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Abstract

The Federal Circuit—the appeals court in charge of virtually all patent cases—has been fraught with controversy since its creation. 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 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 law. Its supporters, while acknowledging the Federal Circuit’s distinctive behavior, defend its exclusive jurisdiction as ensuring efficient, accurate, and uniform decisions in a technically complex area. 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 is the first to provide a model of Federal Circuit decision-making that unifies these fragmented critiques by explaining Federal Circuit behavior as a product of predictable expert community dynamics. The Article unpacks the behavior of the Federal Circuit into five distinct features not previously identified: (1) epistemological monopoly; (2) epistemological autonomy; (3) codification; (4) typecasting; and (5) inability to self-coordinate. Expert communities’ drive for epistemological control and autonomy means they are less likely to defer to solutions proposed by other expert communities, such as the PTO, than would be expected of generalist courts. It also implies that expert communities are more likely to defy non-expert superior generalists, such as the Supreme Court, than predicted by traditional accounts of judicial behavior. The model also explains the Federal Circuit’s resort to rule formalism as a function of an expert community’s drive to codify its knowledge base to control subordinate communities, build 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. Inevitably, 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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INTRODUCTION

Patent law has transitioned from an arcane topic\(^1\) 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 synthetic biology.\(^4\) As patent law captures national headlines, commentator have placed renewed focus on the workings of the U.S. Court of Appeals for the Federal Circuit (the “Federal Circuit”)—the single appeals court in charge of virtually all patent cases.\(^5\)

The Federal Circuit’s patent jurisprudence has come under sustained criticism. Commentators rue the Federal Circuit’s increasing preference for simple rules over standards;\(^6\) its unwillingness to defer to the District Court’s and the Patent and Trademark Office’s (PTO) findings of fact\(^8\) or to decisions by the International Trade Commission (ITC);\(^9\) its propensity for de novo review;\(^10\) and its overly expansive view of its own jurisdiction.\(^11\) Taken together, critics argue, 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

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\(^1\) 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 (U.S. 2013) (holding that isolated genomic DNA is patent ineligible).

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


\(^12\) See, e.g. , Rai, supra [Engaging] note —, at 1053; Thomas, supra note —, at 775.
adjust patent law to the changing conditions of technological innovation.\textsuperscript{13} Arti Rai characterizes the court’s aggressive \textit{de novo} review as “having problematic effects across entire fields of technology.”\textsuperscript{14} And Sapna Kumar is critical of 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.\textsuperscript{15} In part echoing these critiques, Chief Judge Diane Wood recently proposed that we eliminate the Federal Circuit’s exclusive jurisdiction over patent law.\textsuperscript{16} Judge Wood cautioned against specialized tribunals, emphasizing that no area of the law should “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.”\textsuperscript{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”\textsuperscript{18} patent cases in the hands of a single appeals court would lead not only to national uniformity but also to better quality patent decisions.\textsuperscript{19} Thus, explaining these particular features of Federal Circuit jurisprudence is important both to provide a diagnosis of the current “patent failure”\textsuperscript{20} and to design a way out.

One explanation for some of these peculiar features of the Federal Circuit has figured prominently in recent debates: the court’s institutional position as a centralized decision-maker. In this account, the absence of inter-circuit competition and diversity in the development of patent law has prevented the kind of experimentation that leads to incremental legal innovation in other areas of the law.\textsuperscript{21} The solution is a more decentralized appeals system “allowing for multiple courts to experiment with various judicial viewpoints and debate new and existing ideas.”\textsuperscript{22} Critics of decentralization, on the other hand, warn that it would represent a throwback to the pre-Federal Circuit days of rampant forum-shopping.\textsuperscript{23} Moreover, they

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  \item \textsuperscript{13} Thomas, \textit{supra} note \_, at 775.
  \item \textsuperscript{14} Rai, \textit{supra} \[Engaging\] note \_, at 1065.
  \item \textsuperscript{15} Kumar, \textit{supra} note \_ at 1552-1553.
  \item \textsuperscript{16} Wood, \textit{supra} note \_ at 7.
  \item \textsuperscript{17} Id.
  \item \textsuperscript{18} H.R. Rep. No. 97-312, at 22-23 (1981).
  \item \textsuperscript{19} Id.
  \item \textsuperscript{20} See JAMES BESSON & MICHAEL MEURER, \textsc{Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk} (2008).
  \item \textsuperscript{21} See, \textit{e.g.}, Craig Allen Nard & John F. Duffy, \textit{Rethinking Patent Law’s Uniformity Principle}, 101 Nw. U. L. Rev. 1619, 1649 (2007) (arguing that the Federal Circuit is “isolated from noteworthy doctrinal proposals and normative prescriptions that would be generated by other circuit courts”); Wood, \textit{supra} note \_ (arguing that the “process of testing and experimentation” generated by circuit splits “is lost when uniformity is privileged above all values.”).
  \item \textsuperscript{22} Id. See also, Rai, \textit{supra} \[Engaging\] note \_, at 1135 (calling for “greater generalist input in the appellate process.”).
\end{itemize}
\end{footnotesize}
predict that circuit splits would lead to uncertainty regarding patent rights and impose large economic costs on innovators, who are almost invariably multi-circuit actors.24

The problem with the centralization/decentralization debate is that it is very hard to assess the “optimal” amount of decentralization for any given institution. Indeed, judgments of whether centralizing patent cases in a single appeals court versus decentralizing them among multiple circuits is preferable depend in large part on assumptions or intuitions about the costs of circuit splits for innovative industries versus the advantages of policy variation.25

More specifically, the debate over the merits and demerits of centralization cannot provide a full explanation for the features of the Federal Circuit that have attracted the criticism described above.26 For example, there is nothing inherent in the concept of centralization that predicts the observed low-level of deference to institutions that have a considerable level of expertise in patent law issues, such as the PTO and the ITC.27 This low level of deference has arguably done much to undermine the predictability and uniformity of patent law.28

It is certainly the case that centralization cannot guarantee high-quality decisions,29 and may even undermine quality by eschewing flexibility and the ability to adapt to changing technical environments in favor of predictability. Yet, centralization itself is not inevitably linked to inflexible, low-quality decisions. In contrast to the centralization account, this Article argues that understanding the behavior of the Federal Circuit, and improving judicial decision-making in patent law, requires understanding expert institutions, including their blind spots and strengths, and solutions that have been adopted in other fields to optimize centralized expert decision-making.30

The concept of expertise in techno-legal questions31 has been inadequately studied and theorized both in legislative and in academic debate. The legislative history of the Federal Circuit Act shows that Congress created

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24 Cf. Wood supra note ____ at 10 with Reines supra note ____.
25 See infra Part I.B. Proponents of decentralization do not propose centralization as a general explanatory framework for Federal Circuit behavior, but rather as an undesirable feature of the court. See, e.g., Duffy & Nard supra note ____ at 1656-1657; Wood supra note ____ at 5.
26 See also infra Part I.B.1.
27 See infra Part I.B.I.
28 When speaking of the “quality” of judicial decision-making, these academic commentators and others adopt Rochelle Dreyfuss apt definition: “whether the law … is … responsive to the philosophy of the Patent Act, to national competition policies, and to the needs of researchers and technology users.” Dreyfuss, supra [Fed. Cir. Case Study] note ___, at 5.
30 The term “techno-legal questions” denotes those issues at the intersection of law and scientific disciplines, whose resolution requires understanding both the scientific principles behind a particular legal issue and the legal rules and standards that have developed to address it.
the Federal Circuit at least in part to increase expertise in patent cases. At the same time, Congress also considered the costs of judicial specialization and attempted to mitigate them. Both Congress and most academic commentators, however, focus almost exclusively on two features of a specialized judiciary that are thought to represent the dark side of specialization or expertise—“capture” and “tunnel vision.” These two features, however, provide only a limited and incomplete description of the behavior of expert decision-making bodies.

This article fills this gap in the literature by refocusing the specialization debate on the role, possibilities and limitations of decision-making by an expert institution. Drawing from and expanding upon studies in the sociology of expertise, this Article is the first to provide a model that explains Federal Circuit behavior as flowing from expert community dynamics. An “expert community,” as the term is used here, refers to institutionalized groups 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. Similarly, the Federal Circuit has developed its own system of abstract knowledge—a system to identify

32 See, e.g., S. Rep. No. 97-275, at 6 (1981) (noting that the Federal Circuit Act is “a sensible accommodation of the usual preference for generalist judges and the selective benefit of expertise in highly specialized and technical areas”); H.R. Rep. 97-312, at 22-23 (1981) (“Directing patent appeals to the new court will have the beneficial effect of removing these unusually complex, technically difficult, and time-consuming cases from the dockets of the regional courts of appeals.”).

33 Specialization and expertise are related concepts. Specialized courts typically have jurisdiction over a narrow type of cases (such as those involving patent, bankruptcy or tax issues). See, e.g., LAWRENCE BAUM, SPECIALIZING THE COURTS (2011). Because judges in specialized courts are exposed to a larger concentration of cases dealing with specific issues, even if they do not join the bench with prior training in that particular subject area, they are expected to develop a type of expertise through that repeated and concentrated exposure. Indeed, the Federal Circuit itself considers its exposure to a large volume of patent cases to confer upon it “useful expertise” in patent law. Highmark Inc. v. Allcare Health Mgmt. Sys., Inc., 687 F.3d 1300 (Fed. Cir. 2012), reh’g denied, 701 F.3d 1351 (Fed. Cir. 2012).

34 See, e.g., S. Rep. 97-275, at 6 (1981) (describing the “imperative of avoiding undue specialization within the Federal Judicial system”); id. (noting that the court’s “varied docket spanning a broad range of legal issues and types of cases” would “assure[] that the work of the proposed court will be broad and diverse and not narrowly specialized.”)

35 See infra Part I.B.3 note ___ (citing sources).

36 Capture is overinclusive, as it describes behavior linked both to centralization and specialization. Crucially, although the Federal Circuit has long been viewed as a pro-patent court, many of its decisions have limited the scope of patent grants, thus undercutting the explanatory power of capture theory. Tunnel vision is an ambiguous concept, as it hides multiple mechanisms by which expert decision-making can influence the content of judicial decisions. For example, tunnel vision may refer to the professional biases of patent lawyers towards regarding patents as valid; or tunnel vision may also refer to the insight that judges who are experts in patent law may be unable to fully grasp and consider the impact of their decisions on other fields of law, notably competition law. Part I.B.3 considers the limitations of these two concepts in describing Federal Circuit behavior.

and categorize what inventions require a patent to incentivize innovation, and designed to ultimately foster the “progress of science and the useful arts.” 38 I develop the concept of “expert community” throughout this article. A key claim is that there are important, but unexamined, differences between how experts 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 paper draws from two lines of sociological research. The first explores how expertise is institutionalized in organized groups of experts and how those organized groups interact with each other and with society at large. 39 The second focuses on understanding the role of codified knowledge (usually in the form of explicit rules of action) and tacit knowledge (i.e. not codified contextual knowledge) in expert decision-making. 40

Two basic insights emerge from these studies. First, organized groups of experts seek maximal control and autonomy in the development and application of the abstract knowledge base that constitutes their expertise. 41 But expert groups are embedded in an ecosystem composed of other expert groups with different knowledge systems that apply to overlapping sets of problems. 42 This overlap leads expert communities to engage in constant competition with each other for jurisdictional control. 43 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. 44 In addition, an expert community’s struggle to maintain autonomy in the development of its knowledge base, predicts that expert communities will be more likely to defy solutions imposed by non-expert generalists than are communities of non-experts. 45 In the specific case considered here, it predicts that the Federal Circuit is more likely to defy Supreme Court decisions than are other circuit courts. 46

38 U.S. Const. art. I, §8, cl. 8.
39 See infra Section II.A.
40 See infra Section II.B.
41 See infra Section II.A.1.
42 See id.
43 See infra Section II.A.2.
44 See infra Part II.D.2.a(1). See Banks Miller and Brett Curry, Experts Judging Experts: The Role of Expertise in Reviewing Agency Decision Making, 38 LAW & SOCIAL INQUIRY 55, 55-56 (2013) (noting that courts are generally deferential to the decision making of federal agencies).
45 See infra Part II.A.1.
46 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 II.D.2.a(1).
Second, expert practitioners differ from novices in their relationship to the use of rules to solve problems. Novices must self-consciously follow explicit rules to begin their path towards expertise. 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.”). 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 two additional functions. Because rules prevent recourse to more subjective contextual judgment, expert communities often resort to rules to constrain and control the action of subordinate communities. Finally, rules also serve a legitimating function by showing non-expert novices and the public at large the utility of the expert practice, and by reducing variability in expert communities with high levels of internal dissent.

Taken together, these studies present a more nuanced picture of why and when an expert community, such as the Federal Circuit, will prefer formal rules to flexible standards. Specifically, they explain rule formalism at the Federal Circuit 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. An expert community’s resort to rules, however, can also lead to an apparent double standard. Rules that bind District Courts also bind the Federal Circuit and prevent it from deploying its “tacit knowledge” or “expertise.” To solve this paradox, one would expect an expert community to look for ways to free itself from the very same rules it created, in order to deploy its expertise. Indeed this Article shows how this prediction is borne out by Federal Circuit behavior.

This article makes three important contributions. First, it develops a thorough and systematic typology of expert community features that the sociology literature has not provided. These features allow for a more complete, sharper and more nuanced understanding of the behavior of the Federal Circuit than previous analyses focused largely on the enhanced likelihood of capture by special interests, and on the fuzzy concepts of “narrowness” or “tunnel vision.” Specifically, this model of expert decision-making sheds light on the Federal Circuit’s unique relationships with other players in the judicial hierarchy, including the PTO, District Courts, and the Supreme Court. Second, it provides a framework to evaluate existing proposals for Federal Circuit reform, revealing several previously unidentified weaknesses and providing guidelines for minimizing expert bias.

47 See infra Part II.B.
48 See infra Part II.B.
49 See infra Part II.B.
50 See infra Part II.A.2.
51 See infra Part II.A.2.
52 See infra Part II.D.2.b(1).
53 See infra Part II.D.2.b(1).
while preserving the benefits of expert decision-making. Third, the model has important implications beyond the Federal Circuit, as it provides a novel theoretical lens to analyze the behavior of other specialized courts.

The remainder of the Article proceeds in three parts. Part I offers an overview of the critiques surrounding the performance of the Federal Circuit as the sole appellate arbiter of patent disputes, as well as existing explanations for the Federal Circuit’s performance. Part II introduces the reader to studies in the sociology of expertise. Drawing and expanding upon these studies, Part II also develops a typology of five features that are closely associated with communities with attributed expertise in a particular subject matter: (1) epistemological monopoly; (2) epistemological autonomy; (3) codification; (4) typecasting; and (5) inability to self-coordinate. This part demonstrates how conceptualizing the Federal Circuit as an expert community helps explain key features of its jurisprudence.

Part III 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.

I. THE FEDERAL CIRCUIT UNDER FIRE: THE INSTITUTIONAL CRITIQUE

The Federal Circuit stands alone as the only Article III court with virtually exclusive jurisdiction over a specific subject matter—patent law. Despite generally favorable assessments of its performance during the first five years of its existence, criticism of the Federal Circuit began to mount in the early 1990s and has continued to this date. Indeed, both academic commentators and judges have recently 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. 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 three types, concerning: (1) the relationship of the Federal Circuit with other decision-making bodies and courts; (2) the adjudicative “form” of patent law; and (3) the adjudicative “substance” of patent law. It then summarizes the explanations and solutions to these shortcomings proposed by critics. It closes by showing how current accounts of the Federal Circuit provide a limited and incomplete description of the behavior of expert decision-making bodies.

55 See, e.g., Dreyfuss, supra note ___.
56 See, e.g., Rai, supra note ___, at 1106-1107; Thomas, supra note ___, at 796.
A. Institutional Critique

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), an appeals court reviews legal conclusions de novo, but reviews factual findings under the more deferential clearly erroneous standard. 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 plainly making factual findings. Commentators have blamed this anomalous behavior for creating increased unpredictability and uncertainty in patent claim construction and, more broadly, for divorcing patent law from the context-specific needs of different innovation communities.

The Federal Circuit’s proclivity for interpreting arguably factual questions as issues of law is seen most clearly 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). 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. Nevertheless,
the Federal Circuit has not interpreted any aspect of claim construction—including the use and evaluation of expert testimony—as fact-finding.\(^{64}\)

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”\(^{65}\) as well as crucial Supreme Court language in *Markman v. Westview Instruments, Inc.*\(^{66}\), that characterizes claim construction as a “mongrel practice” involving both legal and factual issues.\(^{67}\) District court judges have also been critical of the Federal Circuit’s penchant for de novo review in claim construction. For example, Chief Judge Saris of the District Court of Massachusetts argued “there should be more deference [to the district judge on claim construction] particularly when the district judge takes expert testimony or receives other extrinsic evidence.”\(^{68}\) And while serving at the District Court, judge O’Malley (currently 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.”\(^{69}\)

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 35 U.S.C. § 285.\(^{70}\) In *Highmark Inc. v. Allcare Health Management Systems, Inc.*, petitioners argued that the Federal Circuit had arrogated the “responsibility of applying a fact-dependent legal standard” thus “improperly divid[ing] labor between the trial courts and courts of appeal.”\(^{71}\) 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.”\(^{72}\) In both cases, the Supreme Court sided with petitioners, striking down the Federal Circuit’s

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\(^{64}\) *Cybor Corp.*, 138 F.3d 1448, 1451 (Fed. Cir. 1998) (determining that the Federal Circuit shall review district court claim construction decisions de novo).

\(^{65}\) *Rai* supra note ____, at 1048.


\(^{67}\) *Id.* See also Anderson & Menell, supra note ____ at 6. 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.”


\(^{69}\) *Id.* (statement of Hon. Kathleen O’Malley).


\(^{72}\) *Petition for a Writ of Certiorari* at i, *Octane*, 134 S. Ct. at 1749 (No. 12-1184), 2013 WL 1309080.
de novo standard of review. The Court emphasized that the Federal Circuit had relied on an “unduly rigid” framework that “impermissibly encumbers the statutory grant of discretion to district courts.”

Commentators have also criticized the Federal Circuit for acting as a fact-finder itself—even in 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, it often issues a ruling on infringement following claim construction, rather than remand the case for a new trial. William Rooklidge and Matthew Weil have criticized the Federal Circuit’s “judicial hyperactivity” in “reaching out to make factual findings as an alternative to remanding a case to be considered anew in the district court.” In this context, Arti Rai has criticized the court’s penchant for “simply declar[ing] that there can be no factual dispute with respect to infringement.” And in decisions concerning patent validity, including nonobviousness and disclosure determinations, Rai contends that the Federal Circuit has “merely paid lip service to deference,” but has actually substituted its own fact-finding for that of the district court.

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. 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 de novo arguably factual issues. Indeed, it is telling that Federal Circuit judges themselves have characterized the court’s behavior as a “temptation to label everything legal and usurp the province of the fact finder with our manufactured de novo review.”

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

73 Highmark, 134 S. Ct. at 1748-1749.
74 Octane Fitness, 134 S. Ct. at 1755.
76 See, e.g., Rooklidge & Weil, supra note ___, at 725 (2000)
77 Rooklidge & Weil, supra note ___, at 725 (2000)
78 Rai supra note ___, at 1060.
79 Rai supra note ___, at 1063.
80 Id.
81 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. Alleyn 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.”
83 Highmark, 687 F.3d at 1362.
Dreyfuss has suggested that the Federal Circuit’s “unique responsibility towards patent law argues for a broader scope of review over factfinding.” 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 other specialized bodies

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 have 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. The ITC makes 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.

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, courts review administrative fact-finding under the highly deferential “arbitrary or capricious” or “unsupported by substantial evidence” standard. Yet, until the Supreme Court intervened in Dickinson v. Zurko, the Federal Circuit maintained that the APA did not apply to its reviews of the PTO’s findings of fact, choosing to apply a more rigorous standard of review. And although the Court’s Zurko decision held that the APA did apply to the Patent Act, commentators have observed that the Federal Circuit has displayed considerable resistance to applying APA standards of review to its patent docket.

The Federal Circuit has repeatedly refused to grant deference to the PTO’s substantive interpretations of the Patent Act. Rather, it considers the PTO to have only procedural—but not substantive—rule-making authority with respect to the Patent Act. The Federal Circuit has also retained the

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84 Dreyfuss, supra note ___ at 62
89 In re Zurko, 142 F.3d 1447,1459 (Fed. Cir. 1998).
90 See, e.g., Rai, [Engaging] supra note ___, at 1055.
91 See, e.g., Tafas v. Doll, 559 F.3d 1345 (Fed. Cir. 2009) (holding that the PTO does not have substantive rulemaking authority); Brand v. Miller, 487 F.3d 862, 869 n.3 (Fed. Cir. 2007) (The PTO “does not earn Chevron deference on questions of substantive patent law.”).
92 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).
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.\footnote{In re Leuders, 111 F.3d 1569,1571 (Fed. Cir. 1997) (‘‘We review the Board’s ultimate legal conclusion. . . de novo.’’); In re Zurko, 142 F.3d 1447, 1449 (Fed. Cir. 1998) (‘‘We believe §559 for the [APA] permits. . .our continued application of the clearly erroneous standard in our review of these fact-findings.’’).} 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\footnote{See, e.g., Joseph Scott Miller, Substance, Procedure and the Divided Patent Power, 63 ADMIN. L. REV. 31 (2011).}, or by granting the PTO substantive rule making authority and thus Chevron deference to its decisions.\footnote{See, e.g., Michael J. Burstein, Rules for Patents, 52 WM. & MARY L. REV. 1747, 1751 (2011); Jonathan S. Masur, Regulating Patents, 2010 SUP. CT. REV. 275, 279; Melissa Wasserman, Chevron Deference for the PTO? 54 WM & MARY L. REV. 1959 (2013).}

As elaborated further in Part II, the relationship between the Federal Circuit and the PTO can be described and understood as one of \textit{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.

The Federal Circuit has similarly refused to grant either \textit{Chevron} or \textit{Skidmore} deference to patent decisions from the ITC.\footnote{See, e.g., supra note ___, at 1547.} 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 APA and \textit{Chevron} if the ITC is interpreting the Tariff Act—but not the Patent Act—when making patentability determinations.\footnote{See, id. at 1562-63 (arguing that the ITC is interpreting the Tariff Act when making patentability determinations to decide whether to grant an exclusion order); \textit{but see 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 interprets Patent Act whenever it makes patent-related determinations).} 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.\footnote{Process Patents: Hearing Before the S. Comm. on the Judiciary, \textit{supra} note ____ (statement of John R. Thomas, Professor of Law, Georgetown University).} In contrast, Sapna Kumar has argued that considerations of institutional competence and political accountability favor granting Chevron deference to ITC patentability and infringement decisions.\footnote{See Kumar, \textit{supra} note ___, at 1587,1592.}

Leaving aside whether increased deference is normatively desirable, what remains clear is that the Federal Circuit is an outlier among all Article III courts in its review of agency action. 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.  

3. Adjudicative “Form” of Patent Law

The Federal Circuit also stands out among other Article III appellate courts in its systematic preference for formal, rigid rules over flexible standards. This behavior, many commentators believe, has contributed to patent law’s disconnect from the needs of communities of innovators in a fast-paced technological environment. In a seminal article, Duncan Kennedy distinguished two “different rhetorical modes” of private law adjudication regarding the form of legal decisions. 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.” By all accounts, the Federal Circuit has consistently favored the use of clear and inflexible general rules. Time and again, the court has attempted to distill patentability inquiries in to 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.

One of the most prominent, and most criticized, examples of Federal Circuit rule formalism is the court’s development of the “teaching, suggestion, and motivation” (TSM) test for determining whether an invention is non-obvious under section 103 of the Patent Act. 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. Although designed to avoid hindsight bias, the TSM test ultimately prevented consideration of contextual factors, such as tacit knowledge in the relevant scientific community, that would lead one of ordinary skill in the art to combine references, even absent an explicit indication to do so. This is

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100 Kumar, supra note ___, at 1566 (noting that the Federal Circuit grants both APA and Chevron deference “when patents are not at issue”); Nard, supra note ___ at 1430 (“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.”).
102 Id.
103 See, e.g., Timothy R. Holbrook, Substantive Versus Process-Based Formalism in Claim Construction, 9 LEWIS & CLARK L. REV. 123 (2005); Nard & Duffy, supra note ___, at 1644; Rai, supra note ___, at 1040; Thomas, supra note ___, at 774; see also Peter Lee, Patent Law and the Two Cultures, 120 YALE L.J. 4, 21-22 (2010) (arguing that the Federal Circuit resorts to inflexible rules to avoid engaging with complex technologies).
105 Pedraza-Fariña, supra note ___, at 825.
106 Id. at 823-25; Rebecca S. Eisenberg, Obvious to Whom? Evaluating Inventions
essentially the conclusion reached by the Supreme Court in *KSR International v. Teleflex, Inc.* when it rejected the TSM test as the sole test for obviousness, and replaced it with a case-by-case focus on what scientists would know or could develop during routine research.\(^{107}\) 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,\(^ {108}\) the court still rarely does so.\(^ {109}\) Rather, the court appears to be sliding back into rule formalism.\(^ {110}\)

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, remedies and, more recently, in its extraordinary case jurisprudence.\(^ {111}\) 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.\(^ {112}\) Under this test, a process may constitute patentable subject matter if (1) it utilizes a particular machine or apparatus, or (2) it transforms an object into a different state or thing.\(^ {113}\) 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 purpose of patent law” to adapt to technological advances.\(^ {114}\) Similarly, prior to the Supreme Court’s decision in *EBay Inc. v. MercExchange, LLC*,\(^ {115}\) the Federal Circuit relied on a “general rule” that injunctions should issue in patent infringement cases absent exceptional circumstances.\(^ {116}\) The Supreme Court struck down this general rule and held

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\(^{107}\) 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.”).

\(^{108}\) See Durie & Lemley, supra note ___, 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”).


\(^{110}\) See, e.g., Pedraza-Fariña, supra note ___, 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).


\(^{112}\) In re Bilski, 264 Fed. Appx. 896 (Fed. Cir. 2009) (per curiam).

\(^{113}\) Id.


\(^{116}\) Apple, Inc., 678 F.3d at 1335.
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.”" 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. 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, while a majority of academic commentators have denounced it as inconsistent with patent law’s goal of promoting innovation. As Part II 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-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.

4. Adjudicative “Substance” of Patent Law

The creation of the Federal Circuit has also had an impact on the “substance” of patent law, that is, the content of rules or standards that regulate what may be patented, as well as the scope and content of patent rights. Commentators have criticized the Federal Circuit for having a pro-patentee bias, which has led to an unwarranted expansion in the number of patents held valid. Two mechanisms are thought to drive this “patent explosion.” First, the court has expanded potentially patentable subject matter, placing more human activities than ever before under the regulatory

117 547 U.S. at 388.
118 Octane Fitness, LLC, 134 S. Ct. at 1755.
119 See, e.g., Russell B. Hill & Frank P. Cote, Ending the Federal Circuit Crapshoot: Emphasizing Plain Meaning in Patent Claim Interpretation, 42 IDEA 1 (2002); Lee & Evans, supra note ___, at 7; Thomas supra note ___, at 794 (noting that patent lawyers were a powerful lobby that advocated for clear rules in patent law); Victoria Slind-Flor, Federal Circuit Judged Flawed, NAT’L L.J., Aug. 3, 1998.
120 See, e.g., Rai supra note ____ at 1106-1107; Thomas supra note ___, at 796.
121 See supra Part III.C.2.
122 Id.
123 See infra Part II.D.2.b.
124 See, e.g., Adam Jaffe & Josh Lerner, supra note ___, at 125-26 (arguing that “the primary direction of the [Federal Circuit’s] changes has been in the direction of strengthening patent holders’ rights” and criticizing such “strengthening of patent rights” as going “beyond recalibration to reach troubling proportions.”).
125 See, e.g., Bronwyn Hall, Exploring the Patent Explosion, 30 J. TECH. TRANSFER 35, 38 (2005) (arguing that the creation of the Federal Circuit has “led to an increased focus on patenting by firms in industries where patents have not traditionally been important, such as computers and electronics”).
structure of patent law. Second, the court has lowered the bar to patentability, largely by weakening the obviousness requirement.

Nevertheless, the court’s jurisprudence is not so clearly patentee-friendly. As John Thomas has remarked, loosening the obviousness standards can cut both ways: by making it easier to patent small improvements over existing technology, lowering the bar to patentability may benefit improvers at the expense of pioneer inventors. Further, the court’s utility and written description jurisprudence has made it harder to obtain patents in some technology areas. And the court’s infringement jurisprudence has had decidedly mixed effects. While the court’s preference for permanent injunctions for patent infringement clearly benefited patentees, the court has also weakened the doctrine of equivalents, a position that benefits non-patent holders.

Rather than focus on the court’s potential bias in favor of a specific type of player (patentee vs. non-patent holder), a more apt description of the court’s jurisprudence is that it has sought to expand the reach of its expertise by finding new areas for its application. Seen in this light, the court’s expansion of the categories of inventions that may be patented, or its revival of design patents, can be understood as an expected behavior of expert communities.

B. Existing 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; (3) capture and tunnel vision. Nevertheless, none of them 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.\(^\text{134}\) For example, Craig Nard and John Duffy argue that the Federal Circuit has achieved uniformity at the expense of quality.\(^\text{135}\) According to Nard and Duffy, the Federal Circuit’s mandate (and quest) 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.\(^\text{136}\) 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.\(^\text{137}\) 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.\(^\text{138}\) 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”\(^\text{139}\) by allowing parties to file their case either in the Federal Circuit or in the regional circuit where their claim was first filed.\(^\text{140}\)

Nevertheless, taken alone, centralization and the drive for uniformity cannot explain many of the features of the Federal Circuit described above. 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.\(^\text{141}\) Strict adherence to the uniformity principle would not predict such a

\(^{134}\) See, e.g., Nard & Duffy, supra note ___, at 1622.

\(^{135}\) 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.”)

\(^{136}\) Id.

\(^{137}\) Id. at 1649.

\(^{138}\) 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”).

\(^{139}\) Hon. Wood, supra note ___, at 9.

\(^{140}\) Id.

\(^{141}\) 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
malleable interpretation of its own precedent. In addition, the Federal Circuit has an unusually high rate of dissent for an appellate tribunal—a fact that is not easily reconciled with a court for which uniformity is of paramount importance. These features are best explained as a consequence of institutionalized expert decision-making. 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. The low level of deference accorded to those institutions has arguably done much to undermine the predictability and uniformity of patent law. 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.

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. 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. 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].” As elaborated in Part III, 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

143 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. Supra note ___, at 1646.
144 See infra Part III.C. This article does not argue that centralization and the drive for uniformity don’t 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.
145 See infra Part III.C.1.
146 See infra Part III.C.2.
147 Lee, supra note ___, at 25.
148 Id. at 9.
149 Thomas, supra note ___, at 795.
policy through patent law). 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.

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. Both Congress and most academic commentators, however, focus almost exclusively on two features of a specialized judiciary that are thought to negatively influence decisional content—capture and tunnel vision. Capture describes the external influence of interest groups on the policies and decisions of a particular institution. 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; and 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 termed the “undue specialization” of the Federal Circuit. Concerns about undue specialization

150 See infra Part ___.
151 See infra Part ___.
152 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.”) (emphasis added).
153 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 ___, 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) (posing 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 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.”).
154 William J. Novak, A Revisionist History of Regulatory Capture, in PREVENTING REGULATORY CAPTURE: SPECIAL INTEREST INFLUENCE AND HOW TO LIMIT IT (Daniel Carpenter & David Moss eds., 2013).
155 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.
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.\(^{156}\) Counteracting such narrowness required exposing judges to cases from a variety of fields,\(^{157}\) and ensuring the court was not simply staffed by “patent lawyers.”\(^{158}\) But tunnel vision is an ambiguous concept. It hides 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.\(^{159}\) (what this article analyzes 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. (what this article analyzes 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. (what this article analyzes as *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. (what this article analyzes 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

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.”).

\(^{156}\) 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.”)

\(^{157}\) 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.”)

\(^{158}\) 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 548-49 (“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.”).

\(^{159}\) See, e.g., Baum, *supra* note ___, at 36 (arguing that people who work in patent law are likely to have “a narrower range of opinion about the issues in their field than does the general public or political and social elites as a whole.”).
people. (Raising issues of public trust and the legitimacy of expert-decision making.)

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

This Part provided a synthesis of three 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 do other Article III appellate courts. 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. Third, several scholars have criticized the Federal Circuit for having expanded and strengthened the scope of patent rights. This Part also showed why existing theories—centralization, information-costs, capture, and tunnel-vision, are insufficient to explain this set of anomalous Federal Circuit behaviors. The next part develops a model of expert decision-making that provides a broader conceptual framework to understand not only the behavior of the Federal Circuit, but also that of specialized courts more broadly.

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160 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 ___ at 7.

161 See, e.g., Dreyfuss, supra note ___ 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).

162 The work of political scientist Lawrence Baum is an exception to this narrow treatment of specialized courts. Baum’s analysis, however, is individualistic: it focuses on how individual judges’ behavior is influenced by his or her possession of specialized knowledge. The analysis advanced here is complementary, as it focuses not on individual actors 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 ___. 
II. A TYPOLOGY OF EXPERT DECISION-MAKING

This Part first synthesizes and brings together two approaches to the study of expertise. It then develops a typology of features of expert communities, elaborating upon these insights in the sociology of expertise. To both develop the typology and to test its main claims and consequences, Section II.D uses the Federal Circuit as a case study.

A. Expertise As Competition for Maximal Autonomy and Control

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 each other. From this body of work, emerge three key themes with important consequences for the study of expert courts: (1) expert communities’ interdependence and competition for jurisdicitional control (2) abstraction and codification as mechanisms of competition and legitimation (3) subjective and objective properties of tasks and problems as both enabling and restraining jurisdicitional expansion. I explore these three themes below.

1. Interdependence and Competition for Jurisdictional Control

Through a series of studies of professional organizations (such as those of doctors and psychologists) Andrew Abbott and Eliot Friedson theorize that the essence of a profession is to seek maximal autonomy and control over the set of abstract principles within its “jurisdiction.” 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. 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. 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.

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

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165 Abbott, supra note ___, at 59.

166 Id.

167 See, e.g., Gorman & Sandefur, supra note ___, 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.”).
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 claim immediately implies another: professions do not exist in isolation, but are embedded in an ecosystem where they compete with each other for jurisdictional control.\textsuperscript{168} In turn, dissecting the mechanisms by which such competition takes place is important for understanding expert community dynamics. The following two subsections explore three such mechanisms: (a) the creation of a system of abstract knowledge; (b) codification of (at least a portion of) such knowledge; (c) competing framings of tasks and problems.

2. Abstraction and Codification as Mechanisms of Competition and Legitimation

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.\textsuperscript{169} For example, different medical specialties have developed abstract knowledge systems that correlate symptoms with disease diagnoses, mechanistic explanations for the disease, and appropriate treatments.\textsuperscript{170} Law is itself built on different systems of abstract knowledge. In patent law, concepts such as “a person of ordinary skill in the art,”\textsuperscript{171} “conception,”\textsuperscript{172} and “nonobviousness,”\textsuperscript{173} to name only a few, are elements in an abstract knowledge system designed to ultimately incentivize innovation.

A classic example of jurisdictional competition through the control of a system of abstract knowledge concerns the struggle among the clergy, medicine, psychiatry, and criminal law to define and treat alcoholism. Each one of these four communities sought to conceptualize 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.\textsuperscript{174}

\textsuperscript{168} See, e.g., Abbott, supra note ___, at 19.
\textsuperscript{169} See, e.g., id. at 70.
\textsuperscript{170} See THE MERCK MANUAL OF DIAGNOSIS AND THERAPY (Robert S. Porter et al. eds., 19th ed, 2011).
\textsuperscript{172} 35 U.S.C. §201(g) (2006).
\textsuperscript{174} Abbot, supra note ___, 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 HUTCHINS, THE SELLING OF
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. Codification allows expert communities to expand their jurisdiction by enlisting other—subordinate—communities to render services under the dominant expert community’s supervision. For example, doctors have delegated the provision of on-site emergency aid (or prehospital aid) to paramedics, whose conduct is regulated by the “Basic Life Support Guidelines” and “Advanced Life Support Guidelines.” As a general rule, deviation from these guidelines requires direct medical oversight, thus sharply reducing paramedic discretion.

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 diagnosis, and direct treatment plans would lead to a considerable erosion of physicians’ power and autonomy. 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 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 professional claim to effective treatment by giving a glimpse to the lay public of its claims to

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DSM 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.”).

175 See Abbot supra note ___, 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.”).

176 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 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).


178 Stamford Hospital, supra note ___ at 4.

expertise through a simplified, rule-based version of the experts’ knowledge. Thus, jurisdictional control requires an optimal 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.” Similarly, the turn towards the standardization of medical care was made, at least in part, to address a legitimacy crisis. A series of studies documented wide divergences in the medical treatments offered to similarly situated patients, undermining the credibility of health care practitioners. 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. 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. Indeed, several studies have found that only a minority of doctors complies with guidelines in their field, despite being familiar with them.

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—what historian of science Theodore Porter calls “weak communities”—are expected to rely on inflexible rules most often. Expert communities can be “weak” either when they lack legitimacy in the eyes of external audiences or when there is a high level of internal dissent (which in turn can lead to low levels of external trust). Rules can also help manage internal dissent by reducing variability and uncertainty in weak communities without widely shared background assumptions.

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180 See, e.g., Porter supra note ___, at 4 (“Mechanical objectivity . . . has a powerful appeal to the wider public. It implies personal restraint. It means following the rules.”); Abbott supra note ____ 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.”).
181 Kirk & Hutchins, supra note ____, at 13.
182 See, e.g., Stefan Timmermans & Emily Kolker, Evidence-Based Medicine and the Reconfiguration of Medical Knowledge, 45 J. HEALTH AND SOCIAL BEHAVIOR, 177, 177 (2004).
184 See Timmermans & Kolker, supra note ____., at 181.
185 Id. at 186.
186 Id.
187 Porter supra note ____., at 229-30 (noting that recourse to inflexible rules is most salient in scientific communities that are poorly insulated from public criticism)
188 Id. at 226-228.
189 Id. 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.”).
Taken together, these studies present a more nuanced picture of the multiple reasons why an expert community may resort to rules. Rules can be an instrument of control, but they can also serve to provide external legitimacy and to manage communities fractured by internal dissent.

Professions use abstract knowledge to classify and offer solutions for tasks and problems. But there is no single or best way to conceptualize a problem. Rather, the act of classifying a problem creates the arena where jurisdictional struggles take place. The next subsection addresses this “classification problem” and its implications for professional competition.

3. Competing Framings of Tasks and Problems

Tasks can be conceptualized as having both objective and subjective elements. Objective qualities are features of a problem that are so broadly agreed upon as constitutive of a problem that they come to represent fixed characteristics that are not easily reinterpreted. The most obvious objective quality of a problem is given by its natural or factual characteristics. For example, all the approaches to alcoholism described above were 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. Thus, objective qualities of tasks limit jurisdictional expansion by requiring that a profession’s definition of a problem remain closely linked to that problem’s fixed attributes.

Subjective qualities, 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 abstract knowledge system. For example, alcoholism framed as a mental disorder concerning addiction and impulse control grants primary jurisdictional control over treatment to psychologists or psychiatrists; but framed as a problem involving neurotransmitter hypersensitivity, it grants primary jurisdictional control to physicians.

B. Expertise in Action: Rules versus Contextual (Tacit) Knowledge

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. The key insight derived from this line of inquiry is that expertise is inextricably linked with tacit knowledge—“inarticulable skills of which one cannot fully give account”—that make

190 See, e.g., Abbott supra note ___, at 38.
191 See, e.g., Harry Collins, Tacit and Explicit Knowledge (2010); Harry Collins & Robert Evans, Rethinking Expertise (2007); Herbert Dreyfus & Scott 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).
192 Evan Selinger, Expertise: Philosophical Reflections 10 (2011).
it impossible to fully codify an expert’s body of knowledge into a set of written rules (or code).

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. 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. While a novice slowly and deliberately strives to follow rules, through a “painful” and “jerky” process, an expert experiences “flow” as he/she “unsocially” recognizes complex contextual cues. In fact, experts often tend not to follow the heuristics they relied upon during their training. 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.” 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 an expert community’s knowledge requires “enculturation”: “interactive immersion in the way of life of the [expert] culture.” In other words, acquiring expertise requires learning by doing with other members of that expert community. 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.”

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. The process of acquiring expertise represents a progression “from relative detachment to engaged commitment.” Second, experts will have difficulty communicating with non-experts precisely because non-

193 Dreyfus & Dreyfus supra note ____, at 21-36.
194 Dreyfus & Dreyfus supra note ____, at 21-36.
195 Dreyfus & Dreyfus supra note ____, at 21-36.
196 Selinger supra note ____, 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.”)
197 Collins & Evans supra note ____, at 25.
198 Collins & Evans supra note ____, at 23, 24.
199 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).
200 Collins & Evans supra note ____, at 3.
201 Dreyfus & Dreyfus, supra note ____, at 19 (According to Dreyfus & Dreyfus, it is this affective transformation following skill acquisition—in addition to tacit knowledge—that differentiates expert communities from computerized expert systems.).
202 Dreyfus & Dreyfus, supra note ____, at 33.
experts can be likened to novices who only have access to the rules, but not the intuition of the expert community.  

C. Summary

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, increasing legitimacy with external audiences, managing internal dissent, and providing expert training. Applying these insights to the Federal Circuit and to specialized courts more broadly, however, necessitates a finely grained understanding of how these various aspects of expert community behavior interact with each other. It also requires adapting these insights to the hierarchical court system. The first step is a more thorough typology of expert community behavior, which the sociological literature has not provided. I address that gap in the next section. Drawing from and synthesizing the work discussed in the previous sections, the next section unbundles expert behavior into five characteristics: (1) epistemological monopoly; (2) epistemological autonomy; (3) codification; (4) typecasting; and (5) inability to self-coordinate.

D. A Typology of Features of Expert Communities: The Federal Circuit as a Case Study

1. 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, licensure procedures, and ethical guidelines. One crucial question in applying these insights to the Federal Circuit and to specialized courts more broadly is how to translate this research to a different institutional context. In other words, how is a specialized court like the expert communities studied by sociologists, how might it be different, and how might these differences impact behavior predictions that flow from the study of the professions?

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.” And sociologist Gil Eyal argues that jurisdictional competition can take place between “any groups that can lay a claim of

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203 Selinger, supra note ___, at 22.
204 Abbott, supra note ___, at 318.
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 (attributed) expertise in formulating patent doctrine to fulfill the dual Congressional mandate of uniformity and efficiency. Second, the Federal Circuit has (attributed) special knowledge on how to apply abstract patent doctrine to technical fact patterns. Third, the Federal Circuit has (attributed) 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. 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 both types of expertise to the Federal Circuit. Importantly, recent empirical studies show that district 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). 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

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


208 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).

209 Attributed, as opposed to substantial, 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.


volume of patent cases it decides.  

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 52a requiring deference to the District Court’s findings of fact, or the required deference to Supreme Court holdings) that place limits on its autonomy. In addition, current Federal Circuit judges have no say over new judicial appointments—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. And several states have passed laws banning some types of scientific research, such as human reproductive and therapeutic cloning. 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.

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 such as, for example, gynecologists or geneticists. In other words, 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.  

Second, this self-perception is shared across government actors, including Congress, lower courts, and the Supreme Court. Third, epistemic diversity upon entering the court does not preclude the development of

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212 Festo Corp. v. Shoketsu Kinzoku 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 (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 a reasonable expectation of success.


216 See supra note 212.

217 See supra note 213.
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.218 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.

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

2. Five Features of Expert Communities and Their Application to Federal Circuit Behavior

This section introduces the five features of the typology. Because a concept is often best understood through its application to a particular case, the five categories are briefly described and their details worked out by their application to the Federal Circuit as a case study. Table 1 below summarizes how the five features describe below map onto Federal Circuit behavior.

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<th>Epistemic Monopoly</th>
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<th>Codification</th>
<th>Typcasting</th>
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Table 1: Mapping the Typology of Expert Decision-Making to Federal Circuit Behavior

a. Epistemic Monopoly and Autonomy

Jurisdictional control requires the twin forces of monopoly and autonomy. Epistemic monopoly refers to an expert community’s drive to attain maximal control over its knowledge base. Monopoly allows control over the supply of expertise by placing the expert community as the only source of

218 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).
valid 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 jurisdictional 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 monopoly and autonomy. First, epistemic monopoly will lead to resistance to solutions for a particular problem proposed by non-experts in positions of authority—the problem of defiance. Second, epistemic monopoly will reduce deference to findings by subordinate non-experts—the problem of non-deference. Third, 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—the problem of jurisdictional expansion.

(1) Epistemic Autonomy and Monopoly at the Federal Circuit: Defiance, Non-Deference, and Jurisdictional Expansion

The behavior of the Federal Circuit tracks these three consequences of epistemic monopoly and autonomy.

*Defiance*

There have been no quantitative empirical studies comparing Federal Circuit disobedience of Supreme Court decisions to disobedience by other circuits, 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 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. An analysis of Federal Circuit case law reveals a pattern of resistance to implementing Supreme Court decisions

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219 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.” Laurence Baum, *Specialization and Authority Acceptance: The Supreme Court and Lower Federal Courts*, 47 POL. RES. Q. 693, 700 (1994).

overruling Federal Circuit precedent—a pattern consistent with the model’s prediction of defiance to decisions by generalist superiors.\textsuperscript{221}

For example, in one of the two Supreme Court cases reviewing the Federal Circuit in the 1980s, Dennison Manufacturing Co. v. Panduit Corp., 475 U.S. 809 (1986), 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 non obviousness.\textsuperscript{222} 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.\textsuperscript{223}

As discussed in Part I.A.2, in Dickinson v. Zurko,\textsuperscript{224} 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.\textsuperscript{225} 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 that the “arbitrary and capricious” standard when applied to judicial review of agency fact-finding—in contravention of Supreme Court precedent.\textsuperscript{226}

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 Part I.A.3, 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.\textsuperscript{227} The Court deemed the Federal Circuit’s “rigid approach” at odds with Supreme Court precedent in Graham v. John Deere Co. of Kansas City,\textsuperscript{228} which called for a flexible, functionalist inquiry.\textsuperscript{229} 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.\textsuperscript{230} Rather, a PHOSITA would be driven by “design incentives and other market forces.”

\textsuperscript{221} See infra Part ___.

\textsuperscript{222} See also Rai [Engaging Facts] supra note ___, at 1061 (analyzing Dennison and its aftermath).

\textsuperscript{223} See, e.g., Newell Cos. v. Kenney Manufacturing 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).


\textsuperscript{225} Id.


\textsuperscript{229} KSR, 550 U. S. 401.

\textsuperscript{230} Id. at 401-402.
to find solutions to existing problems worked out within the PHOSITA’s own field or a different one.231

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.232 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 analogous art inquiry,233 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,234 the Federal Circuit did not even cite KSR as relevant authority.235

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 Genetics236 to decide the case in light of the Court’s decision in Mayo v. Prometheus.237 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.238 Mayo concerned the patentability of a diagnostic method for adjusting the dosage of a drug to avoid toxicity while preserving therapeutic effectiveness.239 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”240 were patent-ineligible laws of nature.241

231 Id. at 401.
234 In re Klein, 647 F.3d 1343.
235 Id.
238 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 1309.
239 Mayo, 132 S. Ct. 1290-1291.
240 Id. at 1294.
241 Id.
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 gives instructions for translating DNA into a specific protein sequence.\(^{242}\) 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.\(^{243}\) Nevertheless, the Federal Circuit simply declared that *Mayo* was not applicable to the issue of patentability of genomic and cDNA.\(^{244}\)

*Gunn v. Minton*\(^{245}\) 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.\(^{246}\) *Gunn* concerned a suit for attorney malpractice in patent litigation, filed in a Texas state court.\(^{247}\) In *Gunn*, the Supreme Court rejected the Federal Circuit’s bright-line rule that all patent malpractice cases must be brought into Federal Court.\(^{248}\) Nevertheless, even though *Gunn* rejected the Federal Circuit’s interpretation of its own jurisdictional reach,\(^{249}\) the Federal Circuit has already suggested that the decision should be interpreted narrowly, thus preserving much of its previous jurisdictional case law.\(^{250}\)

**Non-Deference**

As discussed in Part I.A.1, 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.\(^{251}\) If superior understanding of how to apply patent law to 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

\(^{242}\) See, e.g., *Supra* note ___, at ___.

\(^{243}\) "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."

\(^{244}\) Ass’n for Molecular Pathology v. U.S. Patent and Trademark Office, 689 F.3d 1303, 1324-1325 (Fed. Cir. 2012).

\(^{245}\) Forrester Envt’l 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*”).

\(^{246}\) Id. at 1061.

\(^{247}\) Id.

\(^{248}\) Id.

\(^{249}\) Id.

\(^{250}\) See, e.g., *Supra* note ___, at ___; *Dreyfus*, *supra* note ___, at ___.

\(^{242}\) 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.

\(^{243}\) The case involved both cDNA and genomic DNA claims. *Mayo*: “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.”
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-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. 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 affirmation rates and deferential standards of review. 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. Specifically, these theories predict that agencies with multiple tasks will tend to give prominence to one of those tasks due to “agency culture, history, monitoring difficulties, and political concerns.” Under this view, the Federal Circuit expands its jurisdiction on issues central to its core mission, but surrenders it on peripheral issues. This model offers an alternative, yet complementary, explanation: the Federal Circuit’s unique behavior in the area of patent law flows from its attributed expertise in patent law.

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. For example, Shubha Ghosh argues that the Federal Circuit has appropriated

255 Id. at 1799.
256 Id.
jurisdiction over state contract law by creating its own federal common law of contracts.\textsuperscript{258} Similarly, the Federal Circuit has interpreted its Congressional grant of jurisdictional as encompassing any state law claim that simply requires the application of patent law.\textsuperscript{259} 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.\textsuperscript{260} 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.”\textsuperscript{261}

Finally, the drive to maintain maximal control and to displace alternative framings of a problem also plays out through 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 to gain 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 rule-making), however, remains one of the most powerful mechanisms whereby 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 and \textit{Chevron}.\textsuperscript{262} 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.\textsuperscript{263}

\begin{footnotes}
\footnotetext{258}{Ghosh, \textit{supra} note \underline{___}, at 3.}
\footnotetext{259}{Gugliuzza \textit{[Patent Law Federalism]} \textit{supra} note \underline{___} at 30.}
\footnotetext{260}{\textit{Id.} at 31-32.}
\footnotetext{262}{See \textit{supra} note \underline{___}.}
\footnotetext{263}{See, e.g., Long \textit{supra} note \underline{___}, at 1966 (“The PTO has been vying to gain more influence in the market for supplying legal rules and norms.”); Craig Allen Nard, \textit{Defence, Defiance and the Useful Arts}, \textit{Ohio St. L. J.} (“[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.”).}
\end{footnotes}
b.  Codification

All communities of experts strive to codify into written rules at least part of their abstract knowledge base. Parts II.A.2 and II.B above outlined the four interrelated purposes of codification by an expert community: (1) teaching; (2) delegation and control; (3) legitimation; (4) managing internal dissent.

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. 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 suggest that it will behave like a weak expert community. In turn, as a weak community, this model predicts that the Federal Circuit would resort to rules on issues characterized by high levels of internal dissent. Finally, the technical background of some judges—and the corresponding lack of technical expertise of others—may make technically proficient judges disproportionately influential on issues involving their technological expertise.

(1) Codification and the Federal Circuit: Managing Relationships through Rule Formalism

The codification feature of expert communities explains the Federal Circuit’s resort to rules as a key mechanism by which the Federal Circuit manages its relationships with subordinate decision-making bodies, with other relevant audiences, such as the patent bar and the public at large, and among its own members. Specifically, the Federal Circuit relies on rules not only to control subordinate expert and generalist communities, but also to seek legitimacy and support from relevant audiences (notably the patent bar) and to constrain the impact of internal dissent.

Relationships with District 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. 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.

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.”

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. 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, and in particular to decisions by specific District Court judges who have sat with the Federal Circuit, which is consistent with the teaching function of

experience in patent law to be able to judge, without more explicit guidance, whether a patent law case is “exceptional.” *Supra* note ___, at 13.


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

268 Anderson & Menell *supra* note ___; Petherbridge, *supra* note ___.

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 subordinate expert community. Instead, 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 monopoly 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.

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. But as shown here, an equally important function of codification is that of a gatekeeper of an expert community’s 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, thus limiting their own autonomy. Indeed, the Federal Circuit appears to often “break” its own rules. For example, District Court judges have criticized the Federal Circuit for routinely ignoring its own rules in matters of claim construction. Commentators have leveled a similar criticism to the Federal Circuit’s choice of law jurisprudence, noting how the court has “inconsistently applied its choice of law rules” or “simply ignore[d] the choice of law rules issue altogether.” This paradox also makes a rule-based system much less

judges who have visited the Federal Circuit from 2006 to 2013 see:

270 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 ___, 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 ___, at 28.


272 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, 1356-1357 (Fed. Cir. 1998); In re Fritch, 972 F.2d 1260, 1265-1266 (Fed. Cir. 1992).

273 See, e.g., O’Malley, Saris & Whyte, supra note ___ at 676.

274 Field, supra note ___, at 645.

275 Id. at 653.
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.276

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 manage internal dissent or secure external legitimacy—a role which is more important in weak expert communities.277 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.278 The next section begins to fill this gap by applying these two features of codification to Federal Circuit behavior.

**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.279 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.280 Expert communities 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.281 In contrast, expert communities that enjoy high levels of sociological legitimacy (and thus higher levels of trust) can rely more heavily on tacit or uncodified contextual knowledge.282

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.283 Although

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276 See, e.g., Guggliuzza, supra note ___, at (noting that the Federal Circuit has failed to bring predictability to patent appeals).

277 See infra Part ___.


281 See, e.g., Porter supra note ___, at 226-28.

282 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.”).

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.\textsuperscript{284} Criticism began to mount in the late 1990s.\textsuperscript{285} Specifically, several commentators blamed the Federal Circuit for inconsistent, panel-dependent opinions that failed to bring uniformity to patent law.\textsuperscript{286} The Federal Circuit’s turn to rule formalism closely followed these waves of critiques.\textsuperscript{287} This is consistent with the hypothesis that rule formalism was (at least in part) a response to a crisis in sociological legitimacy—much like the DSM is thought to have been developed to address psychology’s vulnerability to public and scientific criticism.\textsuperscript{288}

**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.\textsuperscript{289} 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.\textsuperscript{290} 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.\textsuperscript{291}

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.\textsuperscript{292} And disagreement appears to

\begin{itemize}
  \item \textsuperscript{284} See, e.g., Dreyfus, supra note ___, at 74 (“On the whole, the CAFC experiment has worked well for patent law . . . .”).
  \item \textsuperscript{286} Id. at ___ (“Many members of the intellectual property bar . . . . accuse the . . . . court of unpredictability, claiming that results are often panel-dependent . . . .”).
  \item \textsuperscript{287} See Thomas supra note ___, at ___ (describing the rise of adjudicative rule formalism at the Federal Circuit in the late 1990s).
  \item \textsuperscript{288} See infra Part II.A.2.
  \item \textsuperscript{289} See infra Part II.A.1.
  \item \textsuperscript{291} See, e.g., Porter supra note ___, 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”).
  \item \textsuperscript{292} 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).
\end{itemize}
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% in the period between 2005 to 2013.293

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 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 vs. 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.294 And rule formalism did not emerge as a dominant method of decision until 1998. There is reason to believe that the pre-1998 Federal Circuit—which had a relatively stable membership since its inception—had fewer internal divisions than the current Federal Circuit, which has a significant percentage of newcomers.

One final, important feature of codification bears emphasizing: jurisdictional control requires an optimal 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,295 and its description of its own role in patent law as providing a “outer shell”296 to be filled out by the Federal Circuit’s expertise, could be understood as a call for the Federal


294 See infra Part ____.

295 See, e.g., Lee supra note ____, 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).

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

* * *  
These four features of codification present a more complex and nuanced view of how an expert community, and the Federal Circuit in particular, uses rules as a mechanism of jurisdictional competition. 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 complicates data interpretation).

c. Typecasting

Typecasting captures the role of framing in problem-classification and analysis by expert communities. As Part ___ 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.  

For example, doctors are constrained by their abstract knowledge system to conceptualize a broken bone as an ailment of the human body, and to look for solutions and analogies in medical textbooks, not in engineering manuals.  

Yet,

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298 See supra Part ___; see also 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.”).

299 See, e.g., Pedraza-Fariña supra note ___, at 847 (describing resistance from engineers, biologists and funding institutions to an approach to biology that incorporated insights from engineering).
engineering principles turned out to have clear applications to bone repair. 300
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. 301

(1) Typecasting at the Federal Circuit: Tunnel Vision Revisited

Consider the following examples in the evolution of patent law jurisprudence:

(1) In 1980 the Supreme Court issued a decision, Diamond v. Chakrabarty, 302 that many believed ushered in the age of biotechnology. 303 In Chakrabarty, a divided Court held that living organisms engineered in the laboratory were patent eligible. 304 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 40 years. 305

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. 306 Challenging this long-standing view required a new analogy that was readily available to those working with mechanical inventions and within a different patent culture. 307 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. 308 But to engineers and their patent attorneys, microorganisms manipulated in the laboratory could be analogized to physical products made of different parts. 309 Once this new analogy was articulated, it became possible—and even a matter of simple legal logic—to

300 See, e.g., Anne Eisenberg, Replacement Bones, Grown to order in the lab, N.Y. Times (May 27, 2010).
301 See also Joseph Fishman, Creating Around Copyright, HARV. L. REV. (forthcoming 2015) (describing research on creativity that shows that problem-solving is constrained by available, familiar solutions to similar problems—or “prior exemplars”).
303 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 Ists 541, 569 (showing that Chakrabarty was a “critical ruling for commercial biotechnology”) (2001).
304 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.
306 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.” Id. at 117.
307 Id.
308 Id.
309 Id.
think of living organisms not as natural products, but as items manufactured out of chemical subunits.\footnote{10}

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 concerns directly the Federal Circuit and the PTO.

(2) Following the Supreme Court’s decision in \textit{Diamond v. Chakrabarty}, the PTO began granting patents to isolated DNA sequences\footnote{11}—analogizing DNA sequences that had been extracted from an organism to purified chemical compounds, which had long enjoyed patent protection.\footnote{12} 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.\footnote{13} Neither the PTO nor the Federal Circuit appears to have given much consideration to this distinction.\footnote{14} Rather, it was the Southern District of New York in its \textit{Myriad} decision that engaged in a discussion of the implications of the information carrier analogy for the patentability of genes.\footnote{15} The S.D.N.Y. concluded that the DNA-as-information-carrier analogy rendered isolated genes unpatentable products of nature.\footnote{16}

The Federal Circuit considered the \textit{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 \textit{Mayo v. Prometheus}.\footnote{17} As emphasized in Part II.D.2.a(1), an application of the reasoning in \textit{Mayo to Myriad} could have led

\footnote{10} \textit{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.”).
\footnote{12} \textit{See Utility Examination Guidelines}, 66 Fed. Reg. 1092, 1093 (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.”).
\footnote{14} \textit{See, e.g., Ass’n Molec. Pathol. v. Myriad Genetics, Inc., 689 F.3d 1303, (“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. 1092, 1093 (2001) (“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.”).}
\footnote{16} \textit{Id. 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.”)}
\footnote{17} \textit{Mayo v. Prometheus}, 566 U.S. ___ (2012)
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. Under this framing, Judge Lourie concluded, “Mayo does not control the question of patent eligibility.” 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.” 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. Arti Rai has similarly hypothesized that Judge Lourie’s obviousness analysis of DNA-based inventions was influenced by his technical background in chemistry.

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. 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 thus provides a finer-grade description of two types of “tunnel vision” that can afflict an expert court.

d. 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” with his/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. 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

318 See supra Part II.D.2(a)(1).
320 Id.
321 Id.
322 Id., supra note ___, at 218n.64 [Patent Gold Rush] (noting that Judge Lourie has a Ph.D. in Chemistry)
323 Id.
324 Id.
325 See infra Part ___.
326 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).
or practices may require constraining patent entitlements—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. When such cooperation is required—as is, for example, in “wicked problems” that require action across multiple expertises—it will be difficult for expert communities to self-coordinate across multiple expert areas. Instead, coordination will likely require external structuring or incentives.

(1) Coordination Challenges at the Federal Circuit: A Different Type of Tunnel Vision

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. And, as Stuart Benjamin and Arti Rai have recently argued, courts and agencies that regulate innovation are often unaware of each other’s solutions to similar problems.

At a fundamental level, coordination challenges concern the organization of knowledge in isolated communities (or isolated institutions). Trans-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].” This represents a second type of tunnel vision—distinct from typecasting.

328 See infra Part ____.
329 See Pedraza-Fariña, supra note ____, 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 (describing coordination problems arising from knowledge specialization).*
330 See, e.g., Horst Rittell & 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).
331 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)
333 See, e.g., Rai and Benjamin, supra note ____ at 19.
334 Selinger & Seager, supra note ____ at 106.
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.” Dreyfuss’ analysis implied that expanding the Federal Circuit’s jurisdiction to include antitrust cases would correct this imbalance. 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.

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

III. Normative Implications

A. Evaluating Proposals for Federal Circuit Reform

The analysis of the Federal Circuit as an expert community developed above has normative implications for the design of the Federal Circuit, and of expert institutions more broadly. In particular, this section shows how two features of decision-making by expert communities—typecasting and inability to self-coordinate—have normatively undesirable consequences in the context of centralized courts, and how taking them into account can help evaluate proposals for Federal Circuit reform. Specifically, 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, appellate court to hear patent cases. This section closes with an alternative proposal for Federal Circuit design: the use of external advisory panels as a solution to the problems of typecasting and coordination.

335 Dreyfuss, supra note ____, at 54.
336 Id.
337 Gugliuzza, supra [Rethinking] note ____, at 1498.
1. 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 law-makers with the power to alter rules in their favor. Thus, the market for services effectively tests expert communities’ claims that their approach leads to the best results.338

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 (and certainly a goal of courts of appeals)339 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.340 The second is the pull of precedent — once consensus is reached and announced in a judicial opinion, framing devices become sticky. 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. Thus, in the context of a centralized court, typecasting is likely to lead to lower quality decisions, in particular by 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.341 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 has made a similar proposal

338 See, e.g., Abbott supra note ___, at 140 (arguing that “jurisdictional contests are often decided by client choice”).
339 See, e.g., Fischman, supra note ____.
340 Duffy & Nard supra note ___, at 1637.
341 Duffy & Nard supra note ___, at 1629-37.
to decentralize patent appeals.\textsuperscript{342} Hon. Diane Wood’s proposal, however, would allow appellants to choose to file their appeal either with the Federal Circuit or the regional circuit court.\textsuperscript{343} 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).\textsuperscript{344}

Decentralization may also not cure typecasting if the composition of the courts is quite similar (for example, 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.

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 (for example, by appointing more judges with technical expertise in software design, or professional background in antitrust law). But appointing judges with particular technical expertise is likely ill-advised.\textsuperscript{345} The structural constraints of a court of appeals regarding the number of judges (currently thirteen) 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.\textsuperscript{346} 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.\textsuperscript{347}

\textsuperscript{342} Hon. Wood \textit{supra} note \\textsuperscript{343}, at 9.
\textsuperscript{343} \textit{Id}.
\textsuperscript{344} 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. \textit{Id}.
\textsuperscript{346} See, e.g., Pedraza-Fariña, \textit{supra} note \\textsuperscript{344}.
\textsuperscript{347} Collins & Evans \textit{supra} note \textsuperscript{344} at 3.
2. 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. 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 Circuit’s decisions in In re Independent Service Organizations Antitrust Litigation (Xerox), Intergraph, and C.R. Bard—which involved antitrust challenges to a monopolist’s refusals to license or sell products subject to intellectual property protection—antitrust attorneys uniformly criticized the Federal Circuit for giving undue weight to intellectual property considerations at the expense of competition principles embedded in antitrust law. 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. 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. Taken together, these results are consistent with coordination difficulties predicted from the concentration of expertise in particular communities or institutions.

Overcoming coordination difficulties will likely require external incentives or coordination mechanisms. For example, Stuart Benjamin and Arti Rai have recently proposed one such coordination mechanism: the creation of an Office of Innovation hosted within the Executive branch, that

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348 See, e.g., Dreyfus supra note __; Guggliuza supra note __.
352 Boyle, Lister & Everett, Jr., supra note __.
353 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).
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.\footnote{Benjamin and Rai, supra note ___, at 56-58.}

The proposal for an advisory panel described below, however, has the advantage of both ameliorating typecasting and coordination difficulties, while optimizing interdisciplinary expertise with fewer administrative costs—as it would not require the creation of a new institution.

3. External Advisory Panels as a 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 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. Designing an expert institution requires not only understanding its behavior—which has been the main focus of this Article—but also engaging with the content of substantive expertise in that area to reach the most accurate and efficient solutions.

Nevertheless, the model developed here provides some initial guidelines. At a minimum, the distortive effects of typecasting and the difficulties posed by coordination, suggests that a preferable approach to those outlined above would be to house technological and social science expertise outside the federal courts system. The traditional solutions to the problem of expertise—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.\footnote{See Rebecca Haw, Adversarial Economics in Antitrust Litigation: Losing Academic Consensus in the Battle of Experts, NW. U. L. REV. 1261, 1270 (2012).}

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 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,’”\footnote{Kian v. Mirro Aluminum Co., 88 F.R.D. 351, 356 (E.D. Mich. 1980).} 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.

A third solution avoids these concerns with court-appointed and parties-appointed experts: the use of expert advisory panels. Expert panels are widely used to optimize medical decision-making.\footnote{See, e.g., See, e.g., Matthew J. Gabel & Charles R. Shiman, A Social Choice Approach to Expert Consensus Panels, 23 J. OF HEALTH ECON. 543, 544 (2004).} 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.\textsuperscript{358} 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. An advisory panel could provide input on key issues where a blend of economic, sociological, and technical expertise is required, such as pace of innovation in a particular technology area, the knowledge of a PHOSITA, boundaries of analogous arts, and the likelihood of cumulative innovation in a particular field.

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 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.\textsuperscript{359}

Finally, an advisory panel provides an additional advantage: it can 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.

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 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.\textsuperscript{360} 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; (5) Meta-expertise at the


\textsuperscript{359} See Benjamin & Rai, \textit{supra} note ___, 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.”)

\textsuperscript{360} See, e.g., Gabel & Shipan, \textit{supra} note ____.
intersection of these four types of expertise. Because addressing patent law problems requires relying 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 parties and the Federal Circuit to actually use expert panels, and evaluating whether expert panel opinions should also be available to advise District Courts and agencies.

IV. 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 as evidence. 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 argued that any principled discussion of Federal Circuit design requires an understanding of decision-making by expert communities. In particular, it requires addressing three fundamental questions: (1) How does subject-matter specialization or expertise impact the content of judicial decisions? (2) How does subject-matter specialization or expertise impact the form of judicial decisions? (3) 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 five features of decision-making by expert communities. The article demonstrates how these five features explain puzzling aspects of Federal Circuit jurisprudence, such as lack of deference to both the District Courts and the PTO, defiance to Supreme Court decisions, and a preference for rules over standards.

Importantly, the typology has two broader implications. First, it identifies two specific features of expert communities—typecasting and inability to self-coordinate—that are normatively undesirable in the context of a centralized expert court, and provides a framework for evaluating existing proposals for Federal Circuit reform. It concludes that most of these proposals are unable to address distortions in decision-making caused by an expert community’s typecasting and inability to coordinate. As an alternative,

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361 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 could be changed to require specialized or expert courts to appoint expert advisory panels, or to require the Federal Circuit to do so. And professional organizations of scientists, economists, and sociologists could be enlisted to provide help in panel assembly.
it proposes the adoption of expert advisory panels with the necessary complement of economic, social and technological expertise. Second, it provides a novel theoretical lens with which to analyze 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.