

**ANYTHING UNDER THE SUN MADE BY HUMANS:
PATENT LAW DOCTRINES AS ENDOGENOUS
INSTITUTIONS FOR COMMERCIALIZING INNOVATION**

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ABSTRACT

This Essay outlines a comparative institutional analysis among various doctrines in patent law to show how they can have different impacts on the way inventions are commercialized. It builds on a prior body of work about the positive role that property rights in patents can play in commercializing innovation to show how recent shifts in approaches to the particular legal doctrine known as patentable subject matter can be expected to have different effects on the commercialization of inventions than prior approaches. It concludes that, to the extent society wants to increase the overall rate of invention commercialization and increase overall competition as reflected in diversity in firm size among participants in the markets for commercializing innovation, society should consider reversing course on the law of patentable subject matter and return to an approach that is closer to the “anything under the sun made by man” view that was championed by the Supreme Court in the 1980s and by Congress through most of the second half of the twentieth century, updating only its gender biased language.

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INTRODUCTION

This conference volume arises out of the 2012 Randolph W. Thrower Symposium, which is part of the endowed lecture series sponsored by Mr. Thrower’s family and hosted by the *Emory Law Journal* and Emory University School of Law. The 2012 symposium was entitled “Innovation for the Modern Era: Law, Policy, and Legal Practice in a Changing World.” This Essay was presented on the panel entitled “The Role of Institutions in Fostering and Disseminating Technological Innovation” and offers a comparative institutional analysis of different approaches to one of today’s hot topics in modern patent law—the issue of patentable subject matter¹—to elucidate the ways different approaches to institutional design in patent law can have different impacts on the markets for commercializing innovation.

This Essay proceeds as follows: Part I introduces a précis on institutions and their application to intellectual property. Part II highlights some links that can be found between, on the one hand, a patent system’s overall goals and the types of dispute resolution it conducts, and on the other hand, the different relationships these set up between the government and market actors. Part III lays out as a benchmark the “anything under the sun made by man” approach towards patentable subject matter that was featured in the 1952 Patent Act, championed by the Supreme Court in the 1980s, and followed by Congress through most of the second half of the twentieth century,² as well as a

¹ See, e.g., Andrew Pollack, *Justices Send Back Gene Case*, N.Y. TIMES, Mar. 27, 2012, at B1 (describing case about whether technologies relating to genes associated with breast and ovarian cancer are eligible subject matter for patenting); Eduardo Porter, *Tech Suits Endanger Innovation*, N.Y. TIMES, May 30, 2012, at B1 (describing case about whether technologies relating to computer software are eligible subject matter for patenting).

² See *Diamond v. Diehr*, 450 U.S. 175, 182 (1981); *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980); S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952). The historical and revision notes for 35 U.S.C. § 101 state that the 1952 Act expanded the definition of *process* to include a “new use of a known process, machine, manufacture, composition of matter, or material,” 35 U.S.C. § 101 hist. n. (2006), which is highly relevant to many technologies such as software, which is fundamentally about finding new uses for

contrasting more subjective approach the Court again deployed in its most recent cases. This Essay concludes by elucidating some reasons why, to the extent society wants to increase the overall rate of invention commercialization and increase overall competition as reflected in diversity in firm size among participants in the markets for commercializing innovation, society should consider largely returning to the prior approach toward the law of patentable subject matter, updating only its gender biased language.

I. A PRÉCIS ON INSTITUTIONS

In the social sciences, the term *institutions* refers to constraints that are human imposed—laws, rules, norms, and their enforcement characteristics; and the field known as New Institutional Social Sciences, including the narrower field known as New Institutional Economics, studies the nature and degree of the impact that institutions can have on overall economic and social performance.³ Institutions are usually considered to be largely endogenous to a given democratic society—meaning that they are seen as internally generated rather than imposed from outside—because it is generally at least some subset of the people in that society that decides which institutions are implemented.⁴

This Essay outlines a comparative institutional analysis among various doctrines in patent law to show how they can have different impacts on the way inventions are commercialized. It recognizes that one size rarely fits all because different societies have different goals they intend to further within the systems of institutions they implement; that no one approach to furthering any particular set of goals is perfect; and that it may make sense to eliminate patent systems in their entirety. In so doing, this Essay builds on a prior body of work

existing machines (i.e., computers). See Omnibus Consolidated Appropriations Act of 1997, Pub. L. No. 104-208, § 616, 110 Stat. 3009, 3009-67 to -69 (1996) (codified as amended at 35 U.S.C. § 287(c) (2006)) (providing a safe harbor for certain medical methods but declining to exclude them from patentability); American Inventors Protection Act of 1999, Pub. L. No. 106-113, 113 Stat. 1501, 1501A-552 to -57 (codified as amended at 35 U.S.C. § 273 (2006)) (providing a prior user defense for business method patents but declining to exclude them from patentability).

³ For a general discussion of these terms in relation to intellectual property, see F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327, 338-40 (2006); and Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PA. L. REV. 2083, 2083-101 (2009).

⁴ See Stanley L. Engerman & Kenneth L. Sokoloff, *Debating the Role of Institutions in Political and Economic Development: Theory, History, and Findings*, 11 ANN. REV. POL. SCI. 119, 124-25 (2008) (discussing the definition of *institutions* and their endogenous and exogenous origins). In contrast, sometimes laws are imposed largely by outside forces, such as when a society is controlled by a foreign power. For more on endogenous institutions, see *id.*

about the positive role that property rights in patents can play in commercializing innovation.⁵ We show how recent shifts in approaches to the particular laws about what types of subject matter are eligible for patent protection can be expected to have different effects on the commercialization of inventions than prior approaches.

The particular institution that is the focus of this Essay is the area of patent law known as the patentable subject matter requirement, which is distinct from the other more widely known legal requirements for a valid patent, such as novelty, nonobviousness (known outside the United States as inventive step), and adequate disclosure.⁶ The patentable subject matter requirement is an additional requirement that is designed to entirely exclude from patent eligibility particular fields of inventive activity, even if they satisfy those other requirements for patentability.⁷ Common targets of the patentable subject matter requirement include those inventions relating to life, such as biotechnology,⁸ those relating to computers, such as software,⁹ those relating to business, such as financial techniques,¹⁰ and those relating to fun, such as sports moves.¹¹ This area of the law has again become a hot spot, and the Supreme Court recently decided two high-profile cases in it: *Bilski v. Kappos*, involving finance and software, and *Mayo Collaborative Services v. Prometheus Labs*, involving biotechnology.¹²

⁵ See Stephen H. Haber et al., *On the Importance to Economic Success of Property Rights in Finance and Innovation*, 26 WASH. U. J.L. & POL'Y 215 (2008) (surveying recent developments surrounding property rights and their economic impact).

⁶ See 35 U.S.C. § 102 (2006) (amended 2011 and 2012) (setting forth the substantive requirement in patent law for novelty); *id.* §§ 103, 112 (2006) (setting forth the substantive requirements in patent law for nonobviousness and disclosure). For more on all of these requirements, see F. SCOTT KIEFF ET AL., *PRINCIPLES OF PATENT LAW* 154–688 (5th ed. 2011), which discusses disclosure, novelty, and nonobviousness.

⁷ Rebecca S. Eisenberg, *Wisdom of the Ages or Dead-Hand Control? Patentable Subject Matter for Diagnostic Methods After In re Bilski*, 3 CASE W. RES. J.L. TECH. & INTERNET 1, 1 n.2 (2012).

⁸ See Eisenberg, *supra* note 7.

⁹ James Bessen, *A Generation of Software Patents* (Bos. Univ. Sch. of Law, Working Paper No. 11-31, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1868979.

¹⁰ John F. Duffy, *Why Business Method Patents?*, 63 STAN. L. REV. 1247 (2011).

¹¹ F. Scott Kieff et al., *It's Your Turn, but It's My Move: Intellectual Property Protection for Sports "Moves,"* 25 SANTA CLARA COMPUTER & HIGH TECH. L.J. 765 (2008–2009).

¹² *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289 (2012) (regarding a patent on methods for adjusting the dosage of a drug in response to metabolite levels in a patient's blood); *Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (regarding patent on methods for hedging against the risk of price changes in the commodities market). The Court has also vacated and remanded other important subject matter cases to the Federal Circuit to be considered in light of *Mayo*. *E.g.*, *Ass'n for Molecular Pathology v. U.S. Patent & Trademark Office (Myriad II)*, 653 F.3d 1329 (Fed. Cir.), vacated, 132 S. Ct. 1794, remanded to 689 F.3d 1303 (Fed. Cir. 2012) (*Myriad IV*) (regarding patent on BRCA1&2 breast cancer markers in cancer screening); *Ultramercial, LLC v. Hulu, LLC*, 657 F.3d 1323 (Fed. Cir. 2011) (regarding patent on methods of distributing

II. BASIC GOALS FOR A PATENT SYSTEM AND BROAD INSTITUTIONAL DESIGN

While a searching study of patent theory is beyond the scope of this Essay, this Part offers a brief outline of some basic goals and broad institutional features of the patent system to set the stage for the more focused comparative institutional analysis later in the Essay on the topic of patentable subject matter. The discussion in this Part is designed to highlight the types of links that can be found between, on the one hand, a patent system's goals and the types of dispute resolution it conducts, and on the other hand, the different relationships these set up between the government and market actors.

Although patents often are seen as tools that societies use to encourage inventors to invent, significant and politically diverse voices among those studying and implementing the U.S. patent system have instead focused on the role of strong and predictable rules for patent procurement and enforcement in facilitating competition and the commercialization of inventions.¹³ Economic history has taught that a defining feature of the early U.S. patent system that was central to its economic success was the way in which it used a property rights approach to facilitate private ordering.¹⁴ Analysis of legal history reveals that the principal draftsman of the statute that implemented the patent system that operated in the United States from 1952 through the end of the twentieth century was explicit in focusing on the role of the system in facilitating coordination among many diverse market participants in order to commercialize innovation, rather than on getting inventions made.¹⁵ As Abraham Lincoln described it, the patent system “added the fuel of interest to

copyrighted products over the Internet in exchange for viewing an advertisement), *vacated sub nom. Wildtangent, Inc. v. Ultramercial, LLC*, 132 S. Ct. 2431 (2012).

¹³ B. Zorina Khan & Kenneth L. Sokoloff, *History Lessons: The Early Development of Intellectual Property Institutions in the United States*, J. ECON. PERSP., Summer 2001, at 233, 235.

¹⁴ See, e.g., *id.*; Naomi R. Lamoreaux & Kenneth L. Sokoloff, *Intermediaries in the U.S. Market for Technology, 1870–1920*, in FINANCE, INTERMEDIARIES, AND ECONOMIC DEVELOPMENT 209, 210–11 (Stanley L. Engerman et al. eds., 2003).

¹⁵ See Giles S. Rich, *The Relation Between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. & TRADEMARK OFF. SOC'Y 159 (1942), *reprinted in* 14 FED. CIR. B.J. 21, 34 (2004) (part of five-part series of articles written by principal drafter of the 1952 Patent Act). Diverse jurists immediately recognized the power of the 1952 Act in strengthening patents and leading progressives among them championed such strong patents as tools for helping smaller market entrants compete against larger, established firms. See *Reiner v. I. Leon Co.*, 285 F.2d 501, 503 (2d Cir. 1960) (“There can be no doubt that the Act of 1952 meant to change the slow but steady drift of judicial decision that had been hostile to patents . . .”); *Picard v. United Aircraft Corp.*, 128 F.2d 632, 643 (2d Cir. 1942) (Frank, J., concurring) (setting forth views of a well-recognized progressive jurist on the role of predictable rules for patent enforcement in helping a smaller “David” compete with a larger “Goliath”).

the fire of genius, in the discovery *and production* of new and useful things.”¹⁶ As shown through analysis of legal history, this approach to strong patents has enjoyed support across the U.S. political spectrum.¹⁷

While focusing on getting inventions made has much appeal, the difference between the goals of inventing and commercializing reveals some key institutional features of the patent system. Consider that the goal of getting inventions made generally involves the use of targeted incentives that can be provided by a host of alternatives to patents, such as tax credits, prizes, grants, rewards, and the like.¹⁸ Providing these targeted incentives requires an immense amount of information about who exactly should be targeted and how large the incentive should be, and those operating under the regime have strong incentives to seek their own rewards but only weak incentives to provide the information needed to discipline the governmental giver to be more frugal in giving rewards to others.¹⁹ Not only is amassing all of that information hard for the government to do, but it is likely that large, established market actors will be better able than smaller market entrants to wield the powerful political influence needed to get the government to act on that information.

One feature that patents have in contrast with other such rewards is that the patent applicants themselves bring to the government much of the information needed to grant and enforce the patent. The patent applicant does this through the process of submitting and prosecuting their patent applications. In addition, competitors of the patentee and the patentee’s business associates, who are

¹⁶ Abraham Lincoln, Second Lecture on Discoveries and Inventions (Feb. 11, 1859), in 3 THE COLLECTED WORKS OF ABRAHAM LINCOLN 356, 363 (Roy P. Basler ed., 1953) (emphasis added and omitted).

¹⁷ See, e.g., Judge Pauline Newman, *Foreword: The Federal Circuit in Perspective*, 54 AM. U. L. REV. 821, 822–23 (2005) (reviewing history of the 1982 statute designed to strengthen the U.S. patent system and included as a major domestic policy initiative of the Carter Administration before being signed into law by the Reagan Administration); see also Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (codified as amended at 28 U.S.C. § 171 (2006)) (creating the U.S. Court of Federal Claims); The Indus. Advisory Subcomm. on Patent & Info. Policy, *Report on Patent Policy*, in ADVISORY COMMITTEE ON INDUSTRIAL INNOVATION: FINAL REPORT 147, 155 (1979).

¹⁸ See, e.g., Michael Kremer, *Patent Buyouts: A Mechanism for Encouraging Innovation*, 113 Q.J. ECON. 1137 (1998) (suggesting the government buy out patents after conducting an auction to determine an appropriate buyout price to better address these same fields and others); Steven Shavell & Tanguy van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & ECON. 525 (2001) (suggesting government-sponsored cash rewards as partial or full replacements for patents and to better address fields where the disparity between average cost and marginal cost is typically large, citing as examples biotechnology and computer software, which are both focal points in today’s debates about patentable subject matter).

¹⁹ For a general critique of rewards-focused approaches to patents, see F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 705–17 (2001); and Daniel F. Spulber, *Should Business Method Inventions Be Patentable?*, 3 J. LEGAL ANALYSIS 265, 298–304 (2011).

putative patent infringers, bring to the attention of the government the rest of the relevant information needed to evaluate the patent when the patent is asserted against them, in court or during patent office reexamination.²⁰

To be sure, the incentive to invent is well supported by a host of factors that are likely to exist in the absence of a patent system, including invention's famous mother, necessity, as well as innate curiosity and the funding of basic research, each of which is to be celebrated. The point here is to highlight some important benefits that come from having the patent system focus on getting inventions commercialized rather than on only getting inventions made.

Getting an invention commercialized requires coordination of a large number of complementary users of an invention, including venture capitalists, managers, marketers, laborers, and often the owners of other inventions. But getting these diverse actors coordinated is not that difficult when inventions can be patented and those patents can be enforced under systems having relatively low administrative costs and less reliance on flexible discretion over subjective factors. When an inventor has a patent backed up by credible enforcement in court, then that patent can act like a beacon in a dark room to draw to itself all of those interested in that technology and start conversations among them.²¹ As long as the patent is predictably enforced, this beacon effect is followed by a bargain effect because those parties know that only those who strike deals with each other involving the patent can avoid being excluded by the patent in court.²² Through the enforcement of that patent right and those contract rights, the government is able to help patentees and their contracting parties appropriate the returns to any of their rival inputs to developing and commercializing innovation—labor, lab space, capital, etc.—without the government itself having to trace the relative contributions of each participant.²³ This decentralized, ad hoc coordination occurs spontaneously, without the government needing to amass any of the specified information it would need to directly target each of the parties.²⁴ Instead, each party brings its own expertise and other assets to the negotiating table and knows—without necessarily having to reveal it to other parties or the government—enough

²⁰ Kieff, *supra* note 19, at 712.

²¹ F. Scott Kieff, *On Coordinating Transactions in Intellectual Property: A Response to Smith's Delineating Entitlements in Information*, 117 YALE L.J. POCKET PART 101, 102 (2007); *see also* Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1751–52 (2007).

²² *See* Kieff, *supra* note 21, at 102.

²³ *See* Smith, *supra* note 21, at 1745.

²⁴ *Id.* at 1763–65.

about its own level of interest and capability to decide whether to strike a deal or not.

Just like the difference between the societal goals of inventing and commercializing reveals a significant difference in degree with respect to the relationship the government needs to have with market actors to implement a patent system, the difference between using court adjudication and administrative agency examination to assess patents reveals a significant difference in the nature of that same relationship. As explored in more detail in prior work, while court litigation is more expensive and time-consuming, it is also less open to political influence and its link between issues of patent validity and infringement provide important, self-disciplining effects on both patentees and alleged infringers.²⁵ As a result, present trends toward increased reliance on administrative agency proceedings instead of court litigation may be expected to make it harder for new firms to enter and compete in markets. Larger firms are much more likely to bring political influence to bear in agency determinations, which also are less subject to that self-disciplining effect.²⁶

The discussion thus far has offered a thumbnail sketch of two basic choices a society can make about the patent system as an institution: overall goals and types of dispute resolution or enforcement. The particular choices a society makes on both of these basic fronts can tilt the system to favor those large, established market actors who will be better able to wield political influence than smaller market entrants. The discussions that follow will show how a similar anticompetitive effect can be caused by certain approaches to the more legally technical doctrine known as *patentable subject matter*.

III. ALTERNATIVE APPROACHES TO THE PATENTABLE SUBJECT MATTER DOCTRINE

Written against a background in which disputes were known to have arisen about what types of subject matter would even be eligible for patent protection, and in which several types of subject matter had temporarily been ruled out of

²⁵ See F. Scott Kieff, *The Case for Preferring Patent-Validity Litigation over Second-Window Review and Gold-Plated Patents: When One Size Doesn't Fit All, How Could Two Do the Trick?*, 157 U. PA. L. REV. 1937, 1949–50 (2009) [hereinafter Kieff, *The Case for Preferring*]; F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 118–22 (2003) [hereinafter Kieff, *The Case for Registering*].

²⁶ Kieff, *The Case for Preferring*, *supra* note 25, at 1949.

bounds, the 1952 Patent Act explicitly ruled everything in.²⁷ The statute provides in its first provisions (§§ 100 and 101) of the chapter setting forth the substantive requirements for obtaining a patent that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”²⁸ It further defines the term *invention* to mean “invention or discovery,” and the term *process* to mean “process, art or method, [including] a new use of a known process, machine, manufacture, composition of matter, or material.”²⁹ The linguistic work these statutory clauses were set up to accomplish is simple: breadth. That is why the lists are exemplary, not restrictive; the restrictions on obtaining a patent come through the requirements listed elsewhere in the statute. For example, even the mention in this statutory text of the word *new* has not been read to provide any separate novelty requirement beyond the novelty and nonobviousness requirements that are more famously associated with other statutory provisions.³⁰

Despite the plain textual meaning and evident historical context of the 1952 Patent Act, the courts eventually reintroduced the set of subjective limitations on patentable subject matter. The leadoff case in the Supreme Court was the 1972 *Gottschalk v. Benson* decision, in which the Court read in to the patentable subject matter requirement some vague notions of the other substantive patentability requirements that are more generally known: novelty, nonobviousness, and disclosure.³¹ It was followed a few years later by the

²⁷ Kieff, *The Case for Registering*, *supra* note 25, at 106; *see also In re Bilski*, 545 F.3d 943, 985–90 (Fed. Cir. 2008) (en banc) (Newman, J., dissenting), *aff’d sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010); Michael Risch, *America’s First Patents*, 64 FLA. L. REV. 1279, 1286–94 (2012). *But see* Joshua D. Sarnoff, *Patent-Eligible Inventions After Bilski: History and Theory*, 63 HASTINGS L.J. 53 (2011).

²⁸ 35 U.S.C. § 101 (2006).

²⁹ 35 U.S.C. § 100(a)–(b) (amended 2011).

³⁰ *See* P.J. Federico, *Commentary on the New Patent Act*, 35 U.S.C.A. 1 (West 1954), *reprinted in* 75 J. PAT. & TRADEMARK OFF. SOC’Y 161, 178 (1993) (“The general part of the Committee Report states that section 102 ‘may be said to describe the statutory novelty required for patentability, and includes, in effect, an amplification and definition of ‘new’ in section 101.”); *see also In re Bergy*, 596 F.2d 952, 960 (C.C.P.A. 1979) (“Notwithstanding the words ‘new and useful’ in § 101, the invention is not examined under that statute for novelty because that is not the statutory scheme of things or the long-established administrative practice.”), *vacated sub nom. Diamond v. Chakrabarty*, 444 U.S. 1028 (1980).

³¹ 409 U.S. 63 (1972). For example, the Court’s analysis in *Benson* begins by citing to older cases on the radio, telegraph, and telephone—*e.g.*, *MacKay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939); *O’Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853); *The Telephone Cases*, 126 U.S. 1 (1888)—as though they stand for the proposition that a claim may be so abstract and sweeping as to cover both the “known and unknown.” *See Benson*, 409 U.S. at 67–69. But this line of reasoning essentially imports into the patentable subject matter analysis concerns that are addressed by the other substantive patent law requirements of

1978 *Parker v. Flook* decision.³² In *Flook*, the Court was more explicit in reading the novelty, nonobviousness, and disclosure requirements into the patentable subject matter inquiry.³³

The double-dipping approach to the patentable subject matter test the Court used in *Benson* and *Flook* can be problematic because it has often become a highly subjective inquiry that largely turns on a court's own reasoning to determine whether "the patent claims add *enough* . . . to qualify as patent-eligible processes that *apply* natural laws."³⁴ This problem would be exacerbated if, as some advocate, courts were encouraged (or even required) to make determinations on the issue of patentable subject matter a question appropriate for summary, policy-based, discretionary determination at the early phases of a patent litigation, long before a factual record is developed.³⁵ Because courts, like other government organizations, are also subject to political influence, this type of subjective standard leaves them favoring those large, established companies better able to muster the expensive government communications and outreach efforts needed to bring cases to the Supreme Court.³⁶ It has long been recognized in the patent community that the *Benson* decision was the direct result of exactly that type of influence,³⁷ and the several published opinions by the en banc Federal Circuit in the later *Alappat*³⁸ decision make the record explicit while disagreeing with each other over the

novelty, nonobviousness, and disclosure. Furthermore, as Adam Mossoff has shown, such fears about the preclusive effects of these historical patents are far overblown. See Adam Mossoff, *The Rise and Fall of the First American Patent Thicket: The Sewing Machine War of the 1850s*, 53 ARIZ. L. REV. 165, 203–05 (2011).

³² See 437 U.S. 584, 600 (1978) (Stewart, J., dissenting) ("The Court today . . . strikes what seems to me an equally damaging blow at basic principles of patent law by importing into its inquiry under 35 U.S.C. § 101 [regarding patentable subject matter] the criteria of novelty and inventiveness [which is also known as nonobviousness].").

³³ See *id.* at 586, 594 (majority opinion) (requiring an "inventive application" or "inventive concept" and discussing the application's failure to adequately define the input variables of the claimed formula).

³⁴ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1297 (2012).

³⁵ See *MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250, 1264 (Fed. Cir. 2012) (Mayer, J., dissenting) ("The issue of whether a claimed method meets the subject matter eligibility requirements contained in 35 U.S.C. § 101 is an 'antecedent question' that must be addressed before this court can consider whether particular claims are invalid as obvious or anticipated."); *SmartGene, Inc. v. Advanced Biological Labs., SA*, 852 F. Supp. 2d 42, 51 (D.D.C. 2012) (holding that the patent claims were not directed to patentable subject matter and noting that "a 35 U.S.C. § 101 subject matter patentability inquiry is the threshold analysis for determining patent validity").

³⁶ See John F. Duffy, *The Federal Circuit in the Shadow of the Solicitor General*, 78 GEO. WASH. L. REV. 518 (2010) (showing how lobbying efforts before the Solicitor General's Office can influence outcomes in Supreme Court patent cases).

³⁷ See, e.g., *infra* notes 39–40.

³⁸ *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (en banc), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc).

possible nullifying impact of a similar politically influenced process.³⁹ As Judge Rich explained when endeavoring to ascertain the cause and effect of *Benson* in *In re Johnston*:

I find it more significant to contemplate the identities of the troops lined up for battle in *Benson* and observe which side obtained the victory. On the one side was the Government, against patenting programs or software, supported by the collective forces of major hardware (i.e., computer) manufacturers and their representative associations who, for economic reasons, did not want patents granted *on programs* for their machines. On the other side was Benson et al. and their assignee and assorted lawyers and legal groups who were in favor of patent protection for programs or software. The anti-patenting forces won the victory⁴⁰

To be sure, the image to keep in mind is not that courts and other government organizations—or the officials within them—are receiving inappropriate payoffs or other forms of influence. To the contrary, it makes sound sense for government organizations and officials to seek out and receive information about how their actions can best impact society, and interested members of society are exercising a vital First Amendment constitutional right to speak to their government.

The reason for concern is that the result has been reliance on an additional subjective standard that is duplicative of more objective standards embodied in the other substantive patentability requirements that are more generally known, namely novelty, nonobviousness, and disclosure. The addition of this easily influenced test for patentability is what further tilts the playing field in favor of those large, established companies better able to muster the expensive

³⁹ See F. Scott Kieff, *Welcome to Patent Purgatory*, DEFINING IDEAS (June 9, 2011), <http://www.hoover.org/publications/defining-ideas/article/81626>.

The elimination of effective patent protection for computer software through the Supreme Court's 1972 *Benson* decision was the direct result of intensive influence wielded by Nicholas Katzenbach, who became general counsel of IBM in 1969, over the U.S. Department of Justice, which he formerly ran as Attorney General during the Kennedy/Johnson Administration. And a similar influence was applied, albeit ultimately unsuccessfully, during the first Bush [A]dministration, in the lead up to the 1994 appellate court *Alappat* decision. The Patent Office Commissioner had made the decision to reconstitute the office's internal Board of Appeals to hold a rehearing before a specially packed Board designed to reject the patent on a type of software.

Id.

⁴⁰ *In re Johnston*, 502 F.2d 765, 774 (C.C.P.A. 1974) (Rich, J., dissenting), *rev'd sub nom.* *Dann v. Johnston*, 425 U.S. 219 (1976).

government communications and outreach efforts, which has given their voices an outsized effect compared to the voices of smaller, market-challenging competitors.

While the *Benson* and *Flook* approach established a beachhead in the debates about patentable subject matter, the broader view embodied in the 1952 Patent Act successfully pushed back almost immediately. In the 1980 and 1981 decisions in *Diamond v. Chakrabarty* and *Diamond v. Diehr*, the Court rejected efforts to exclude from patentable subject matter inventions relating to biotechnology and software, respectively.⁴¹ In both of these cases, the Court pointed out that “Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’”⁴²

There are good reasons to think that it was this return to the broad view of patentable subject matter that played a crucial role in the relative success of the U.S. markets for both biotechnology and software.⁴³ After the 1980 *Chakrabarty* decision, the U.S. biotechnology sector enjoyed far more certainty about eligibility for patent protection than the same sectors in Europe and Japan, and only in the United States was there remarkable growth in the number of small- and medium-sized biotechnology companies and a drastic increase in the number of new drugs and new medical devices brought to market.⁴⁴ Contrary to the expectations of some commentators, widespread patenting in biotechnology did not lead to a patent thicket or anticommons, nor did it result in significant restrictions on research.⁴⁵ Similarly, while there was

⁴¹ See *Diamond v. Diehr*, 450 U.S. 175 (1981); *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

⁴² *Chakrabarty*, 447 U.S. at 309 (quoting S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952)); accord *Diehr*, 450 U.S. at 182 (quoting S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952)).

⁴³ See *Classen Immunotherapies, Inc. v. Biogen Idec*, 659 F.3d 1057, 1075 (Fed. Cir. 2011) (Rader, C.J., additional views) (discussing how, “with some considerable blame on its eligibility doctrines, Europe lost innovation investment to the United States”); *Ass’n for Molecular Pathology v. U.S. Patent & Trademark Office (Myriad I)*, 653 F.3d 1329, 1368 (Fed. Cir. 2011) (Moore, J., concurring in part) (“This outpouring of scientific creativity, spurred by the patent system, reflects a substantial investment of time and money by the biotechnology industry to obtain property rights related to DNA sequences.”), *vacated sub nom. Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 132 S. Ct. 1794 (2012).

⁴⁴ See Heather Hamme Ramirez, Comment, *Defending the Privatization of Research Tools: An Examination of the “Tragedy of the Anticommons” in Biotechnology Research and Development*, 53 EMORY L.J. 359, 359 (2004) (“Since 1992, the number of biotech patents granted has increased substantially, and the industry has more than tripled in size. New biotech drug and vaccine approvals rose from two in 1982 to thirty-five in 2002.” (footnotes omitted)); see also Kieff, *supra* note 3, at 411–12.

⁴⁵ See Timothy Caulfield et al., *Evidence and Anecdotes: An Analysis of Human Gene Patenting Controversies*, 24 NATURE BIOTECHNOLOGY 1091, 1092 (2006); Richard A. Epstein & Bruce N. Kuhlik, *Is There a Biomedical Anticommons?*, REGULATION, Summer 2004, at 54; Kieff, *supra* note 3, at 391–96; Kieff, *supra* note 21, at 106–09; Mossoff, *supra* note 31, at 168–70. Biotechnology research has also not been

no reliable protection for software patents after *Benson* and *Flook* essentially until after the 1994 *Alappat* decision,⁴⁶ that later period in which software patents enjoyed meaningful protection is when Google arrived with a portfolio of strong patents and trade secrets and soon grew to become Microsoft's largest competitive threat.⁴⁷

Despite the success of the broad approach to patentable subject matter in biotechnology and software, the Supreme Court has recently returned to the narrow approach of *Benson* and *Flook*. In the 2010 *Bilski v. Kappos* decision and the 2012 *Mayo v. Prometheus* decision, the Court again imported into the patentable subject matter inquiry a vague and substantively duplicative version of the novelty, nonobviousness, and disclosure requirements.⁴⁸ Taken together, *Bilski* and *Mayo* create what some have called an “I know it when I see it” test

impeded by aggressive enforcement against researchers. See *Myriad IV*, 689 F.3d 1303, 1331 (Fed. Cir.) (“[P]atents are rarely enforced against scientific research, even during their terms.”), cert. granted in part, 133 S. Ct. 694, 694–95 (2012). The recent *Myriad* and *Mayo* cases involved commercial competitors rather than scientists engaged in basic research, and in *Myriad* the patent challengers had to provoke a dispute via a declaratory judgment action. See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1296 (2012); *Myriad I*, 653 F.3d at 1345, 1348.

⁴⁶ *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (en banc), abrogated by *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc).

⁴⁷ According to its own patent information database, Google is the original assignee of over 730 U.S. patents. See *Advanced Patent Search*, GOOGLE, http://www.google.com/advanced_patent_search (last visited Feb. 9, 2013). The number of patents was determined by searching the database for issued patents where Google is the original assignee. U.S. Patent 6,285,999, the patent on PageRank, the foundational algorithm for Google's search technology, is owned by Stanford University and exclusively licensed to Google. See U.S. Patent No. 6,285,999 (filed Jan. 9, 1998); Richard Brandt, *Starting Up: How Google Got Its Groove*, STANFORD MAG., http://alumni.stanford.edu/get/page/magazine/article/?article_id=35436 (last visited May 28, 2013). In 2012 Google obtained 17,000 patents as part of its acquisition of Motorola Mobility. Steve Lohr, *On Google, F.T.C. Set Rules of War over Patents*, N.Y. TIMES, Jan. 5, 2013, at B1. While Google recently committed to antitrust authorities to limit its own ability to enforce those newly acquired patents to the extent they are subject to enforceable commitments to be licensed on fair, reasonable, and nondiscriminatory (FRAND) terms, that new commitment does not appear to reach all of the newly acquired patents or any of the patents within Google's treasure trove of original patents on search. *In re Motorola Mobility LLC*, No. 1210120, at 4, 7 (Jan. 3, 2013), <http://www.ftc.gov/os/caselist/1210120/130103googlemotorolado.pdf>. Furthermore, such a high-profile case imposing limits on enforceability of FRAND-related patents may set a precedent that plays out to the advantage of Google and other large companies when defending against patent infringement allegations.

⁴⁸ See *Mayo*, 132 S. Ct. at 1302 (stating that broad claims foreclose future invention and tie up future use of laws of nature); *id.* at 1297 (stating claims must “add enough to their statements of the correlations to allow the processes they describe to qualify as patent-eligible processes that apply natural laws”); *Bilski v. Kappos*, 130 S. Ct. 3218, 3229 (2010) (plurality opinion) (discussing the need to set a higher bar for patentable subject matter because some business method patents are vague and of “suspect validity”); *id.* at 3231 (majority opinion) (holding the claimed invention patent ineligible because its claims were overbroad and relied on a “long prevalent” economic practice and “well-known . . . techniques”).

for patent eligibility.⁴⁹ If these new precedents play out that way, then the test for patentable subject matter may have again become subject to the influence of larger, more-established industrial parties due to their ability to better communicate with agencies like the Patent Office and courts, including the Supreme Court.

CONCLUSION

There are several possible consequences of the Court's return to a narrow view of patentable subject matter. For example, the restriction on the patentability of financial and business methods may constrain the commercialization of new technologies and lead to a loss of the economic efficiency that could be provided if new business methods were commercialized more rapidly and broadly.⁵⁰

A more immediate consequence may have been a decline in the value of biotechnology companies.⁵¹ This may suggest a similar effect will be seen for companies that rely on business method and software patents. This decline in value may be exacerbated by a decrease in venture capital funding.⁵² Given that venture capital funding is correlated with patenting,⁵³ this may result in an overall decrease in investment in new technologies and their commercialization.

Weaker patents also tend to give more power to large, established companies at the expense of smaller companies, startups, and individual inventors.⁵⁴ Combined with an overall trend toward consolidation in these industries,⁵⁵ this may have significant anticompetitive effects.⁵⁶ A potential

⁴⁹ Kevin Emerson Collins, *Bilski and the Ambiguity of "an Unpatentable Abstract Idea,"* 15 LEWIS & CLARK L. REV. 37, 39 (2011).

⁵⁰ Spulber, *supra* note 19, at 287–88.

⁵¹ See, e.g., Brent Kendall et al., *Top Court Decision Alarms Biotechs*, WALL ST. J., Mar. 21, 2012, at A1 (reporting a 5.2% drop in the value of Myriad Genetics stock out of concern that its patents could be invalidated in the wake of *Myo*).

⁵² Jonathan D. Rockoff & Pui-Wing Tam, *Biotech Funding Gets Harder to Find*, WALL ST. J., Mar. 19, 2012, at B1.

⁵³ Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1281 (2009).

⁵⁴ See *Picard v. United Aircraft Corp.*, 128 F.2d 632, 643 (2d Cir. 1942) (Frank, J., concurring); Kieff, *supra* note 3, at 411; Kieff, *supra* note 21, at 105.

⁵⁵ See, e.g., Cyrus Sanati, *A Different Kind of Drug Deal*, N.Y. TIMES DEALBOOK (Apr. 17, 2009, 7:10 AM), <http://dealbook.nytimes.com/2009/04/17/a-different-kind-of-drug-deal/> (reporting on the rapid consolidation in the pharmaceutical industry).

consequence may be lower rates of commercializing innovation and higher prices as larger companies no longer feel as much pressure from an already reduced number of new market entrants. Returning to a broad view of patentable subject matter may significantly mitigate such risks.

⁵⁶ See, e.g., Richard A. Epstein et al., *The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination*, 8 J. COMPETITION L. & ECON. 1, 2 (2012) (exploring example of an administrative agency applying subjective tests for various patent-related issues. in a way that ends up substituting a small likelihood of a small hold up effect caused by property rights in patents with a large likelihood of a large hold up effect caused by the government in coordination with large market participants to the disadvantage of market entrants).