology*, 689 F.3d 1303 (Fed. Cir. 2012) (“It is undisputed that *Myriad*’s claimed isolated DNAs exist in a distinctive chemical form—as distinctive chemical molecules—from DNAs in the human body.”); Utility Examination Guidelines, 66 Fed. Reg. at 1093 (“A purified DNA *molecule* isolated from its natural environment, on the other hand, is a chemical compound and is patentable if all the statutory requirements are met.”).

266. *Ass’n for Molecular Pathology v. U.S. Patent & Trademark Office*, 702 F. Supp. 2d 181, 228–29 (S.D.N.Y. 2010), *aff’d in part, rev’d in part*, 653 F.3d 1329 (Fed. Cir. 2011), *aff’d in part, rev’d in part*, 689 F.3d 1303 (Fed. Cir. 2012), *aff’d in part, rev’d in part sub nom. Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013).

267. 702 F. Supp. 2d at 229 (concluding that the “defining characteristic” of DNA was its role as a “physical embodiment of information,” and that “the preservation of this defining characteristic of DNA in its native and isolated forms mandates the conclusion that the challenged composition claims are directed to unpatentable products of nature”)

268. *Mayo*, 132 S. Ct. 289.

269. *Ass’n for Molecular Pathology*, 689 F.3d at 1328.

270. *Id.*

271. *Id.*

272. Patent Gold Rush, *supra* note 8, at 218 n.64 (noting that Judge Lourie has a Ph.D. in Chemistry).

273. *Id.*

These two examples also represent two types of typecasting that can operate at the level of the Federal Circuit. The first, professional typecasting, refers to the possibility that the prior professional embeddedness of a judge in a particular community (for example, the patent law community) may influence that judge's interpretation of a problem.²⁷⁴ The second, technical typecasting, refers to the possibility that the framing of a problem is influenced by previous technical training in a particular field. Professional and technical typecasting provide a finer-grade description of two types of "tunnel vision" that can afflict an expert court.

Typecasting is undoubtedly a helpful tool in allowing expert communities to sharply define an issue as analogous to other issues for which an expert community has already found answers, making it amenable to solutions using well-established methods. But typecasting has a clear downside, in particular in the context of a centralized court. As the struggle between psychiatrists, psychologists, and the clergy to treat alcoholism illustrates, different professions compete in the marketplace for the demand of their services by framing particular problems as best solved by the tools of their expertise. That competition among alternative frames is lacking in patent law. I analyze the normative implications of typecasting in the last Part of this Article.

4. *Inability to self-coordinate across multiple expert areas*

This last feature of expert communities combines two insights from the sociology of expertise as embodied intuition and from the sociology of the professions. First, an expert's "engaged commitment"²⁷⁵ with her area of expertise suggests that issues related to that area of expertise are particularly personally salient to experts relative to the general public, and relative to issues in other fields of expertise.²⁷⁶ In turn, this propensity to care more about, and thus focus more on, an expert's field of study makes it less likely for experts in one area to pay adequate attention to problems and solutions within other areas of expertise. When coordination with other expert areas requires trade-offs—as is the case with patent law and antitrust where, for example, protecting consumers from anti-competitive settlements or

274. *Id.*

275. *See supra* Section II.B.

276. This is consistent with Judge Richard Posner's observations that a specialized judiciary would "attract persons of somewhat different abilities . . . who are more deeply interested in particular subjects and less interested in running everything." RICHARD A. POSNER, *THE FEDERAL COURTS* 250 (1996).

practices may require constraining patent entitlements²⁷⁷—a community with expertise in one area may place inadequate weight on the competing interests of other expert communities.

Second, competition to fully occupy an expert space (i.e., to attain full control over a jurisdiction) often prevents spontaneous, sustained cooperation among expert communities with different abstract knowledge bases.²⁷⁸ When such cooperation is required—as is, for example, in “wicked problems”²⁷⁹ that require action across multiple areas of expertise—it will be difficult for expert communities to self-coordinate across multiple expert areas. Instead, coordination will likely require external structuring or incentives.

Coordination challenges at the Federal Circuit have given rise to a different type of tunnel vision. Generally, innovation policy has turned out to be a “wicked problem.” Incentivizing innovation was one of the key driving forces behind the creation of the Federal Circuit, but patent policy is but a single piece in the mosaic of policies designed to encourage innovation. Thus, knowledge required for fashioning innovation policy that is attentive to the welfare-maximizing balance between patent protection and market competition resides in multiple government institutions.²⁸⁰ And, as Stuart Benjamin and Arti Rai have argued, courts and agencies that regulate innovation are often unaware of each other’s solutions to similar problems.²⁸¹

At a fundamental level, coordination challenges concern the organization of knowledge in isolated communities or isolated institutions.²⁸² Trans-

277. See, e.g., Mark A. Lemley, *Industry-Specific Antitrust Policy for Innovation*, 2011 COLUM. BUS. L. REV. 637, 640 (2011) (“IP and competition frequently work at cross purposes toward the goal of innovation.”).

278. See Pedraza-Fariña, *supra* note 91, at 845 (arguing that knowledge exchange among scientific communities is significantly impaired by individual communities’ “resistance to ‘outside’ tools and interpretive frameworks”). See also Gary Becker & Kevin Murphy, *The Division of Labor, Coordination Costs, and Knowledge*, in *HUMAN CAPITAL: A THEORETICAL AND EMPIRICAL ANALYSIS WITH SPECIAL REFERENCE TO EDUCATION* 299, 308–09 (Gary S. Becker, ed., 1994) (describing coordination problems arising from knowledge specialization).

279. See, Horst Rittel & Melvin Webber, *Dilemmas in a General Theory of Planning*, 4 POL. SCI. 155, (1973) (arguing that the specialization of labor and expertise has failed to solve “wicked problems,” such as poverty, crime, and public education, whose interconnectivity and complexity requires a coordinated approach).

280. See, e.g., Evan Selinger & Thomas Seager, *The Incompatibility of Industrial Age Expertise and Sustainability Science*, in *EXPERTISE: PHILOSOPHICAL REFLECTIONS* 99, 106 (Evan Selinger, ed., 2011).

281. Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 GEO. WASH. L. REV. 1 (2008).

282. *Id.* at 19.

institutional knowledge is required for developing innovation policy but access to such knowledge is “significantly handicapped by the degree to which [it] resides in increasingly narrow specializations [or institutions].”²⁸³ This represents a second type of tunnel vision, distinct from typecasting.

But coordination difficulties are not only about lack of awareness of solutions, but also about preferences for, or emotional attachments to, a particular approach to a problem. In this sense, the “inability to coordinate” and “typecasting” features of expert communities are linked: failure to coordinate may be due to a refusal to accept an alternative framing as valid, or to accord it sufficient weight.

Take, for example, the tension between competition law and patent law. In her 1989 analysis of the Federal Circuit’s performance in the five years following its creation, Rochelle Dreyfuss pointed out a coordination problem that persists to this day: “If the CAFC is told to encourage invention, but is permitted to see only a small part of the matrix into which patent cases fit [i.e., only patent law] . . . it will undervalue the interest of competitors because it will not have the occasion to consider the role that vigorous competition plays in encouraging invention.”²⁸⁴ Dreyfuss’s analysis implied that expanding the Federal Circuit’s jurisdiction to include antitrust cases would correct this imbalance.²⁸⁵ More recently, Paul Gugliuzza took a similar stance in suggesting that replacing some of the Federal Circuit’s non-patent docket with commercial disputes may improve the Federal Circuit’s understanding of the place of patent law within the broader array of policies designed to incentivize innovation.²⁸⁶

Unlike epistemic control and codification—features which, taken alone, do not have clear normative implications for the design of the Federal Circuit—typecasting and inability to self-coordinate have normatively undesirable consequences in the context of a centralized court. I explore the predictions and normative implications of these two features in the last Part of this article.

* * *

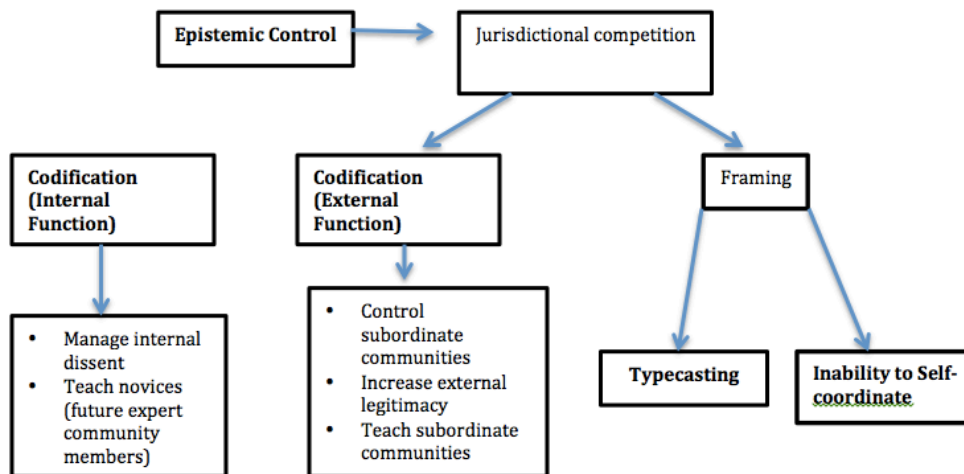
283. Selinger & Seager, *supra* note 280, at 106.

284. Dreyfuss, *supra* note 40, at 54.

285. *Id.*

286. Paul R. Gugliuzza, *Rethinking Federal Circuit Jurisdiction*, 100 GEO. L.J. 1437, 1498 (2012).

Figure 1 below diagrams the relationships among the four features of the typology:



C. ALTERNATIVE EXPLANATIONS OF FEDERAL CIRCUIT BEHAVIOR

Commentators have advanced several explanations for some of the puzzling features of the Federal Circuit described in the previous sections: (1) centralization theory, (2) information-costs theory, and (3) capture and tunnel vision. Nevertheless, none of these theories can fully account for Federal Circuit behavior. This next section engages with these explanations and contends that the expert-community model outlined here both complements these explanatory frameworks and is necessary to fully understand the Federal Circuit.

1. *Centralization Theory*

Several scholars have attributed the Federal Circuit's shortcomings to its central position as the single court for patent appeals.²⁸⁷ For example, Craig Nard and John Duffy argue that the Federal Circuit has achieved uniformity at the expense of quality.²⁸⁸ According to Nard and Duffy, the Federal

287. See, e.g., Nard & Duffy, *supra* note 47, at 1622; Hon. Wood, *supra* note 6; Dreyfuss, *supra* note 12.

288. *Id.* at 1620 (arguing that Federal Circuit precedent does not “adequately reflect[] current knowledge regarding the beneficial functions of the patent system in generating technological innovation, the potential problems of patent rights in foreclosing legitimate competition, and the need for predictable rules capable of curtailing litigation costs”).

Circuit's mandate to achieve uniformity in patent law has resulted in decisions that are divorced from the needs of the very communities whose innovation patent law is supposed to incentivize.²⁸⁹ Nard and Duffy argue that a centralized appeals structure facilitates not only uniformity but also isolation and lack of experimentation with novel approaches to patent law.²⁹⁰ Their proposed solution is to reconfigure the centralized structure of patent appeals to re-introduce a measure of competition and diversity that would inject more incremental innovation and flexibility into the patent system.²⁹¹ Similarly, in a recent keynote address, Chief Judge Diane Wood argued for the reintroduction of "the same kind of marketplace of ideas [in patent law] at the court of appeals level that we have for almost every other kind of claim"²⁹² by allowing parties to file their case either in the Federal Circuit or in the regional circuit where their claim was first filed.²⁹³ Rochelle Dreyfuss has also argued that lack of percolation is a significant problem that has had a negative impact on the quality of Federal Circuit patent decisions.²⁹⁴ Dreyfuss has proposed according greater deference to PTO decision-making, and to select District Court judges that participate in the Patent Cases Pilot Program.²⁹⁵

Nevertheless, taken alone, centralization and the drive for uniformity cannot explain many of the features of the Federal Circuit described above.²⁹⁶ First, the Federal Circuit often disregards its own "rules," a fact that has led many district court judges to express their frustration with the appellate court.²⁹⁷ Strict adherence to the uniformity principle would not predict such a malleable interpretation of its own precedent. In addition, the Federal Circuit

289. *Id.*

290. *Id.* at 1649.

291. *Id.* at 1623, 1625 (proposing that "both the Federal Circuit and United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit) . . . have jurisdiction over appeals from the PTO").

292. Hon. Wood, *supra* note 6, at 9.

293. *Id.*

294. Dreyfuss, *supra* note 12, at 524–26.

295. *Id.* at 532–36.

296. Duffy and Nard do not advance centralization as a comprehensive explanatory framework for Federal Circuit behavior. *Supra* note 47.

297. Inconsistent rule application is most salient in issues of claim construction and choice of law rules. *See, e.g., A Panel Discussion: Claim Construction from the Perspective of the District Judge*, 54 CASE W. RES. L. REV. 667, 678 (remarking that the Federal Circuit applies its rules inconsistently to claim construction, making it difficult for district court judges to avoid reversal); Ted Field, *Improving the Federal Circuit's Approach to Choice of Law for Procedural Matters in Patent Cases*, 16 GEO. MASON L. REV. 643, 644–53 (2009) (explaining the Federal Circuit's inconsistent application of choice-of-law rules).

has an unusually high rate of dissent for an appellate tribunal²⁹⁸—a fact that is not easily reconciled with a court for which uniformity is of paramount importance.²⁹⁹ These features are best explained as a consequence of institutionalized expert decision-making.³⁰⁰ Second, it is unclear how centralization and the uniformity principle explain the Federal Circuit's relationship with other expert bodies, such as the PTO and the ITC.³⁰¹ The low level of deference accorded to those institutions has arguably done much to undermine the predictability and uniformity of patent law.³⁰² But there is nothing inherent in the concept of centralization that predicts this low-level of deference to institutions that have a considerable level of expertise in patent law issues.³⁰³

2. *Information-Costs Theory*

Peter Lee has advanced an “information-cost theory” of the Federal Circuit that explains adjudicative rule formalism as a heuristic to manage the cognitive burdens and technological anxieties of generalist district court judges.³⁰⁴ Under this account, the Federal Circuit prefers rigid rules to flexible standards because rules diminish the need for lay judges to engage deeply with complex technologies.³⁰⁵ Similarly, John Thomas argues that simple rules “might be seen as providing a well-meaning judiciary with a thread through the labyrinth [of complex patent law].”³⁰⁶ And Rochelle Dreyfuss has

298. See, e.g., Rantanen & Petherbridge, *supra* note 218.

299. Nard and Duffy recognize that dissents can be a source of divergent opinions, but argue that they are insufficient to overcome the pull of circuit precedent, and thus not as efficient in creating legal innovation as a decentralized system of appellate courts. Nard & Duffy, *supra* note 47, at 1646.

300. See *supra* Section III.A. This article does not argue that centralization and the drive for uniformity do not play a role in explaining Federal Circuit behavior. Rather, it argues that a conceptualization of the Federal Circuit as an institutionalized community of experts helps explain a host of additional puzzling behaviors and provides an additional lens by which to understand, judge, and design the institutions in charge of administering patent law.

301. See *supra* Subsection IV.C.1

302. See *supra* Subsection IV.C.2

303. Centralization can predict low levels of deference to expert agencies if we assume that centralized courts will seek to consolidate top-down decision-making power and seek final decision-making authority. But it is equally possible that a centralized court designed to increase predictability and uniformity in patent law would choose to defer to expert agencies to set coherent and predictable patent policy. Conceptualizing a centralized court as an expert court that competes with other expert communities for epistemic control over patent law provides a more direct link between the explanatory framework (expert community theory) and the observed behavior (lack of deference to other expert communities).

304. Lee, *supra* note 7, at 25.

305. *Id.* at 9.

306. Thomas, *supra* note 7, at 795.

explained the Federal Circuit's resort to bright line rules as an aid for "trial judges [who] do not have the expertise enjoyed by specialized jurists . . . [to] treat like cases alike, even if some of the complexities in the technological parts of the cases are obscure."³⁰⁷ As elaborated in Part V, an expert decision-making model places the actions of the Federal Circuit within a broader framework. Consistent with Lee's information-cost theory, expert communities resort to rules to codify and simplify expert knowledge for external, lay consumption. But rules also serve two additional purposes. They act as gatekeepers of an expert community's jurisdictional power, by implicitly stating that outsiders do not possess the requisite know-how to correctly engage with a particular subject matter, in this case, technology policy through patent law.³⁰⁸ Rules can also enhance the legitimacy of weak expert communities. Because rules arguably reduce the influence of subjective factors in decision-making, they serve to manage internal dissent and to increase external support.³⁰⁹

3. *Capture and Tunnel Vision*

A final explanatory framework used to describe the Federal Circuit's behavior relies on its status as a "specialized" court. Indeed, the dangers of a specialized judiciary appeared prominently in debates leading to the creation of the Federal Circuit.³¹⁰ But Congress focused almost exclusively on two features of a specialized judiciary that are thought to negatively influence decisional content—capture and tunnel vision.³¹¹ Capture describes the

307. Dreyfuss, *supra* note 12, at 512.

308. See *supra* Part IV.B.1.b).

309. See *supra* Part IV.B.2.c).

310. See, e.g., H.R. Rep. No. 97-312, at 31 (1981) ("Several witnesses before the Committee expressed fears that the Court of Appeals for the Federal Circuit would be unduly specialized or would soon be captured by specialized interests. This provision should reduce these fears by ensuring that all the judges sit on a representative sampling of all the cases heard.")

311. See, e.g., *Hearing on S. 21 and S. 537 Before the Subcomm. on Courts of the S. Comm. on the Judiciary*, 97th Cong. 211 (1981) ("The quality of decision-making would suffer as specialized judges become subject to 'tunnel vision' seeing the cases in a narrow perspective without the insights stemming from broad exposure to legal problems in a variety of fields."); S. Rep. No. 97-275, at 6 (1981) ("[T]he subject matter of the new court will be sufficiently mixed to prevent any special interest from dominating it."); Dreyfuss, *supra* note 40, at 3 (noting that critics of specialization argue it "will produce a court with tunnel vision, with judges who are overly sympathetic to the policies furthered by the law that they administer or who are susceptible to 'capture' by the bar that regularly practices before them"); William Landes & Richard Posner, *An Empirical Analysis of the Patent Court*, 71 U. CHI. L. REV. 111, 111-112 (2003) (positing that a specialist court may be captured because "interest groups that had a stake in patent policy would be bound to play a larger role in the appointment of judges of such court than they would in the case of the generalist federal courts."); Simon Rifkind, *A*

external influence of interest groups on the policies and decisions of a particular institution.³¹² It is not, however, uniquely linked to specialization. Both centralization and specialization can facilitate capture by special interest groups. The former does so by making it easier to coordinate and focus lobbying activities on a small number of judges; the latter because specialized judges are likely to be part of the same professional network with repeat industry players.

Congress was also concerned with what it has termed the “undue specialization” of the Federal Circuit.³¹³ Concerns about undue specialization relate to internal characteristics of specialized bodies that are thought to negatively impact decision-making. Thus, Congress often referred to the “narrowness,” “technical focus” and “tunnel vision” that may arise from specialization.³¹⁴ Counteracting such narrowness required exposing judges to cases from a variety of fields,³¹⁵ and ensuring the court was not simply staffed by “patent lawyers.”³¹⁶ But tunnel vision is an ambiguous concept. It hides

Special Court for Patent Litigation?, *The Danger of a Specialized Judiciary*, 35 A.B.A. J. 425, 425 (1951) (“Once you segregate the patent law from the natural environment in which it now has its being, you contract the area of its exposure to the self-correcting forces of the law.”).

312. William J. Novak, *A Revisionist History of Regulatory Capture*, in PREVENTING REGULATORY CAPTURE: SPECIAL INTEREST INFLUENCE AND HOW TO LIMIT IT 25 (Daniel Carpenter & David Moss eds., 2013).

313. See, e.g., H.R. Rep. No. 97-312, at 31 (“Several witnesses before the Committee expressed fears that the Court of Appeals for the Federal Circuit would be *unduly specialized* . . .”) (emphasis added); *id.* at 50 (“This amendment . . . does, however, clearly send a message to the President that he should avoid undue specialization [sic] on both courts.”; S. Rep. No. 97-275, at 6 (rejecting a proposal to expand the Court of Customs and Patent appeals as “inconsistent with the imperative of avoiding undue specialization within the Federal Judicial system”).

314. See, e.g., Report of Committee of the Section of Patent, Trademark, and Copyright Law to the Section of Patent Law of the ABA, at 548 (“The proposed method of making up the Court will obviate the principal objection which exists to the creation of a court of patent appeals . . . which is, that a permanent court consisting of judges appointed for life and occupied in the sole work of deciding patent cases would be liable to grow narrow and technical in its views and procedure.”).

315. See, e.g., H.R. Rep. No. 97-312, at 19 (“By combining the jurisdiction of the two existing courts along with certain limited grants of new jurisdiction, the bill creates anew intermediate appellate court markedly less specialized than either of its predecessors and provides the judges of the new court with a breadth of jurisdiction that rivals in its variety that of the regional courts of appeals.”).

316. See, e.g., Report of Committee of the Section of Patent, Trademark, and Copyright Law to the Section of Patent Law of the ABA, *supra* note 315, at 548–49 (“Under the proposed plan the judges would come to the court of patent appeals trained for their work by experience on the bench in the field of general jurisprudence. It would give us a court of judges, and not of mere patent lawyers.”).

multiple potential mechanisms for influencing the content of judicial decisions. Consider, for example, the following five:

1. The professional biases of patent lawyers towards regarding patents as valid will cause judges with a background in patent practice to favor patent holders,³¹⁷ analyzed by this article as a form of *professional typecasting*.
2. The technical background of judges will influence how they evaluate the worth, and thus patentability, of particular inventions, analyzed by this article as *technical typecasting*.
3. Judges who are experts in patent law are unable to fully grasp and consider the impact of their decisions on other fields of law, notably competition law, analyzed by this article as an *inability to self-coordinate*.
4. Judges get so used to a particular way of approaching problems within their expertise they no longer question, or are willing to question, the validity of their foundational assumptions, analyzed by this article as a consequence of *epistemic monopoly and epistemic autonomy*.
5. Expert judges will no longer be understood by non-experts—and thus their work will not be transparent and easily accessible to lay people. Thus raising issues of public *trust* and the *legitimacy* of expert decision-making.³¹⁸

Whether and how “tunnel vision” should be corrected depends on understanding the specific mechanisms through which it influences decision-making.

Capture and tunnel vision are also insufficient to explain the specific features of Federal Circuit jurisprudence described above. First, capture is overinclusive, as it describes behavior linked both to centralization and specialization. Most importantly, although the Federal Circuit has long been viewed as a pro-patent court, many of its decisions have limited the scope of

317. See, e.g., LAWRENCE BAUM, SPECIALIZING THE COURTS 36 (2011) (arguing that people who work in patent law are likely to have “a narrower range of opinions about the issues in their field than does the general public or political and social elites as a whole”).

318. It is to this aspect of “tunnel vision” that Judge Wood appears to be referring to when remarking: “Law, in the final analysis, governs society. It should not be an arcane preserve for specialists, who never emerge to explain, even to their clients, what the rules are or why one side or the other prevailed.” Wood, *supra* note 6, at 7.

patent grants, thus undercutting the explanatory power of capture theory.³¹⁹ Further, neither capture nor tunnel vision can fully explain the interactions between the Federal Circuit and other judicial and administrative bodies, nor its preference for rules over standards.³²⁰

The next section analyzes normative proposals to redesign the Federal Circuit in light of this Article's model of expert decision-making.

V. NORMATIVE IMPLICATIONS: EVALUATING PROPOSALS FOR FEDERAL CIRCUIT REFORM

Two features of expert communities—epistemic control and codification—taken alone do not have clear normative implications for the design of the Federal Circuit. Whether or not it is normatively desirable to allow the Federal Circuit to take a non-deferential stance towards district courts and other agencies depends in large part on whether the Federal Circuit has not only attributed expertise in patent law, but also has real, substantive expertise that allows it to reach a better solution—given the goals of patent law—than other institutional players.

“Expertise” could be defined simply as an attribution. This is the view taken by some sociologists.³²¹ Under this relational view of expertise, being an expert means that others attribute the quality of expertise to a particular community or individual which also views itself or herself as expert.³²² In contrast, a substantive view of expertise considers expertise a real, substantive attribute that can lead to “better results” in solving particular social problems.³²³ To be an expert means to “know what you are talking

319. See, e.g., Dreyfuss, *supra* note 40, at 28 (noting that in the five years following its creation the Federal Circuit adopted rules “which favor technology users,” such as stringent reviews of practice before the PTO and a restrictive interpretation of the doctrine of equivalents).

320. The analysis advanced here is complementary to the model of specialized courts proposed by political scientist Lawrence Baum as it focuses not on individual actors, as Baum does, but on the aggregate behavior of expert institutions and groups of experts. Importantly, key insights emerge when we study the activities, work, and discourse of communities of experts, rather than individuals themselves. For example, Baum's approach does not attempt to explain rule-formalism or how expert communities (such as the PTO, ITC, and the Federal Circuit) relate to each other. See Baum, *supra* note 317.

321. See, e.g., Collins & Evans, *supra* note 135, at 2 (describing the “sociology of the acquisition of expert status” as showing that “coming to be called an expert may have little to do with the possession of real and substantive expertise”).

322. *Id.* at 2 (describing relational approaches to expertise as the “assignment of a label”).

323. *Id.* at 2–3 (describing Collins and Evans view of expertise as “the real and substantive possession of groups of experts”).

about”³²⁴ more than non-experts by some external, objective measure—not simply by convincing others.³²⁵ The typology of expert decision-making described in this article sits comfortably with either view of expertise—it applies to communities that perceive themselves (and are perceived) as expert whether or not that expertise is substantively justified. Indeed, attributional disputes over who has expertise and thus should have control over a particular jurisdiction are at the heart of the jurisdictional competition view of expertise. But jurisdictional disputes are often resolved when one community gains legitimacy over another in the eyes of the public. Under a substantive view of expertise, public legitimacy is based, at least in part, on substantive claims of efficiency of results—which are capable of external, objective verification.

This Article takes the substantive view of expertise, that is, that experts can “know what they are talking about” more than non-experts. Indeed, a view of expertise as purely relational would defeat any efforts to improve the quality of expert decision-making. Ultimately, if expertise is a substantive quality, it is not enough to label a community as expert simply because itself and others perceive it as such: there must be some external, objective measurement of expertise. That external measure can also help guide how to best construct expert decision-making bodies. But this Article brackets an analysis of the content of expertise, and concerns itself with modeling the behavior of those communities that are considered expert under the broader relational view. This is a crucial first step in a broader project, not in the least because engaging substantively with how to foster the right type of expertise will require a field-by-field analysis (that is, an expert tax court may look quite different from an expert patent court).

Crucially, this broader descriptive project has normative implications insofar as it identifies characteristics of all expert communities that are likely to be normatively undesirable, suggests avenues for addressing them, and points out why some of the current solutions to the specialization problem are likely to fail. More specifically, the next Part analyzes how the features of typecasting and the inability to self-coordinate have normatively undesirable consequences in the context of centralized courts. Taking them into account can both help evaluate and design proposals for Federal Circuit reform. The model presented in this Article calls into question the effectiveness of proposals that seek to improve Federal Circuit decision-making by expanding its docket to include competition cases, or by allowing a second, or third,

324. *Id.*

325. *Id.*

appellate court to hear patent cases. This Part closes by outlining an alternative proposal for Federal Circuit design: the use of external advisory panels as a solution to the problems of typecasting and coordination.

A. THE DANGERS OF TYPECASTING IN A CENTRALIZED EXPERT COURT

Typecasting can act as a heuristic that formulates what may otherwise be an intractable problem into a solvable question. As a framing device, typecasting is an important tool in efficient problem-solving within an expert community.

When expert communities compete for the demand of their services in the professional world, they effectively pit their framing devices against each other as the most effective means to solve particular problems—seeking to gain legitimacy in the eyes of relevant audiences: consumers of their services and lawmakers with the power to alter rules in their favor.³²⁶ Thus, the market for services effectively tests expert communities' claims that their approach leads to the best results.³²⁷

But this type of weeding-out mechanism doesn't function, or is severely impaired, in a centralized expert court embedded in a court hierarchy for two key reasons. The first is the absence of competition between alternative frames through competition among *peer* expert communities. Despite the epistemic diversity of the Federal Circuit, an important goal of any community of experts, including the courts of appeals,³²⁸ is to reach consensus on their approach to a particular problem. And as John Duffy and Craig Nard have pointed out, the Federal Circuit lacks any peer institutions that can be effective competitors: although both the PTO and the ITC have expertise in patent law they are subordinate, rather than peer, expert communities.³²⁹ The second is the pull of precedent—once consensus is reached and announced in a judicial opinion, framing devices become sticky.³³⁰ Take, for example, the Federal Circuit's treatment of DNA. Framing DNA by reference to its chemical structure has permeated the Federal Circuit's analysis of DNA first in the obviousness inquiry and later when considering patentable subject matter.³³¹ Thus, in the context of a centralized court, typecasting is likely to lead to lower quality decisions, in particular by

326. See *supra* Part IV.A

327. See, e.g., Abbott *supra* note 108, at 140 (arguing that “jurisdictional contests are often decided by client choice”).

328. See, e.g., Fischman, *supra* note 240.

329. Nard & Duffy, *supra* note 47, at 1637.

330. See *id.* at 1630.

331. See *supra* note 276.

preventing alternative framings (and thus solutions) of a problem from being fully explored.

One solution proposed by John Duffy and Craig Nard, is to decentralize judicial decision-making in patent law by allowing two to four circuit courts, including the Federal Circuit, to hear patent cases.³³² This would allow a measure of competition between alternative frames, and thus diminish the problem of typecasting. It is unclear, however, whether the effect of different judicial methodologies or framings on innovation can be efficiently assessed, given the national and often international nature of innovative activity. In other words, it would be a very difficult task to attribute a specific, differential real-world effect on innovation to differences in judicial approaches. Hon. Judge Diane Wood also made a proposal to decentralize patent appeals.³³³ Hon. Judge Wood's proposal, however, would allow appellants to choose to file their appeal either with the Federal Circuit or the regional circuit court.³³⁴ Allowing the parties to choose the forum may provide a quality-control mechanism similar to the market for services in the professional realm. This mechanism, however, is imperfect since parties with weak claims may choose a forum not because of its efficiency or accuracy in rendering patent decisions, but simply because the forum is perceived as patent-friendly, or vice-versa.³³⁵

Decentralization may also not cure typecasting if the composition of the courts is quite similar (e.g., if the courts are partially staffed by former patent attorneys and academics, or those with a technical background, or if the courts develop expertise in patent law through prolonged, concentrated exposure to patent cases)—as these courts may ultimately employ similar frames when reaching patent decisions. On the other hand, if decentralization is achieved by funneling some patent cases to generalist judges, it would come at the cost of losing expertise. To the extent that a court with real, substantive expertise in patent law would reach better decisions than a court of generalist judges, at least most of the time, this is a real concern.

332. Nard & Duffy, *supra* note 89, at 1629–37.

333. Hon. Wood, *supra* note 6, at 9.

334. *Id.*

335. Hon. Diane Wood proposes that, in cases where both parties are aggrieved, jurisdiction among the Federal Circuit and the Circuit where the case was originally filed could be decided by the Judicial Panel on Multidistrict Litigation (“JPML”) to avoid forum-shopping. *Id.* See also Rochelle Cooper Dreyfuss, *Abolishing Exclusive Jurisdiction in the Federal Circuit: A Response to Judge Wood*, 13 CHI.-KENT J. INTELL. PROP. 327, 342 (2014) (discussing selection effects).

A second solution may be to increase the diversity of relevant technical and professional backgrounds in the court with the goal of representing key innovation sectors and approaches to innovation policy. One option may be to appoint more judges with technical expertise in software design or professional backgrounds in antitrust law. But appointing judges with particular technical expertise is likely ill-advised.³³⁶ The structural constraints of a court of appeals regarding the number of judges, currently twelve, make it impossible to appoint judges with expertise in every single area of technology that comes before the court. And even if such constraints did not exist, or if they could be circumvented (for example, by a system of rotating technical judges with expertise in particular technology areas), the rapidly evolving nature of scientific research makes this proposal impracticable. Scientific fields are not static; in fact, new fields of scientific inquiry often redraw the boundaries between technical specialties, making it hard to match judicial technical expertise with case background.³³⁷ And expertise in a scientific field, and in particular in fast-moving fields, is quickly eroded when a judge ceases to be embedded in the relevant scientific community.³³⁸

B. OVERCOMING COORDINATION DIFFICULTIES

Incentivizing innovation requires not only coordinating across different institutions such as the PTO, ITC, Federal Circuit, Food and Drug Administration, and the Federal Trade Commission, but also balancing often-opposing goals within single institutions. In patent law, the most important tension is between patent protection and free competition. For this reason, proposals to re-balance the Federal Circuit's caseload often involve adding to it antitrust cases.³³⁹ Nevertheless, the analysis offered here gives reasons to be skeptical that simply broadening the Federal Circuit's docket to include commercial disputes would lead to better coordination between patent and antitrust. In particular, because the Federal Circuit already views itself (and is viewed by outside observers) as having special expertise in patent law, it is likely that it will bring its existing expertise and framings to bear onto issues of competition.

Indeed, the Federal Circuit is increasingly applying its own substantive law to antitrust issues that implicate patent law, making the problem of coordination particularly pressing. For example, following the Federal

336. See Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 YALE L.J. 1535 (1998); Arti K. Rai, *Specialized Trial Courts: Concentrating Expertise on Fact*, 17 BERKELEY TECH. L.J. 877, 879–80 (2002).

337. See, e.g., Pedraza-Fariña, *supra* note 91.

338. Collins & Evans, *supra* note 135, at 3.

339. See, e.g., Dreyfuss *supra* note 40; Gugliuzza, *supra* note 286, at 1497.

Circuit's decisions in *In re Independent Service Organizations Antitrust Litigation* (Xerox), *Intergraph*,³⁴⁰ and *C.R. Bard*³⁴¹—all of which involved antitrust challenges to a monopolist's refusals to license or sell products subject to intellectual property protection—antitrust attorneys have criticized the Federal Circuit for giving undue weight to intellectual property considerations at the expense of competition principles embedded in antitrust law.³⁴² Even those who defended the Federal Circuit's holdings as consistent with “mainstream antitrust principles,” remarked that the Federal Circuit's antitrust analysis was often “poorly articulated,” “superficial,” “awkward,” and not deeply engaged with the type of “rigorous analysis” required by antitrust law.³⁴³ Importantly, studies of agencies charged with formulating competition policy have found that these agencies tend to downplay intellectual property considerations or fail to consider the impact of breakthrough innovation.³⁴⁴ Taken together, these results are consistent with coordination difficulties predicted from the concentration of expertise in particular communities or institutions. Thus, overcoming coordination difficulties will likely require external incentives or coordination mechanisms.

C. EXTERNAL ADVISORY PANELS AS A PROPOSED SOLUTION TO
TYPECASTING AND COORDINATION PROBLEMS

A key question in the design of expert courts is how to minimize the negative aspects of typecasting and their inability to coordinate—or how to increase the number of frames considered by a community of experts—while maintaining the gains in accuracy derived from expertise. This Part outlines a proposed solution: the creation of advisory panels that would provide a mixture of technical, economic, and sociological expertise by rotating experts in the areas relevant to the case or question under consideration. As a first step, the Federal Circuit could rely on advisory panel opinions when making decisions en banc. The Federal Circuit's most recent en banc orders seek to clarify important areas of the law and involve issues of policy with clear implications for the pace of technological innovation, in which a

340. *Intergraph Corp. v. Intel Corp.*, 253 F.3d 695 (Fed. Cir. 2001); *In re Indep. Serv. Org. Antitrust Litig.*, 203 F.3d 1322 (Fed. Cir. 2000).

341. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340 (Fed. Cir. 1998).

342. See, e.g., Peter Boyle, Penelope M. Lister & J. Clayton Everett, Jr., *Antitrust Law at the Federal Circuit: Red Light or Green Light at the IP-Antitrust Intersection?*, 69 ANTITRUST L.J. 739 (2002).

343. *Id.*

344. See, e.g., Michael L. Katz & Howard A. Shelanski, *Merger Analysis and the Treatment of Uncertainty: Should We Expect Better?*, 74 ANTITRUST L.J. 537, 538 (2007) (noting that antitrust analysis may block mergers with pro-innovation outcomes but allow those with anti-innovation possibilities).

technological, economic, and sociological perspective would be particularly useful.³⁴⁵ Importantly, the Federal Circuit has sought the advice of outside parties in its *en banc* decisions by encouraging the filing of amici briefs.³⁴⁶ The use of advisory panels could gradually be expanded to provide advice in panel decisions that seek to clarify important issues of patent doctrine, and where it would benefit the court to have an opinion on how its decision may impact the pace of technological innovation in a particular field. Advisory panels could also be particularly useful to district courts, when engaging in fact-finding regarding, for example, the level of skill in the art, the predictability of a particular technical field, or the boundaries of analogous arts.

The use of advisory panels with a mixture of economic, sociological, and technological expertise has several advantages over other potential solutions to the CAFC's perceived disengagement from real-world innovation. First, the traditional solutions to the problem of expertise most often used at the trial court level—the use of expert witnesses selected by the parties and the use of court appointed experts—fall short of providing the kind of comprehensive expertise in economic, social, and technical matters that is required to address patent disputes. In addition, parties are expected to find (and often do find) experts who can support their legal conclusions. Litigation turns into a battle of the experts that provides judges and the jury little guidance on how to resolve discrepancies between different experts' perspectives.³⁴⁷ In the context of patent disputes, it is then perhaps no wonder—and not an entirely undesirable outcome—that the Federal Circuit often chooses to substitute its own expertise for that of experts hired by the

345. See, e.g., *Phillips v. AWH Corp.*, 376 F.3d 1382, 1383 (Fed. Cir. 2004) (per curiam) (citations omitted) (order granting petition for rehearing en banc in *Phillips*) (asking for additional amici briefs addressing, among other questions: “What role should prosecution history and expert testimony by one of ordinary skill in the art play in determining the meaning of the disputed claim terms?”); *Ariad Pharmaceuticals, Inc. v. Eli Lilly & Co.*, 595 F.3d 1329, 1330 (Fed. Cir. 2009) (per curiam) (order granting petition for rehearing en banc in *Ariad Pharmaceuticals*, and asking opinions on the proper “scope and purpose of the written description requirement”); Order for rehearing en banc, 2011-1301, *CLS Bank Int'l v. Alice Corp.* (asking: “What test should the court adopt to determine whether a computer-implemented invention is a patent ineligible ‘abstract idea’; and when, if ever, does the presence of a computer in a claim lend patent eligibility to an otherwise patent-ineligible idea?”).

346. *Id.* All of the orders granting a petition for rehearing en banc listed *supra* note 345 specifically invite the PTO or the United States to file amicus briefs and notes that other parties may also file briefs without leave of the court.

347. See Rebecca Haw, *Adversarial Economics in Antitrust Litigation: Losing Academic Consensus in the Battle of Experts*, 106 NW. U.L. REV. 1261, 1270 (2012).

parties. The use of court-appointed, neutral experts may sidestep the battle of the experts, but at the cost of creating a “strong, if not overwhelming, impression of ‘impartiality’ and ‘objectivity,’”³⁴⁸ that may not be warranted. Individual experts likely have pre-existing biases or frames that would not be adequately challenged in the court-appointed expert model. Finally, the Federal Circuit’s increased reliance on amicus briefs, while increasing public participation in important patent law decisions, raises the same concerns of bias as the use of party-appointed experts.

Expert advisory panels avoid these concerns with court-appointed experts, parties-appointed experts, and amici curiae. Expert panels are already widely used to optimize medical decision-making.³⁴⁹ Expert advisory panels can be flexibly designed to reduce pre-existing biases that would be unavoidable with single court-appointed experts. Specifically, studies on the use of expert panels for medical decision-making have shown that reducing bias and increasing accuracy requires balancing a diversity of views and reference frames with panel size.³⁵⁰ Experts can also rotate so as to minimize the possibility of capture, and maximize the fit between expertise and the particular technical, economic, and social problem under study.

Second, advisory panels have several advantages over proposals for decentralization of judicial decision-making. As emphasized above in Section V.A, it will be difficult to assess the effect of different judicial methodologies or framings on innovation, given the national and often international nature of innovative activity—therefore making it hard to ultimately choose among competing judicial approaches. The advisory panels proposal advanced in this Article would ameliorate these concerns because an independent advisory panel would be able to make predictions *ex ante* about the likely economic and social consequences of particular patent policies and rules. In addition, although expanding the number of circuits that can hear patent disputes would certainly ameliorate the dangers of typecasting, it may do so at the expense of expertise. In contrast, advisory panel design can address the typecasting problem (for example, by balancing membership in different specialties and using voting mechanisms that minimize bias) without sacrificing the benefits of expertise. The use of advisory panels, however, does not preclude adopting decentralization proposals. In particular, if an additional circuit court such as the Court of Appeals for the District of

348. *Kian v. Mirro Aluminum Co.*, 88 F.R.D. 351, 356 (E.D. Mich. 1980).

349. See, e.g., Matthew J. Gabel & Charles R. Shipan, *A Social Choice Approach to Expert Consensus Panels*, 23 J. HEALTH ECON. 543, 544 (2004).

350. See, e.g., George A. Krause & James W. Douglas, *Organizational Structure and the Optimal Design of Policymaking Panels*, 57 AM. J. POL. SCI. 135 (2013).

Columbia were to also hear patent cases, as Duffy and Nard propose, advisory panels could provide guidance on patent decisions to both circuits.

Third, as discussed above in Section V.B, proposals to rebalance the Federal Circuit's caseload with a larger proportion of competition cases are likely insufficient to correct coordination problems if the Federal Circuit already views itself as a community with particular expertise in patent law. In addition, coordination problems are not limited to antitrust and patent law—coherent innovation policy should also take into account, for example, the interplay between grants, patents, and other incentives to innovate when considering the impact of patent law on innovation communities.³⁵¹ External advisory panels would be able to more readily take all of these considerations into account and advise the Federal Circuit directly on the impact of particular changes to patent doctrine on the overall innovation landscape.

Fourth, advisory panels can complement Stuart Benjamin and Arti Rai's proposal for the creation of an Office of Innovation hosted within the executive branch that would coordinate the activities of agencies and courts that impact innovation, such as the Federal Communications Commission, the Food and Drug Administration, and the PTO.³⁵² While an office of innovation would be charged with coordinating innovation policy at a macro level, advisory panels could provide input at a micro level. For example, advisory panels can equip the Federal Circuit, and potentially the district courts, with necessary information on the pace of technological innovation, the predictability of a particular field, or the likely impact of market forces on a particular technical advance—information that is often crucial to patentability determinations.

Finally, advisory panels provide the additional advantage of being able to teach and keep the Federal Circuit up to date on developments in innovation economics and sociology, and in the different scientific and technical fields involved in patent litigation. This, in turn, would enhance and standardize the Federal Circuit's expertise—ensuring all of its members are exposed to the most up-to-date insights from research in economics, sociology, and scientific fields relevant to patent law.

An advisory panel opinion on a particular dispute could be made available at the request of any litigant, or at the request of the Federal Circuit itself. To ensure that the Federal Circuit places adequate weight on the panel's recommendations and does not simply ignore its findings, the

351. See, e.g., Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prize Debate*, 92 TEX. L. REV. 303 (2013).

352. Benjamin & Rai, *supra* note 281, at 56–58.

recommendations should be made part of the record, and the Federal Circuit should be bound to clearly explain its reasoning if it chooses to deviate from them. This hard-look requirement would ensure that the Federal Circuit retains flexibility in adopting the panel's opinions but is also bound to consider them seriously.³⁵³ Section 175 of the Patent Act already provides for the appointment of technical assistants to the Federal Circuit.³⁵⁴ The drafters of the Act characterized the role of such assistants as “confer[ring] with judges on technical as well as legal matters.”³⁵⁵

This proposal assumes that there are real gains from expert decision-making in patent law—conceptualized as substantial expertise—that can be preserved while minimizing the costs derived from typecasting and the inability to coordinate. Both defending that assumption and providing a full answer to how to optimize Federal Circuit expertise, including a full blueprint for designing advisory panels, requires further research. In particular, it requires an in-depth exploration of the kinds of substantive expertise involved in the resolution of patent disputes, and how to best achieve the correct mix of expertise in panel design.³⁵⁶ For example, there are at least five types of possible expertise relevant to patent law: (1) expertise in the science and technology involved in the discovery, (2) expertise in innovation dynamics, both sociological and economic, (3) expertise in patent law through continued exposure to relevant cases, or through previous practice experience, (4) expertise in complex litigation, and (5) meta-expertise at the intersection of these four types of expertise. Because addressing patent law problems requires reliance on knowledge at the intersection of different fields, bringing together the right types of expertise to solve patent disputes will also face coordination challenges similar to those in assembling medical review panels or policy panels. Operationalizing advisory panels will also require developing protocols for member selection, creating incentives for both the Federal Circuit and parties to actually use expert panels,³⁵⁷ and

353. See Benjamin & Rai, *supra* note 281, at 65 (proposing the creation of an executive “Office of Innovation Policy” whose opinions—while not legally binding—would “qualify as material at which the agency should take a hard look, and to which the agency would be required to respond”).

354. 28 U.S.C. § 175 (2012).

355. S. Rep. No. 97-275, at 17 (1981).

356. See, e.g., Gabel & Shipan, *supra* note 349.

357. See, e.g., Christopher Tarver Robertson, *Blind Expertise*, 85 N.Y.U. L. REV. 174, 200–01 (2010) (noting judges rarely use court-appointed experts because of social norms against their use and the high cost of finding and training experts to testify). To address hurdles in the assembly of expert panels, Rule 706 and Section 175 could be amended to encourage specialized or expert courts to appoint expert advisory panels, or to encourage the

evaluating whether expert panel opinions should also be available to advise district courts and agencies such as the PTO.³⁵⁸

Given the main focus of this Article on modeling Federal Circuit behavior as a function of expert community dynamics, its treatment of advisory panels design is necessarily in outline form. A full analysis of how expert panels would be designed and implemented will require an in depth exploration of the types of substantive expertise needed to make decisions in patent law, an analysis of how advisory panels have been put together in other disciplines and whether those insights can be adapted to patent law, as well as elucidating details regarding membership selection criteria, mechanisms by which the parties could challenge expert reports, and the scope of the panel's mandate. In addition, a key question regarding advisory panel design is whether—rather than provide technical advice to the Federal Circuit—they are best housed within trial courts (where they would function to provide expert guidance on factual issues), or the PTO. For example, given the PTO's expanding role in patent law following the passage of the America Invents Act, advisory panels could also (or alternatively) be available to provide expert advice on appeals to the Patent Trial and Appeal Board.³⁵⁹

VI. CONCLUSION

The Federal Circuit sits at the epicenter of a vigorous debate over the role of specialized courts in a broader system of generalist judges. Critics of the Federal Circuit view the court as a failed experiment in judicial specialization. They point to its over-reliance on inflexible rules, its refusal to accord deference to both district courts and the PTO, and its failure to maintain doctrinal uniformity. In contrast, supporters of judicial specialization in patent law warn that decentralization would lead to increased forum-shopping and a high level of uncertainty regarding the applicable legal regime—ultimately dampening innovation.

This Article has argued that any principled discussion of Federal Circuit design requires an understanding of decision-making by expert communities.

Federal Circuit to do so. Also, professional organizations of scientists, economists, and sociologists could be enlisted to provide help in panel assembly.

358. A growing literature analyzes whether and how institutions other than the Federal Circuit should be involved in the development of patent law. *See, e.g.,* Arti Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237 (2012); Dreyfuss, *supra* note 10. Advisory panels could thus be useful to a variety of institutional players.

359. *See* Dreyfuss, *supra* note 10.

In particular, it requires addressing three fundamental questions: First, how does subject-matter specialization or expertise impact the content of judicial decisions? Second, how does subject-matter specialization or expertise impact the form of judicial decisions? Finally, how does subject-matter specialization or expertise impact the relationship between decision-making bodies? Drawing on a rich literature on the sociology of expertise, this article takes a first step in answering these key questions by developing a typology of four features of decision-making by expert communities. The Article demonstrates how these features explain puzzling aspects of Federal Circuit jurisprudence, such as lack of deference to both the district courts and the PTO, and a preference for rules over standards, and predicts additional behaviors such as defiance of the Supreme Court, jurisdictional expansion, and inconsistent rule application.

Importantly, the typology has two broader implications. First, it identifies two specific features of expert communities—typecasting and an inability to self-coordinate—that are normatively undesirable in the context of a centralized expert court. This Article analyzes existing proposals for Federal Circuit reform, concluding that most of them are unable to address distortions in decision-making caused by these two features of an expert community's behavior. As an alternative, this Article proposes the adoption of expert advisory panels with the necessary complement of economic, social, and technological expertise. Second, it develops a novel theoretical lens with implications for analyzing the behavior of other expert courts. Further studies analyzing the behavior of, for example, bankruptcy and tax courts can both test and refine the model for application to these broader contexts.